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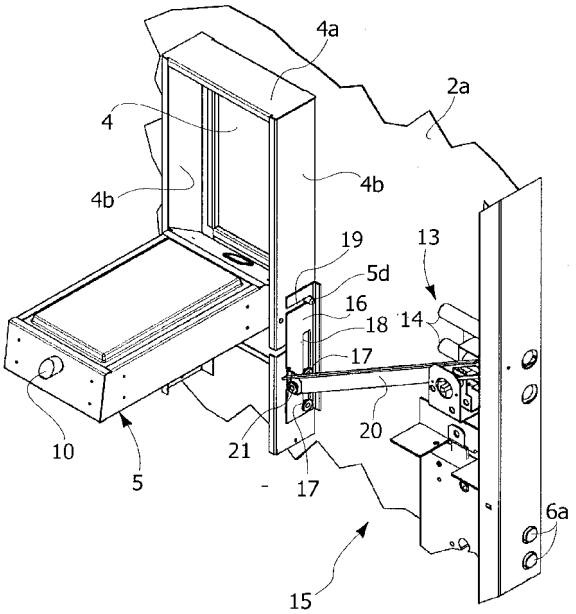
(54) Safety device for doors

(57) A Safety device for doors comprises a door panel (2a) having an opening (4) to allow a user on one side of the door (for example inside a house) communication with the other side and/or exchange of envelopes, packages or the like. Associated to the opening (4) is a lid mounted articulated between a closed position and an open position. The door is provided with an additional bolt (13), borne by the door panel and moveable between a release position and a lock position. Interposed between such bolt and lid is a mechanical transmission (15) suitable to cause the automatic movement of the bolt from its release position to its lock position when the lid (5) is opened, as well as maintain the bolt in its lock position when the lid is closed once again. Provided for is a device for unlocking the bolt, borne by the door panel (2a) and accessible from outside the door by means of a safety key (9). Such unlocking device is suitable to decouple the bolt (13) from the abovementioned mechanical transmission (15) connected to the lid in such a manner to allow moving the bolt from its lock position to its release position, without influencing the transmission connected to the lid.

FIG. 6



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Description

[0001] The following invention regards a safety device for doors, of the type comprising:

- a door panel having an opening to allow a user on one side of the door communication with the other side and/or exchange of envelopes, packages or the like,
- a lid associated to said opening, mounted articulated against the door panel between a closed position and an open position ,
- a bolt borne by the door panel and moveable between a position for releasing and position for locking the door on a fixed framework of the door, and
- a mechanical transmission interposed between the lid and the bolt suitable to cause the automatic movement of the bolt from its release position to its lock position when the lid is opened, as well as maintain the bolt in its lock position when the lid is closed once again.

[0002] A safety device having the characteristics outlined above formed an object of the Italian patent application T02006A000797.

[0003] The object of the present invention is that of further improving the device illustrated in the abovementioned patent application, in terms of construction simplicity and operating reliability, as well as safety and comfort of use for the user.

[0004] In order to attain such object, the invention aims at providing a safety device for doors having all the characteristics indicated above and further characterised in that said device further comprises means for unlocking the bolt, borne by the door panel and accessible from outside the door by means of safety keys, said unlocking means being suitable to decouple the bolt from the abovementioned mechanical transmission and move the bolt from its lock position to its release position.

[0005] In the preferred embodiment of the invention, the mechanical transmission interposed between the lid and the safety bolt comprises a first element mounted sliding vertically with respect to such door panel and operatively connected to the lid in such a manner that the opening of the lid causes the movement of such first element from a lowered position to a raised position. Furthermore, the mechanical transmission includes a second element made up of an arm articulated to an end at the abovementioned first element and connected by means of a pin-slot coupling to its opposite end with the mechanism of the bolt, in such a manner to cause movement thereof from the release position to the lock position when the lid is opened. The abovementioned pin-slot coupling allows the abovementioned articulated arm to return to its initial position when the lid is closed again, even though the bolt is maintained at its locked position.

[0006] Still in the case of the abovementioned preferred embodiment, the abovementioned safety means for unlocking the bolt have a pin for actuating the bolt, mounted rotating in the door panel and operatively connected also with the abovementioned mechanical transmission linked to the lid. Such pin may be moved axially (from outside the door by means of a coded safety key or from inside the door by means of a knob) in such a manner to decouple it from the abovementioned mechanical transmission, hence a subsequent rotation imparted to the pin allows opening the bolt even though the lid of the door is in the closed condition thereof.

[0007] Further characteristics and advantages of the invention shall be clear from the following description with reference to the attached drawings, strictly provided for exemplifying and non-limiting purposes, wherein:

- figure 1 is a perspective view of a door provided with a safety device according to the invention,
- figures 2-4 is a front elevation view, a rear elevation view and a side view of the door of figure 1, with the lid at the open position ,
- figure 5 is a front view of the inner side of the outer panel of the door according to the invention, with the lid at closed position,
- figure 6 is a perspective view in enlarged scale of the inner structure of the door, which shows the safety device according to the invention,
- figure 7 is an exploded perspective view of the unit illustrated in figure 6,
- figures 8, 9 illustrate a part of the safety device according to the invention, respectively in the lid closed and lid open conditions,
- figures 10, 11 are perspective views illustrating a further part of the safety device according to the invention respectively in the lid closed and lid open conditions,
- figure 12 is a perspective view of the bolt unit part of the safety device according to the invention, and
- figure 13 is a sectional view - in horizontal plane - of the structure of the door showing the structure of the unit of figure 12.

[0008] In figure 1, a house door, in the specific case an armoured door, including a structure 2 mounted on hinges (not illustrated) borne by a fixed framework of the door 3, is indicated in its entirety with reference number 1.

[0009] The structure 2 of the door comprises an outer panel 2a and an inner panel 2b (see figure 13), both made of a metal sheet, and preferably covered on the exposed surface with finishing panels, for example wooden panels or panels made of other materials.

[0010] The safety device is intended to be associated to a door having a large opening 4 allowing the user who is on the inner side of the door to communicate with the external environment and/or exchange of envelopes, packages or the like, according to the example of figure 1. Obviously, the size of the opening 4 and positioning thereof with respect to the door panel may vary, depending on the specific needs of the user. In particular, the

opening may be positioned at human height or lower height, should the user for example be a disabled person on a wheelchair.

[0011] As observable in the drawings, the safety device according to the invention comprises a lid 5 associated to the opening 4 and mounted articulated against the door panel in such a manner to be moveable between a closed position and an open position.

[0012] Referring to figures 1-4, the door 1 of the specific illustrated example also comprises, in a per se known manner, a safety lock 6 actuatable by means of a key both on the inner side and the outer side of the door and a handle 7 provided on each side of the door for the actuation of the latch bolt. It is clear that such solution is illustrated strictly for exemplifying purposes and that any different configuration of the door may be applied, without jeopardizing the possibility of applying the safety device of the invention.

[0013] The lock 6 actuates a main bolt of the traditional type, comprising for example a plurality of bolt pins 6a (partially observable in figure 2, wherein they are illustrated in the condition retracted into the door) which cooperate with corresponding seats in the fixed framework 3 of the door to hold the door in the closed condition.

[0014] As observable in figures 2, 3 the invention further provides for a knob 8 on the inner side of the door and a safety lock 9 at a corresponding position on the outer side of the door, which form an object of the safety device according to the invention and whose function shall be illustrated in detail hereinafter.

[0015] Referring to figures 5, 6, the communication opening 4 is delimited by an upper panel 4a, two side panels 4b and a lower panel 4c (see figure 7) all made of metal sheet and joined to the sheet panel 2a, for example by welding. Also the lid 5 has a box-shaped structure made of metal sheet and it is mounted articulated adjacent to its lower edge to a horizontal axis 5a by means of articulation pins 5b (figure 7) which engage corresponding holes 5c (one of which is observable in figure 7) obtained in the side walls of the lid 5. At its lower end, beneath its articulation axis, the lid 5 is further provided with two projecting side pins 5a (only one of which is observable in figure 7) which are guided into arched slots 4d obtained in the side panels 4b. The upper ends of the two arched slots 4d serve as stop elements for the side pins 5a, in such a manner to define the open position of the lid 5, wherein it projects horizontally cantilevered inwards the door, as observable for example in figure 4 and 6. On its upper edge, the lid 5 is further provided with a latch 10 cooperating with a seat 11 obtained in the upper panel 4a (see figure 7) for the engagement of the lid at its closed position. On its inner side, the lid 5 is further provided with a knob grip 12 useable both to grasp the lid, to control the disengagement of the latch 11 to open the lid.

