

(19)



(11)

EP 3 246 506 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
22.11.2017 Bulletin 2017/47

(51) Int Cl.:
E06B 3/46 (2006.01) E05F 15/652 (2015.01)
E06B 3/52 (2006.01)

(21) Application number: **16000697.9**

(22) Date of filing: **17.05.2016**

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
 GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
 PL PT RO RS SE SI SK SM TR**
 Designated Extension States:
BA ME
 Designated Validation States:
MA MD

(71) Applicant: **Welther, Stefan Andrei
 450008 Zalau (RO)**
 (72) Inventor: **Welther, Stefan Andrei
 450008 Zalau (RO)**

(54) **SOLID PRESSED FRONT DOOR WITH AUTOMATED LIFT AND SLIDE MECHANISM**

(57) The invention aims to achieve a lateral sliding entrance door by lifting. Monobloc door on a classic frame structure, either PVC, wood, steel, or aluminum. A part, respectively the fixed door leaf is embedded in the wall.

The mobile door leaf carries out a lifting movement under the action of a motor afterwards it follows a sliding motion under the action of another mechanism. The mobile door leaf is connected to the frame

by a helical screw. Fixing is done with a nut on the sash and frame with a fixed element but the screw can be rotated. With a geared motor linked to the frame the helical screw moves the sash from the frame. The helical screw has a set aperture on the entire width of the door leaf.

The door drive is done through an electronic system that coordinates the sequence of movements required for closing the door and opening it.

EP 3 246 506 A1

Description

[0001] Technical Field: external thermal insulated joinery

the invention covers a solid pressed front door with automated lift and slide mechanism fitted inside of the door leaf and the execution of it.

Background:

[0002] At this time, the lift and slide system is used exclusively for terrace doors regardless if they are operated automatically or manual.

Nowadays automations for terrace door do not comply with the minimum security requests given the fact that once lifted, the door can be easily pushed aside. Consequently, door automations available these days were designed from the perspective of using it for terrace doors exclusively not solid front doors with or without glass that are quite heavy.

Lift and slide terrace doors operate on a roller attached to a rail that doubles as a threshold. The movable part slides over a similar structure that is fixed. When closed, the mobile part sets on the threshold. With the handle and a mechanism connected, it is lifted on the rollers in such a way as to allow the sliding movement.

[0003] Current automation for these patio doors is made out of a motor that replaces the handle - lift door systems and side chain or tow strap - arranged in a box on top of the superior side of the frame.

[0004] Regarding the entrance doors, their opening systems known to date are: revolving, rotating or by standard sliding.

[0005] The swinging, rotating or standard sliding doors have a series of disadvantages.

1. A classic swinging door has the disadvantage of occupying the space reserved for the swing motion when opening the door.
2. A classic door also has a limited dimension due to manufacturing mode and by needing the swing space when opening the door.
3. For wider openings there are generally used rotating doors that also occupy the space for movement and they still do not provide the entire space for entry.
4. A classic entrance door based on the sliding system has suffered from poor insulation and because of this it is completely inappropriate for an entrance door.
5. Safety levels of a conventional door opening are limited. Usually they fall to safe levels RC1, RC2 and sometimes RC3. Setting a higher level can be done for this type of doors but the manufacturing costs are very high and will make the final product too expensive for its functionality.
6. Lift and slide systems are quasi known, but they are used only as terrace doors, with the purpose of

ensuring large openings onto terraces. They cannot be used as entrance doors on one hand, thanks to the opening and, on the other hand, because all systems are designed for large glass surface.

[0006] Technical issues: the technical issue that is to be solved by this invention is the building of a lift and sliding system by combining several materials like PVC, aluminium, wood, steel, insulation materials with an automated operating system that will meet the requirements of an entrance door with high thermal insulation and a high level of security.

Description of technological process - Summary of the Invention:

[0007] For the accomplishment of the invention a classical lift and sliding system from PVC, aluminium, steel or wood was used.