[0016] The safety device according to the invention comprises an additional bolt unit 13 (see figures 6, 7) with respect to the aforementioned conventional bolt pins 6a the armoured door is provided with. The bolt unit 13 is borne by the sheet panel 2a and it has one or more bolt pins 14 (provided for in the illustrated example are two pins 14) moveable between a release position, retracted into the structure of the door, and an extracted position for blocking the door, wherein corresponding seats (not illustrated) of fixed framework 3 of the door are engaged.

[0017] The safety device according to the invention comprises a mechanical transmission, indicated in its entirety with 15 in figure 6, interposed between the lid 5 and the bolt unit 13, suitable to automatically cause the movement of the bolt pins 14 from their door release position to their door lock position when the lid 5 is moved from its closed position to its open position.

[0018] In the case of the preferred embodiment illustrated herein, the mechanical transmission 15 comprises a first transmission element 16 made up of a sheet plate mounted vertically sliding with respect to the door panel (specifically through pins 17 fixed to one of the two panels 4b that are engaged into a vertical slot 18 of the plate 16). The plate 16 also has a horizontal slot 19 into which one of the two pins 5a of the lid 5 is engaged in such a manner that as better illustrated in figures 8, 9, the movement of the lid 5 from its closed position to its open position causes a corresponding movement of the plate 16 from a lowered position to a raised position.

[0019] Referring to figures 6-11, the mechanical transmission 15 further comprises a second transmission element made up of an articulated arm 20, which in the illustrated example is in form of a flat rod made of metal sheet. The rod 20 has an end 21 articulated to a tab of the plate 16 around an orthogonal axis with respect to the general plane of the door panel. At its opposite end, the rod 20 bears a longitudinal slot 22 slidingly engaged in which is a pin 23. As clearly observable particularly in figures 11 and 13, the pin 23 is mounted at the external end of a flat handle lever 24, which is rotationally coupled on a square-shaped portion 25 of a pin 26 for actuating the bolt. The pin 26 is rotationally mounted in the structure of the bolt unit 13. Figure 13 of the attached drawings shows a cross-section of the structure of the door with the panel 2a, further panel 2b arranged on the inner side of the door and the structure made of metal sheet 27 which forms the casing of the bolt unit 13. A rotation of the actuation pin 26 controls the movement of the bolt pins 14 through a further handle lever 28 (see figure 11) which is keyed on the pin 26 and it has its opposite end operatively connected to a plate integrally joined to the bolt pins 14, in such a manner that the rotation of the pin 26 causes the axial movement of the pins 14 between their release and lock positions. Still as illustrated in figure 13, the rotation of the pin 26 may be controlled from inside the door through the knob 8 or from outside the door by accessing to a end bit 30 mounted on the pin 26, through the safety lock 9. The drawings show only the external protection element, or "defender", which accommodates the safety lock therein, which can be of any known type.

Preferably the safety lock is of the key type encoded by means of a magnet.

[0020] During use, when the lid 5 is moved from its closed position to its open position, the movement of the lid causes the raising of the plate 16 and an ensuing movement of the rod 20 from the position illustrated in figure 10 to the position illustrated in figure 11. In such condition, the pin 23 is at contact with the innermost end of the slot 22, hence the movement of the rod causes a clockwise rotation (with reference to the drawings) of the lever 24 and hence, the rotation of the actuation pin 26 thus determining the automatic movement of the pins 14 from the retracted release position to the extracted locking position (figure 11).

[0021] Therefore, when the user opens the lid to communicate with the environment external to the door, the bolt 13 is automatically activated as a further safety measure for the user. Should the lid be closed again after opening, such movement occurs without modifying the condition of the bolt 13, which remains in its locked condition. As a matter of fact, in such step the rod 20 may recede to its initial position due to the sliding of the slot 22 leftwards, with respect to the pin 23, starting from the condition illustrated in figure 11. The deactivation of the bolt 13 may be obtained only intentionally at that point by the user operating from inside through the knob 8 or from outside the door after access to the end bit 30 through the lock 9. In such condition, the actuation pin 26 shall first be moved axially by the user (by applying pressure on the end bit 30, or by pulling the knob 29) in such a manner to axially move the square-shaped portion 25 (figure 11) with respect to the lever 24, in such a manner to move a circular section of the pin 26 into the hole obtained in such lever. In such condition, the pin may be rotated, so as to actuate the bolt 13, without influencing the position of the rod 20 in any manner whatsoever, given that the pin is decoupled with respect to the lever 24. The axial pressure action on the pin 26 is obtained by overcoming the elastic force of a return spring 32, which is associated to the end bit 30 (figure 13).

[0022] As clear from the description above, the safety device according to the invention represents a considerable improvement with respect to the devices of the prior art in terms of safety, operating reliability, construction simplicity, efficiency and comfort of use for the user.

[0023] Obviously, without prejudice to the principle of the invention, construction details and embodiments, may widely vary with respect to the description and illustration strictly provided for exemplifying purposes, without departing from the scope of protection of the present invention.

Claims

1. Safety device for doors, comprising:

- a door panel (2a) having an opening (4) to allow a user on one side of the door communication with the other side and/or exchange of envelopes, packages or the like,
- a lid (5) associated to said opening (4), and mounted articulated between a closed position and an open position ,
- a bolt (13) borne by the door panel (2a) and moveable between a position for releasing and a position for locking the door on a fixed framework (3) of the door, and
- a mechanical transmission (25) interposed between the lid (5) of the bolt (13) suitable to cause the automatic movement of the bolt (13) from its release position to its lock position when the lid (5) is opened, as well as maintain the bolt (13) in its lock position when the lid (5) is closed once again,

characterised in that said device further comprises means for unlocking the bolt (26), borne by the door panel (2a) and accessible from outside the door by means of safety keys (9), said unlocking means (26) being suitable to decouple the bolt (13) from the abovementioned mechanical transmission (15) and move the bolt from its lock position to its release position.

2. Safety device for doors according to claim 1, **characterised in that** the abovementioned mechanical transmission comprises:

- a first transmission element (16) mounted sliding vertically with respect to the door panel (2a) and operatively connected to the lid (5) in such a manner to move from a raised position to a lowered position when the lid (5) is moved from its closed position to its open position , and
- a second transmission element (20) which is interposed between the abovementioned first transmission element (16) and a lever (24) for actuating the bolt (13).

3. Safety device for doors according to claim 2, **characterised in that** said actuation lever (24) is coupled on a square-shaped portion (25) of a pin (26) for actuating the bolt (13) rotationally mounted on the structure of the door panel (2a), said pin (26) being accessible both from inside the door, through a knob (8), and from outside the door, through the abovementioned safety key (9), said actuation pin (26) being further moveable axially, against the action of elastic means (32), to decouple the abovementioned square-shaped portion (25) from the abovementioned actuation lever (24) in such a manner to interrupt the connection between the actuation pin (26) and the abovementioned mechanical transmission, so as to allow the actuation of the bolt (13) through said knob (8) from the inner side of the door or

through said safety key (9) from the outer side of the door, without such actuation influencing the transmission (15) connected to the lid (5).

4. Safety device for doors according to claim 1, **characterised in that** said lid (5) is mounted articulated around a horizontal axis (5a) adjacent to its lower end and it has two laterally projecting pins (5d) located beneath the articulation axis and slidingly engaged in two arched slots (4d) obtained in walls (4b) fixed with respect to the door panel (2a) suitable to define a stop position for the movement of opening the lid (5), wherein the latter projects horizontally cantilevered inwards the door.

5. Safety device for doors according to claim 4, **characterised in that** said first transmission element (16) is made up of a plate slidingly mounted on a side wall (4b) fixed to the door panel (2a) beside the abovementioned opening (4), said plate (16) having a horizontal slot (19) into which one of the abovementioned projecting side pins (5d) of the lid (5) is engaged, in such a manner that the movement of said side pin (5d) in the abovementioned arched slot (4d), upon the movement of the lid, causes a corresponding vertical movement of the abovementioned plate (16).