In Figure 1 and 2 it is set forth the door comprising:

- Frame (1)
- Fixed part (2) that is encased in the wall together with the corresponding frame,
- Sash (door leaf) (3) - the mobile part that rises and slides over the fixed part inside the wall.
- Decorative frame element inside (4)
- The threshold acting as the slider track (5)

[0008] The door leaf - the fixed and mobile sash are monobloc made on a similar structure to the one described in the application for patent filed with OSIM (Romanian patent office) under the number 2014 00243 and publication number 129789 A0 except that here instead of a sash for a swinging door a lift and sliding door sash was used. The system applied in patent 129789 0 is adapted for other materials from which the casement is made: wood, aluminium, PVC, steel.

The structure of the door leaf is represented in figure 3:

- (7), (8) - internal and external aluminium panel,
- (9) - inside and outside reinforcement element made out of MDF or OSB
- (10) - Element of insulation - expanded polystyrene filler (extruded), polyurethane foam, mineral wool (basalt), etc.

[0009] The opening system consists of a classic lift and slide hardware from any supplier. To this hardware it was adapted and automated a system consisting of the engine-linear motor (19) - figure 8, which lifts the door leaf by pulling and lowers it by pushing the trolleys (20) from the classic system, effectively taking the role of the handle from the classic system in a way that allows the lateral slide. The trolley system (20) is extended by pieces (21, 22) and it is connected to the linear motor (19) that is rigidly fixed to the door sash(23)- detail B.

[0010] When the door has reached the point for lift that

allows the lateral sliding, it is powered the geared motor (15) of Figure 5 and 6 - detail A, which operates the helical screw (12) fixed to the front of the door leaf with a nut(13) and at the rear of the frame with the fixing element (14) rigidly fixed to the frame, and the nut (13) is rigidly fixed to the door leaf, so that by turning the helical screw it is achieved the displacement of the door leaf laterally by sliding on the classic hardware system's rollers (6). Particularly important is that the helical screw is hidden in a hole made on the entire width of the sheet practically in the door insulation (18).

[0011] The diameter of the helical screw is between 20 and 40 mm depending on the size of the door. On the door frame near the engine is disposed a proximity sensor (16) to be operated, when the door finished sliding, by the control element (17).

As embodiment for an increase in the level of safety, you can have two helical screws into two symmetrical positions above and below- Figure 7.

The vertical position lateral sliding system must be judiciously chosen as this hole to be possible to be done i.e. there are no items that cannot be crossed (glass etc.) In Figure 9 the door control **wiring diagram** is shown. Thus, with the help of elements command T1, T2, T3 (can be remote or card reader, fingerprint reader, keypad entry codes or simple switches) that via summation SUM1 are added together and the control circuit CI1, which actions engine M1 equivalent to 19 of figure 8.

Once in the point of maximum lift, P2 element equivalent to the proximity sensors 24, 25 in Figure 6, activates engine M2 (M3) through circuit CI2 corresponding to the engine 15 of Figures 6,7.

As it reaches the end of the course, element P2, the equivalent of proximity sensor 16, 17, will stop the motor. At the same time, CI2 circuit receives the signals from protection element F1 - for force and photocells F2 - for objects that could impediment the door movement. The door closes in the reverse order of the opening process as the motors are reversible.

Benefits

By applying the invention, the following advantages are obtained:

[0012]

1. A monobloc sliding door with automatic lifting that has good thermal insulation, sound insulation and high reliability.
2. Judicious use of door space.
3. Wide opening spaces are created - up to 2-3 meters in special cases.
4. The invented door, because of the opening way and the parts in the rear - the part recessed in the wall - in this case the helical screw, achieves high levels of safety up to RC4, RC5.

Description of the figures

[0013]

Figure 1. Represents an external view of a monobloc door with a generic design. Basically, this is how this type of door is viewed from outside. In the top part it is presented a sections through the wall and door and on the side there is a lateral section view with the composing elements: 1-frame, 2-mobile door leaf - lift and slide, 3-fixed door leaf - cased in the wall - that is manufactured with the same technique, 4-decorative frame element fixed on the internal side of the door, 5-the aluminium threshold that doubles as the slider track.

Figure 2. Represents the same elements except that the fixed door leaf (3) is underscored by removing the wall to better understand the process.

Figure 3 Is a section through a monobloc door: movable sash : 1-frame, 2-door leaf, 3-fixed door leaf - embedded in the wall, 5-threshold, 6- sliding trolleys, 7-external aluminium plate, 8-internal aluminium plate, 9-OSB board or other rigid bracing, 10-filler of ESP or polyurethane foam (PUR).

Figure 4. represents a section through the invented door with a top view. We distinguish the same elements: 1-frame, 2-mobile door leaf - with the structure described in figure 3, 3-the fixed door leaf encased in the wall, 4- decorative frame element fixed on the internal side of the door. Plus, you can find a part of the elements needed to operate - automation: 12-helicoil screw, 13 - fixing nut on the movable door leaf, 14-fixing element onto the frame, 15- gear motor for driving screw 12.

Figure 5 Represents a detail that refers to the automated system for sliding: 1-frame, 2-mobile door leaf, 12-helical screw, 13 - the screw's fixing nut to the sash, 14-nut for fixing the screw to the frame, 15-geared motor and gear for driving the helical screw, 16 - proximity sensor, 17- command element of the proximity sensor, 18- aperture for the helical screw 12 when the sash-2- is pulled sideways.

Figure 6. Represents the door seen from within with the uncovered wall side. We distinguish: 1-frame, 2-mobile door leaf, 3-fixed door leaf, 5-threshold, 12-helical screw, 14-fixing element onto the frame, 15-gear motor for driving the screw, 16-proximity sensor, 18-aperture for the helical screw 12. Enlarged elements- details:

Detail A-15-gear motor, 16-proximity sensor, 12-helical screw

Detail B -20-trolley, 21, 22 extra coupling ele-

ments, 19-gear motor for lifting and lowering, 23-fixing element for the lifting-lowering motor.
Detail C-25, 26 proximity sensor with the activating element of the sensor, 1-frame, 2-door leaf.

5

Figure 7. Option for greater security with two actions - 2 motors. In a similar way, for bigger doors and with a higher security level, it can be done with 3 or 4 motors.

10

[0014] Definite example: During experimentations, there were made monobloc doors with PVC sliding system Pofine88 from Profine Group and with a classic sliding hardware from Siegenia.

15

These results are due to the materials used, as well as the door model developed from the combination of aluminium plates of conventional PVC sash door, by making a large structural depth over the entire surface of the door.

20

Claims

1. **Lift and slide monobloc entrance door characterised by using a classic sliding by lifting system whether is PVC, wood, aluminium or steel, both of the sashes being monobloc, obtained through using the system from patent application filed with OSIM under the number 2014 00243, publication number 129789 A0.**
2. **The door according to claim 1, characterized in that together with the fixed sash of the frame and the threshold is embedded in the wall.**
3. **The door according to claim 1, characterized in that it has been fitted an automatic side sliding by helical drive screw (12) secured to the frame by the nut (13) and the frame by the fixing element (14), which lies in the mobile sash (2) in a aperture (18).**