6. Safety device for doors according to claim 5, **characterised in that** the abovementioned second transmission element (20) is in form of a rod having an end articulated to the abovementioned plate (16) around an orthogonal axis with respect to the general plane of the door and the opposite end bearing a slot (22) into which a pin (23) is engaged borne at the external end abovementioned actuation lever (24).

FIG. 1

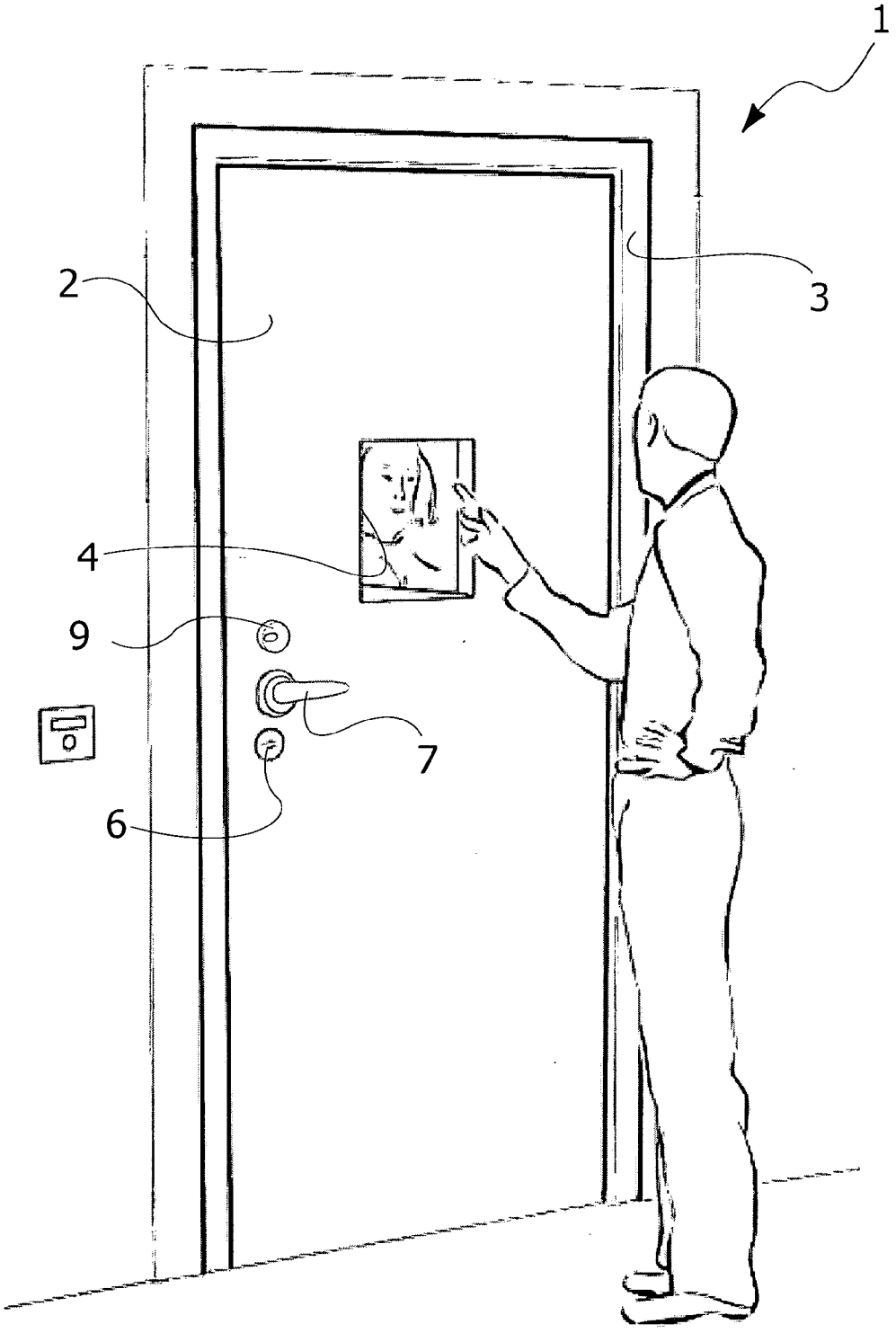


FIG. 2

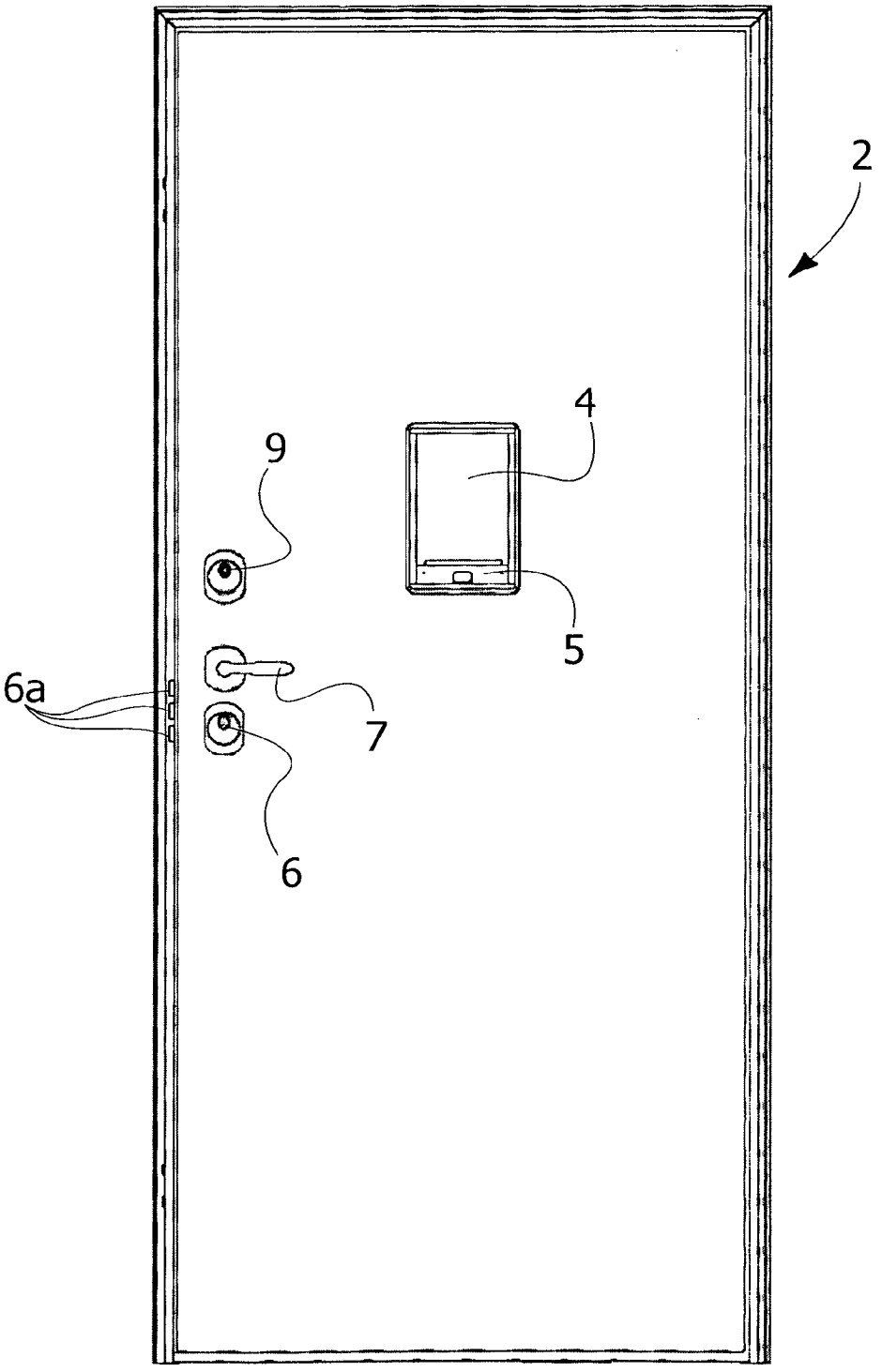


FIG. 3

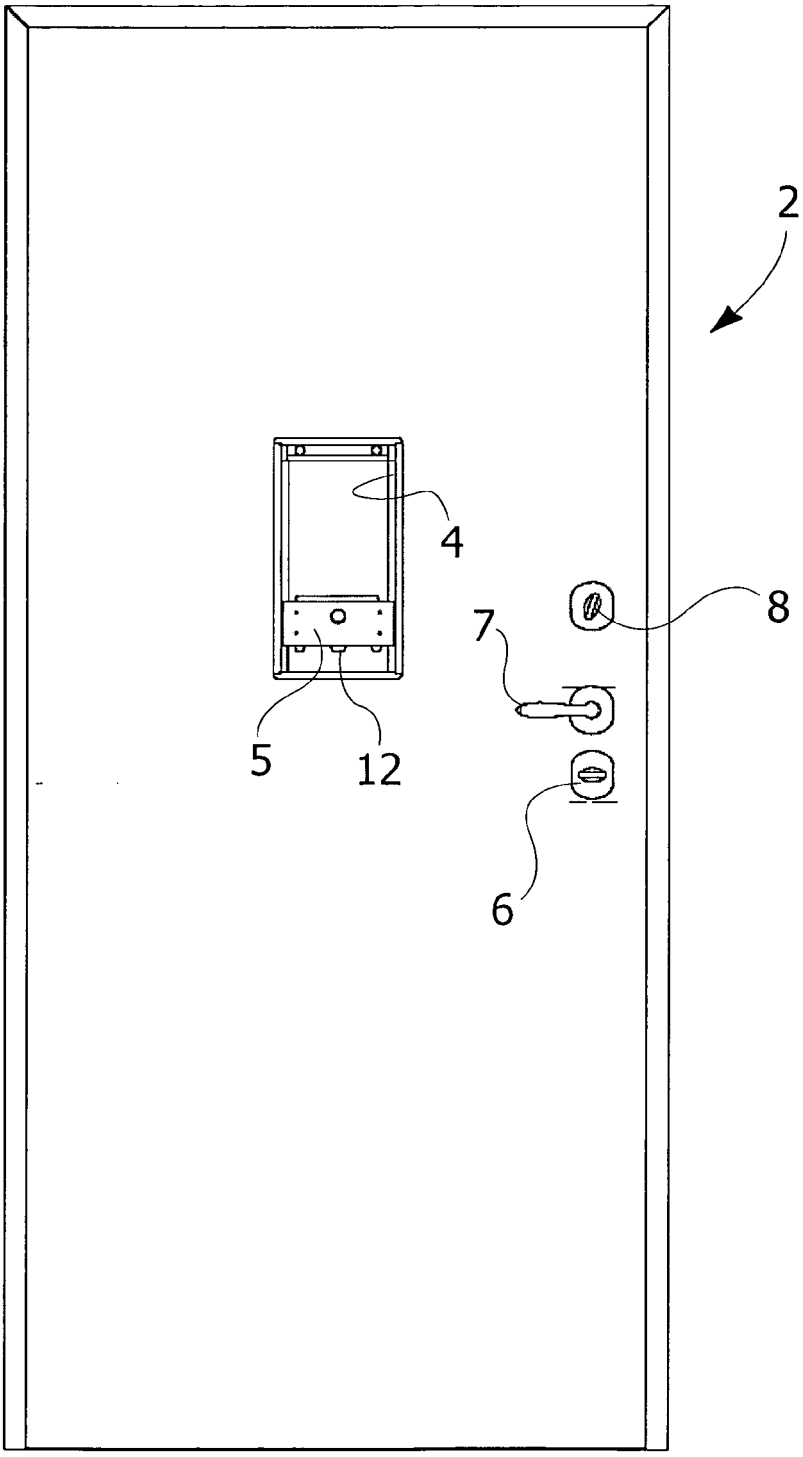


FIG. 4

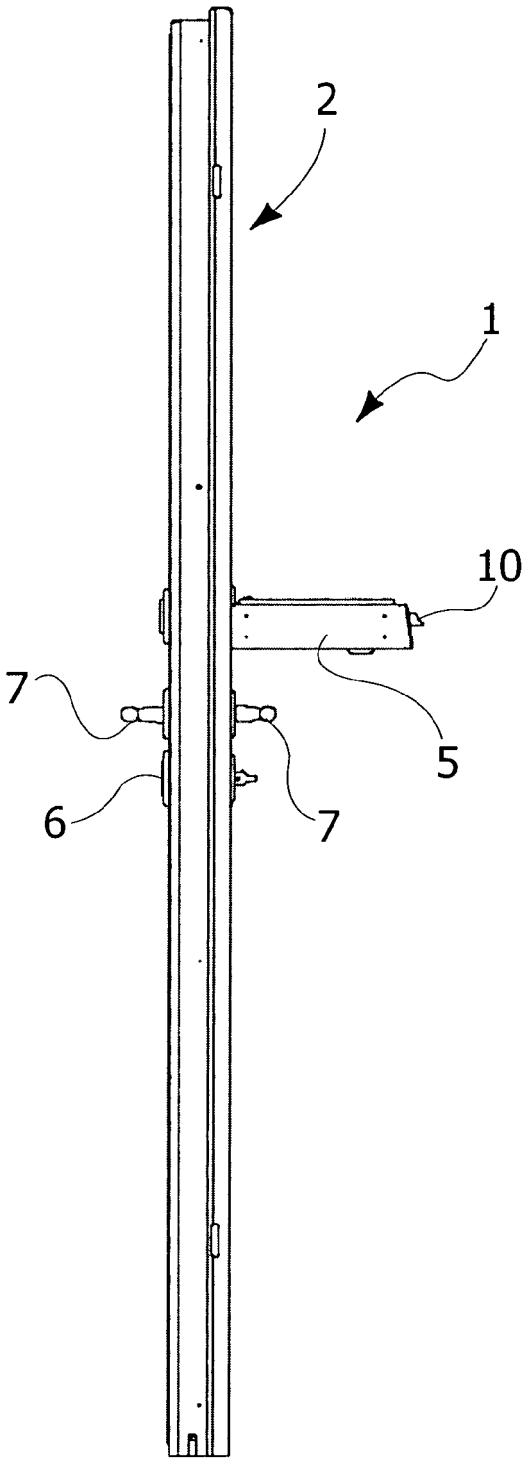


FIG. 5

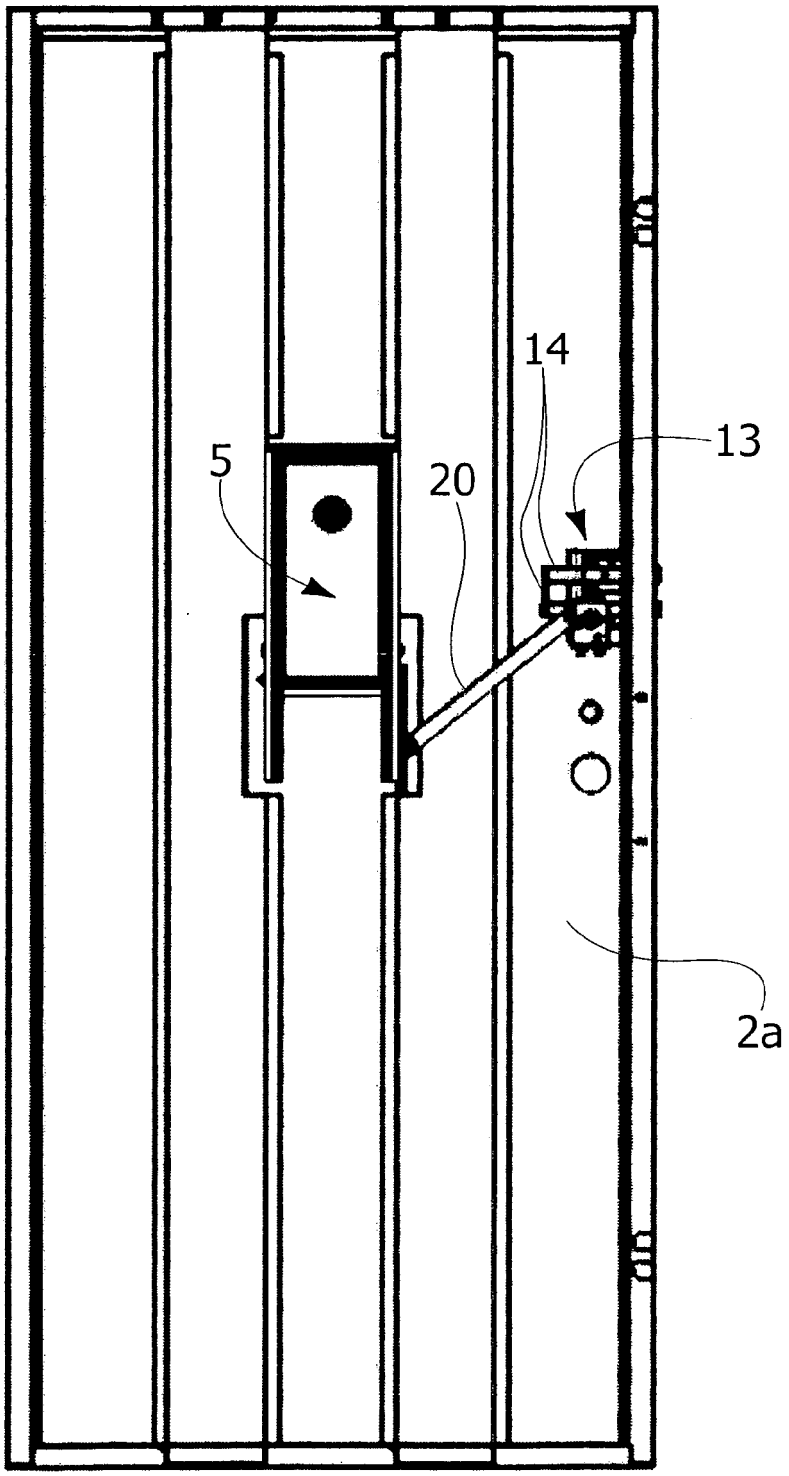
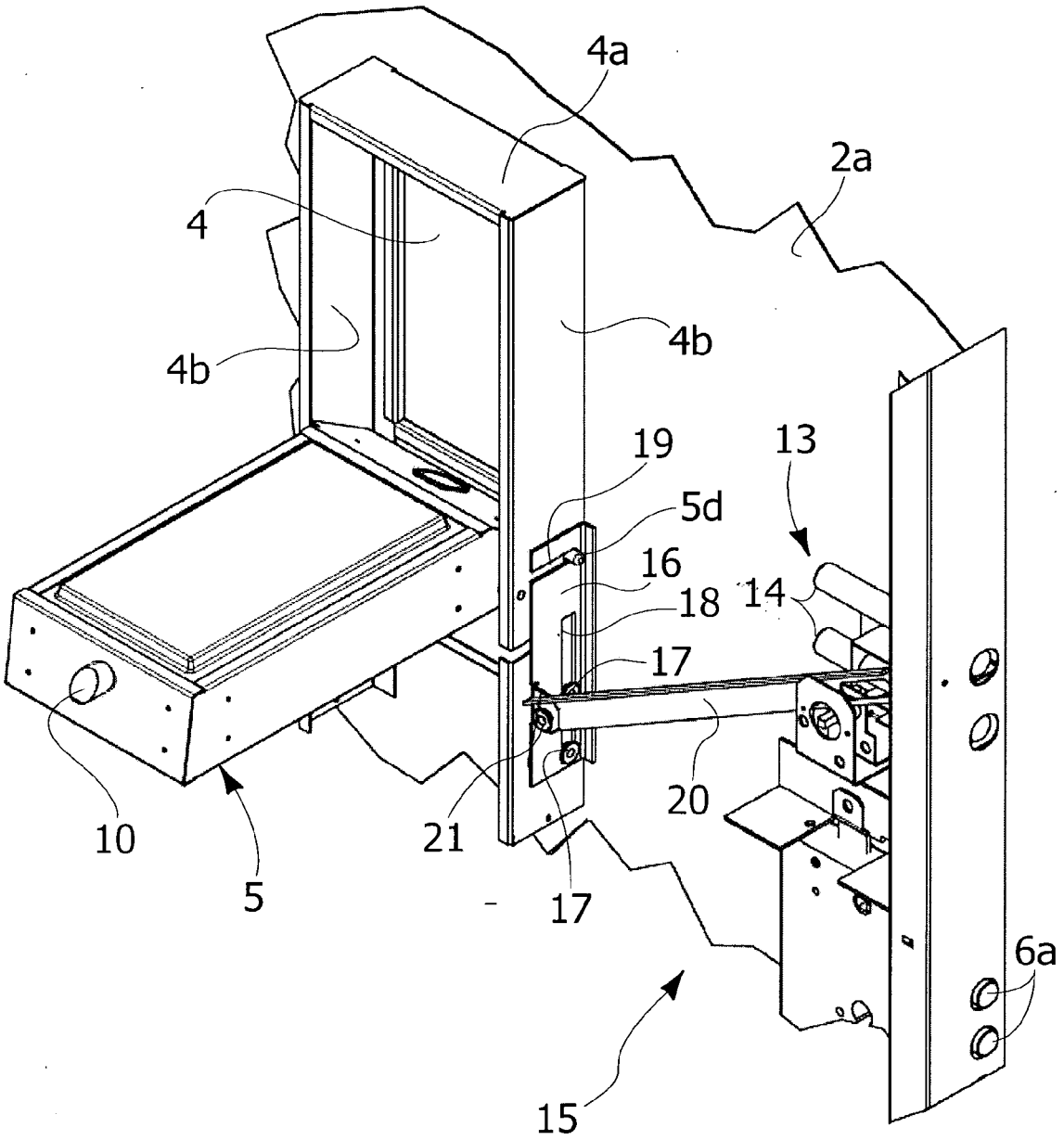