25

30

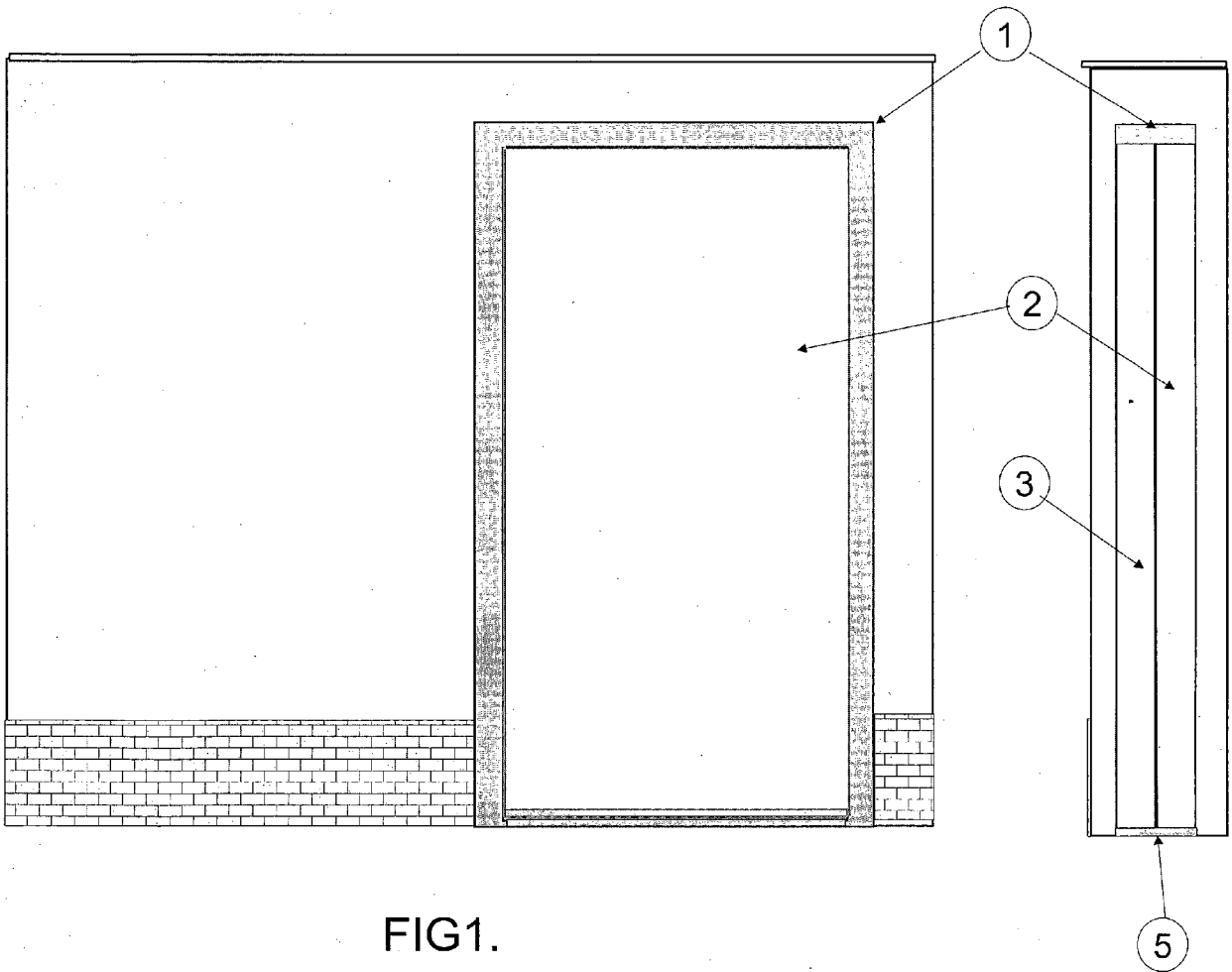
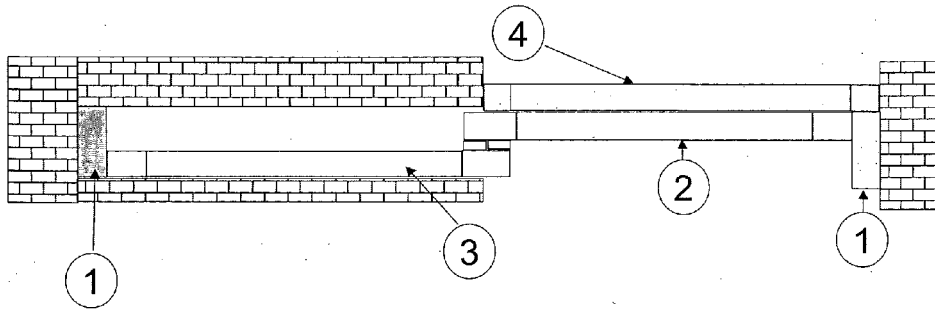
35