FIG. 6



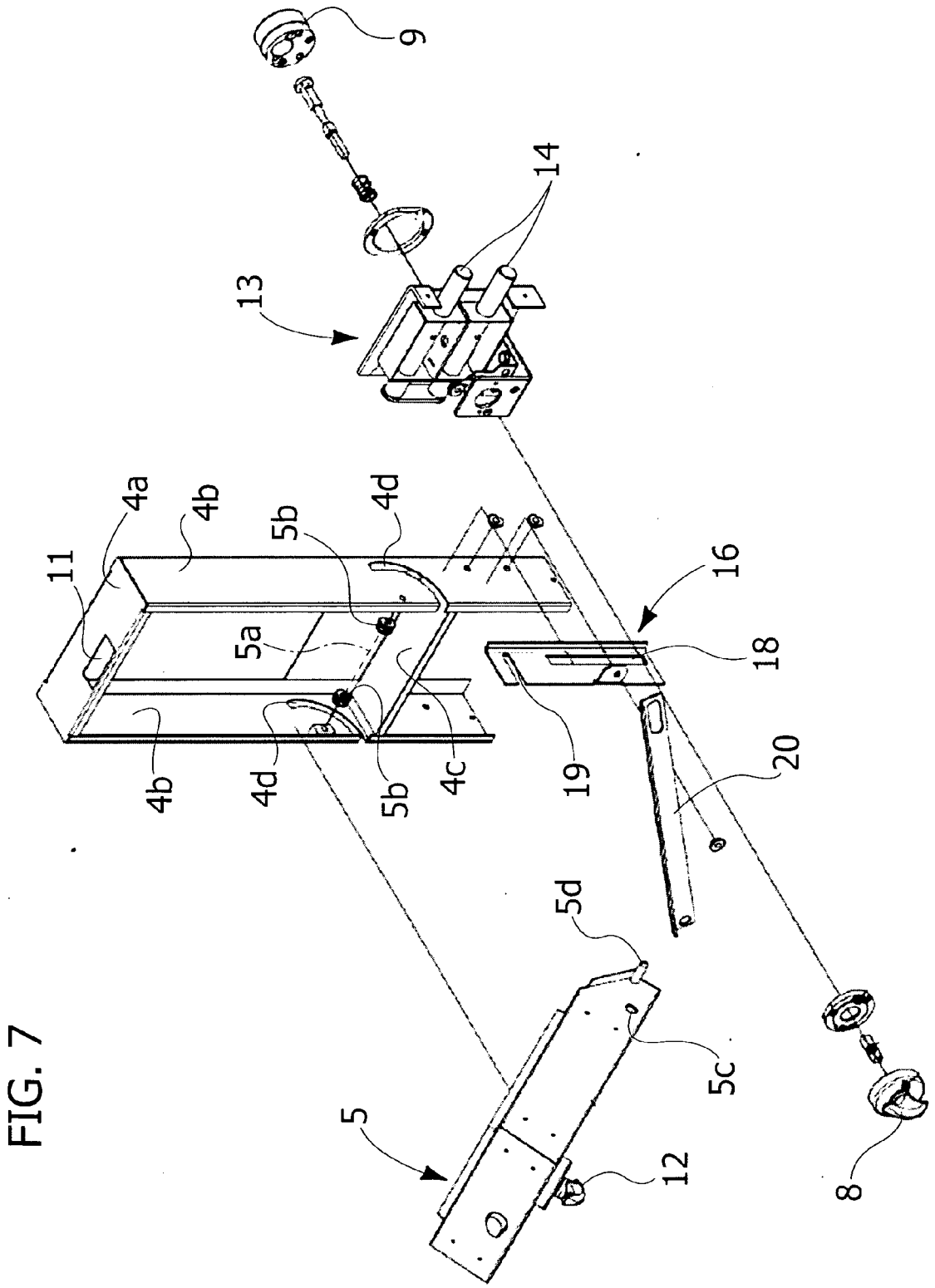


FIG. 7

FIG. 8

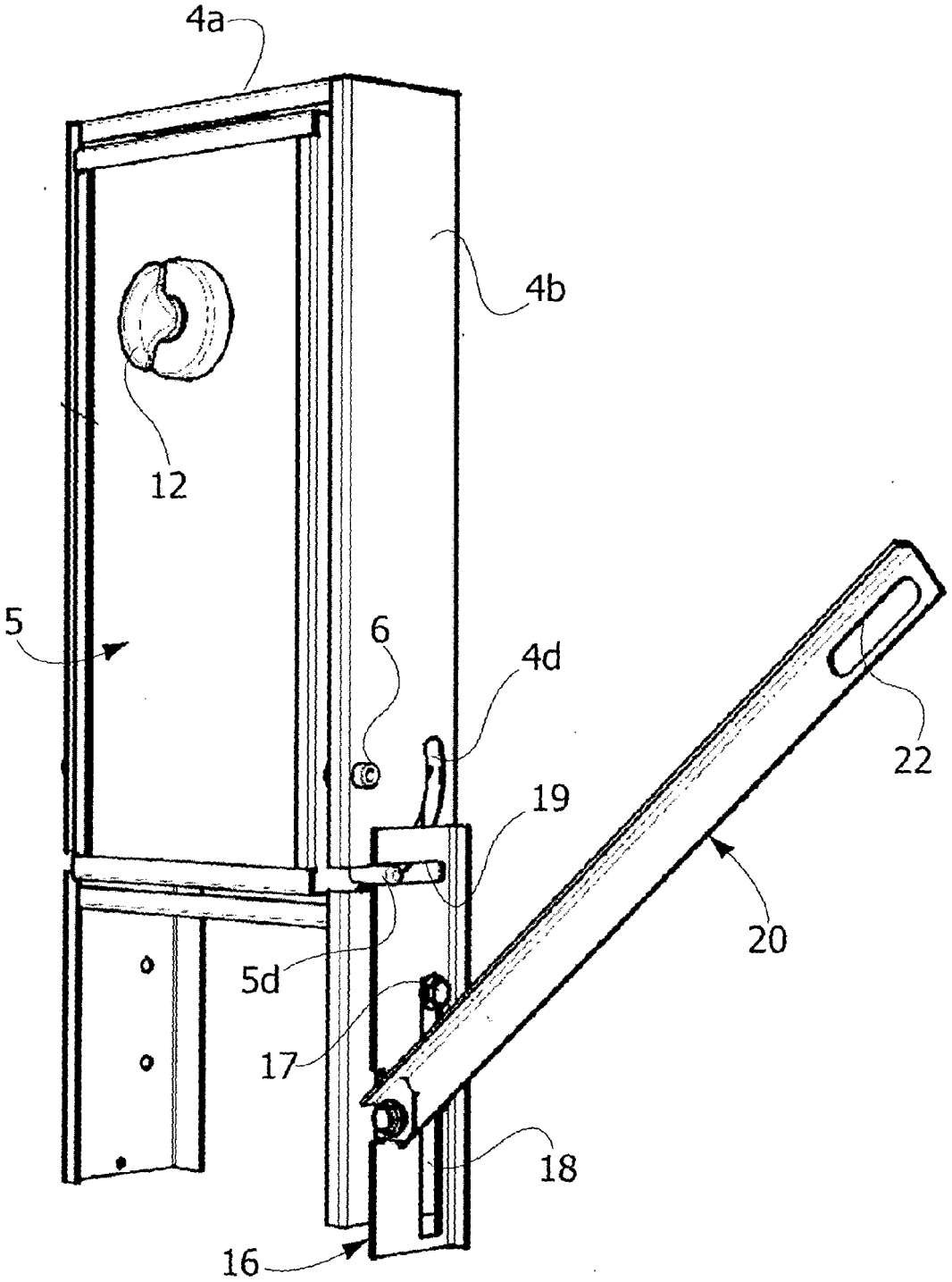
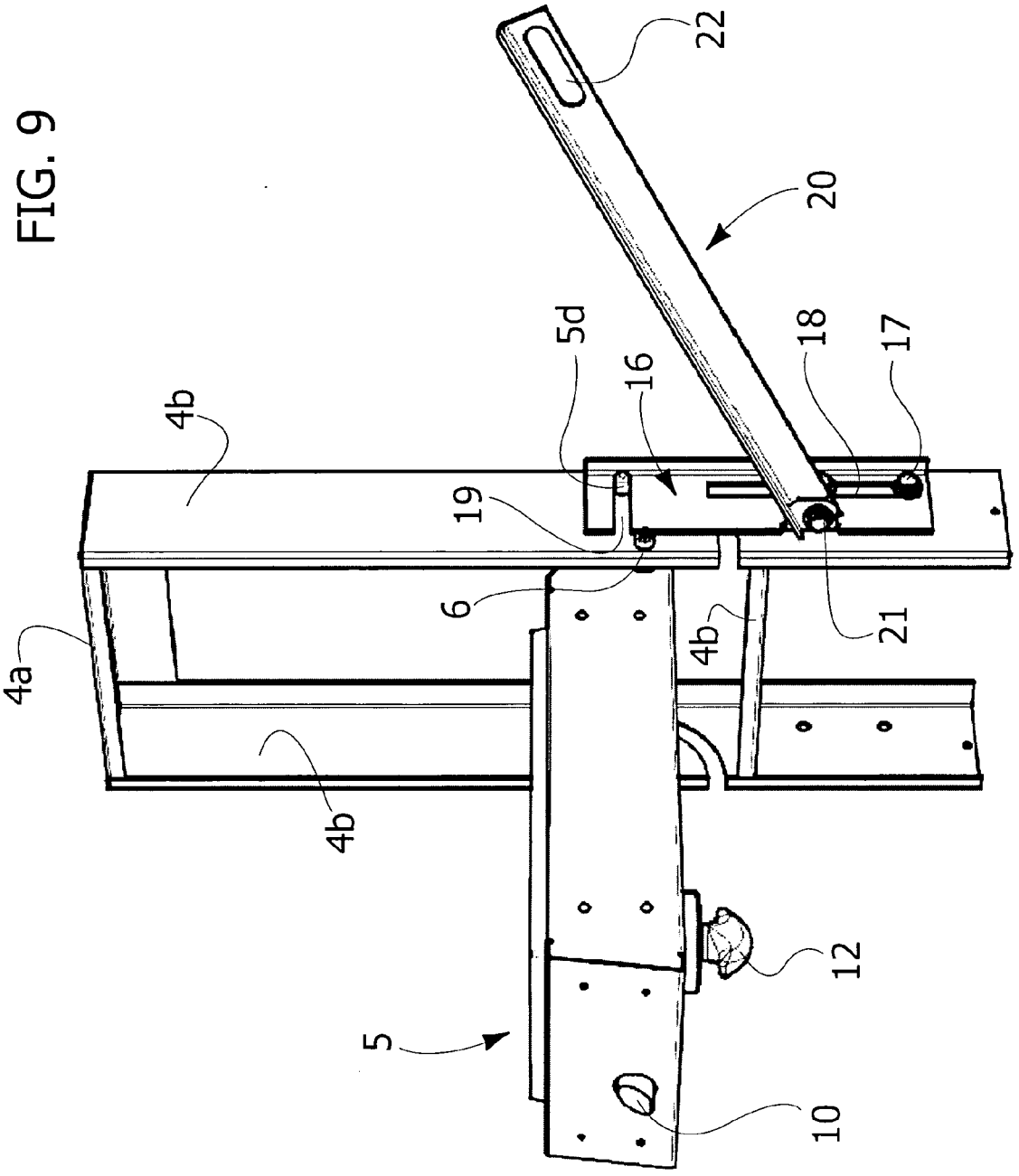


FIG. 9



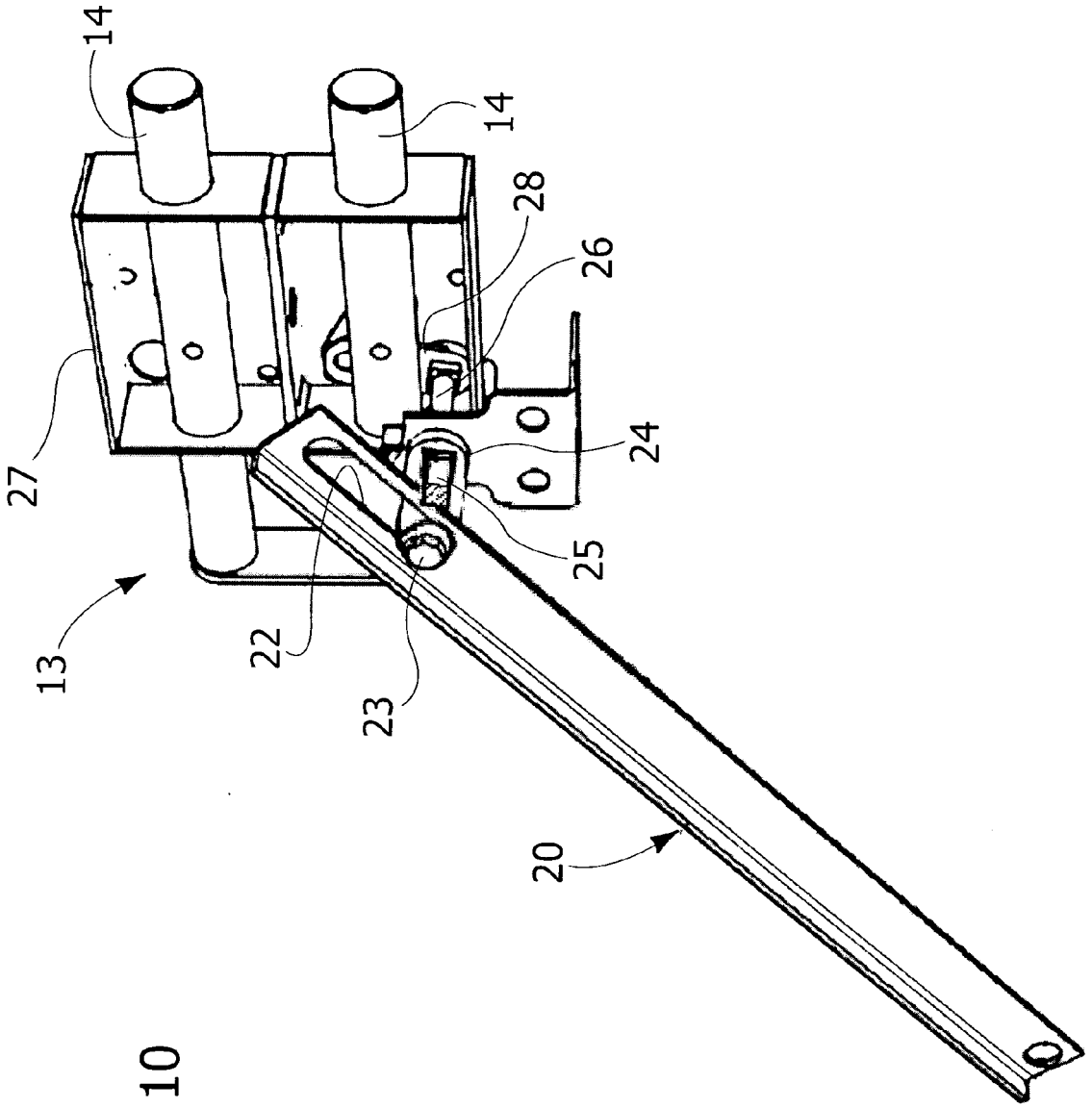


FIG. 10

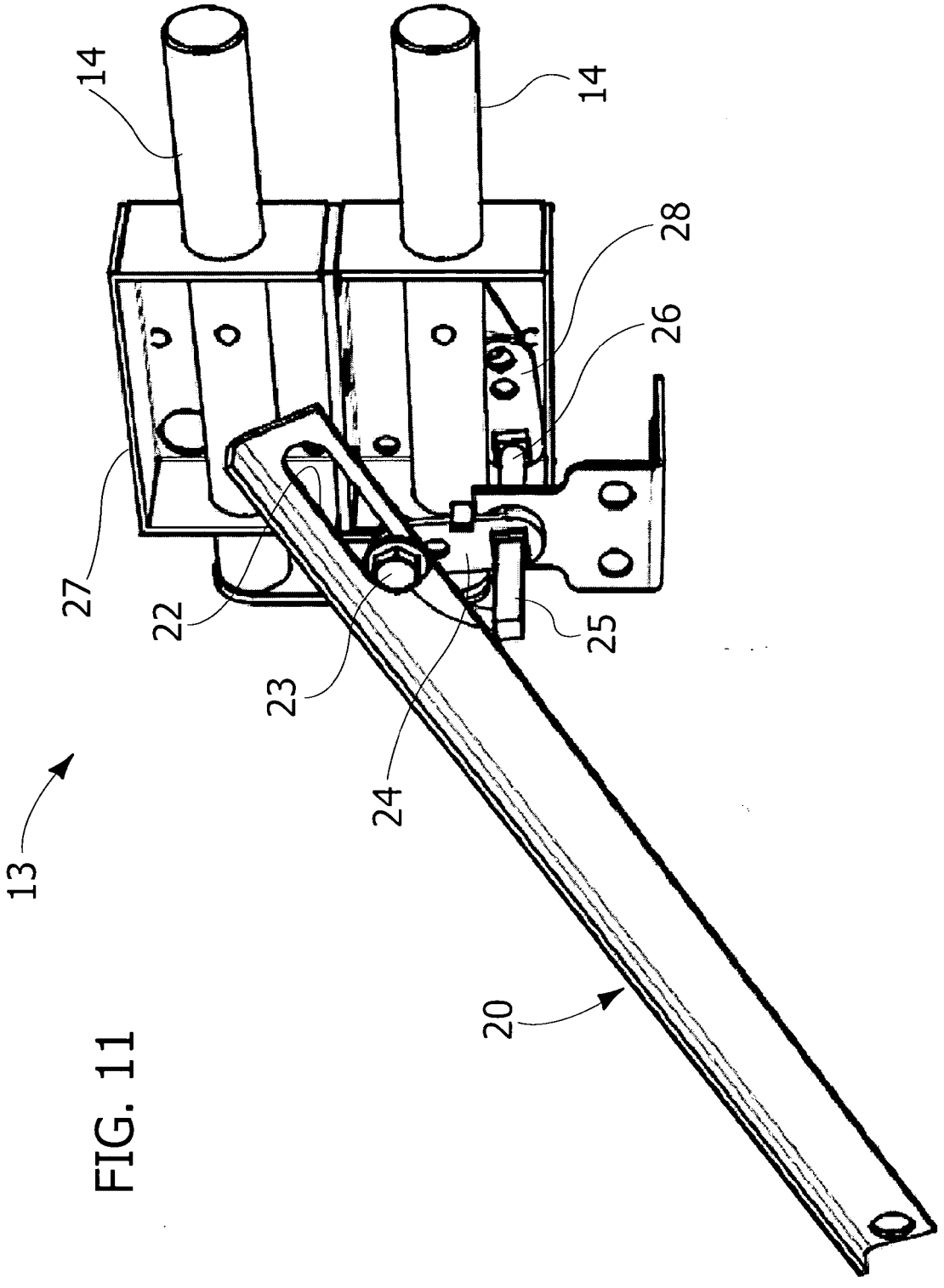


FIG. 11

FIG. 12

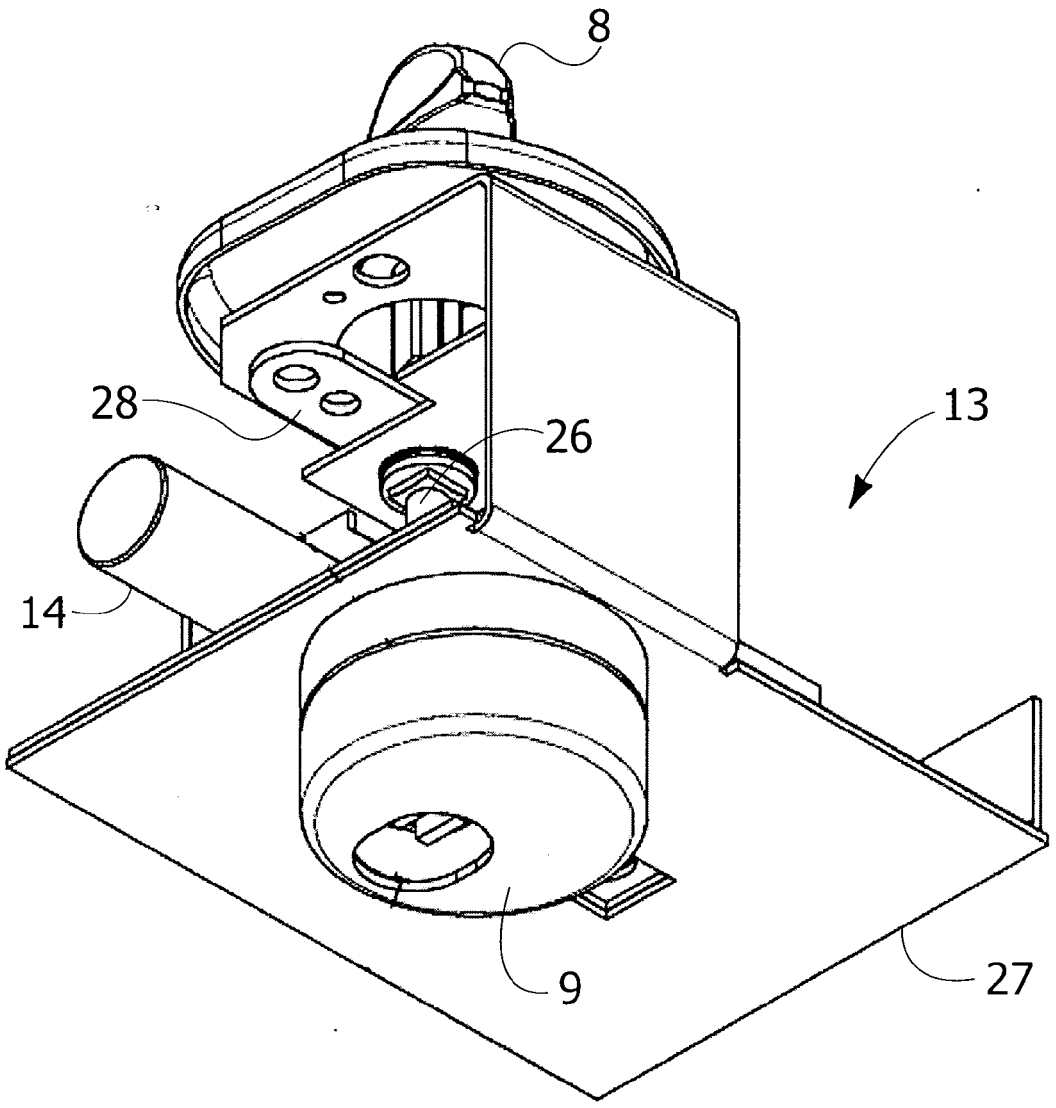
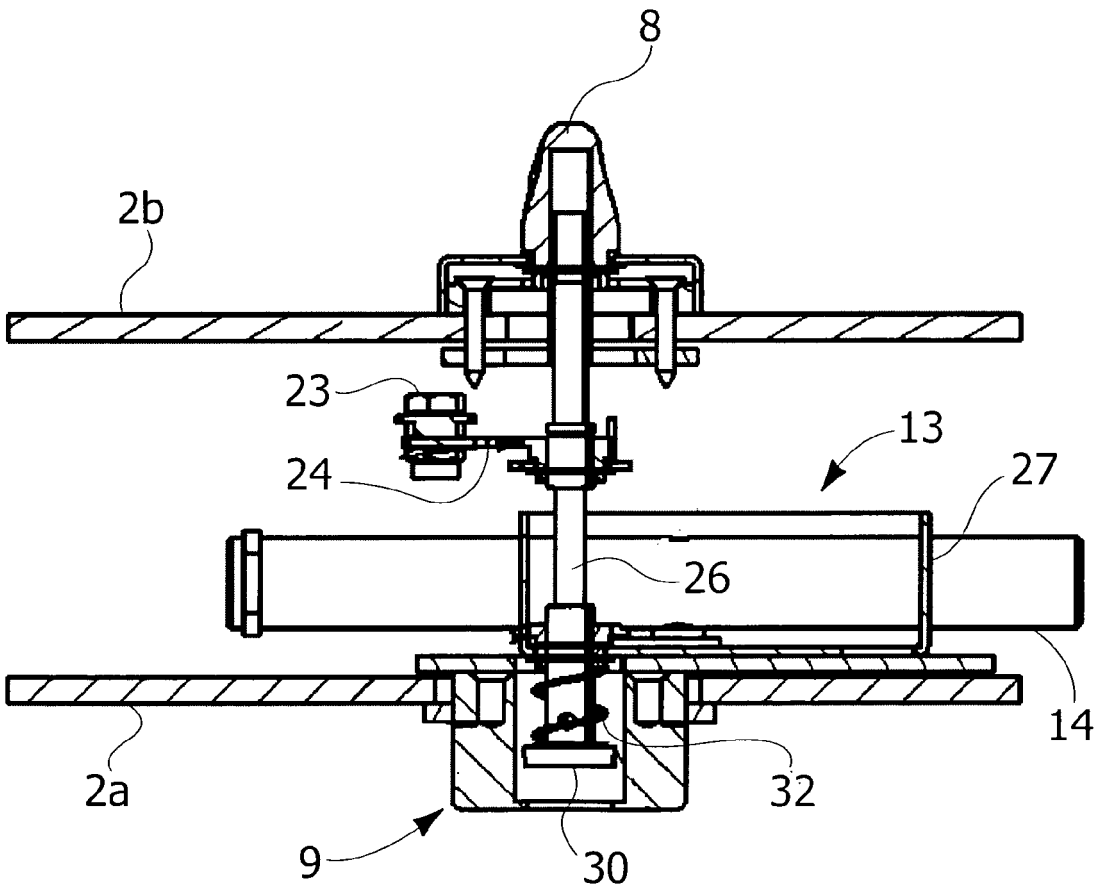


FIG. 13



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EUROPEAN SEARCH REPORT

Application Number
EP 09 42 5395

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A,D	IT TO20 060 797 A1 (MARFIA PIEDRO MILANO) 9 April 2008 (2008-04-09) * the whole document *	1-6	INV. E06B7/30 E06B7/32
A	FR 2 541 361 A1 (TELL NOHET JORGE [ES]) 24 August 1984 (1984-08-24) * the whole document *	1-6	
A	US 5 579 605 A (TANAKA SHUNJI [JP]) 3 December 1996 (1996-12-03) * the whole document *	1-6	

TECHNICAL FIELDS SEARCHED (IPC)

E06B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	10 March 2010	Wagner, A

CATEGORY OF CITED DOCUMENTS

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10-03-2010

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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