40

45

50

55



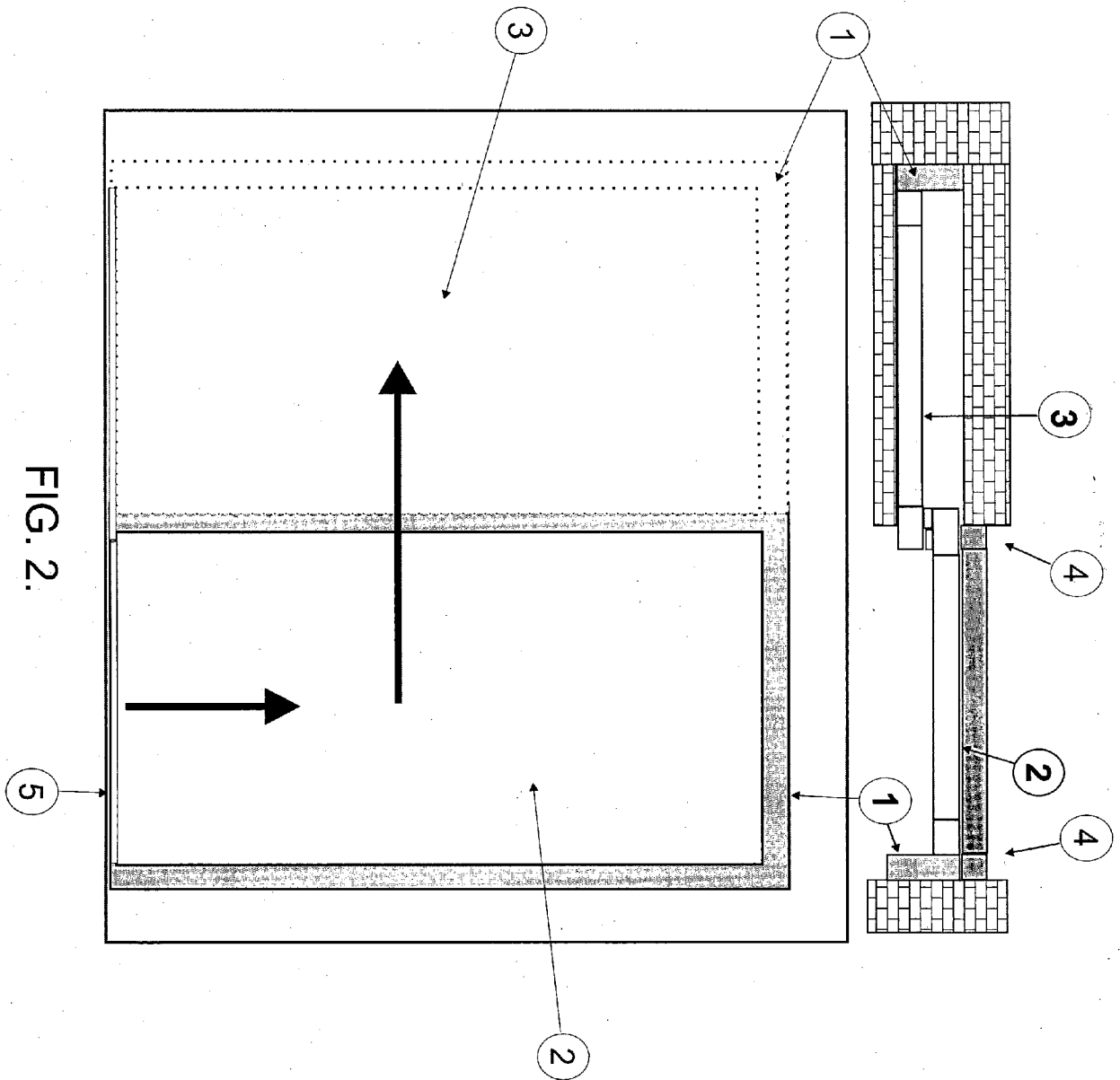


FIG. 2.

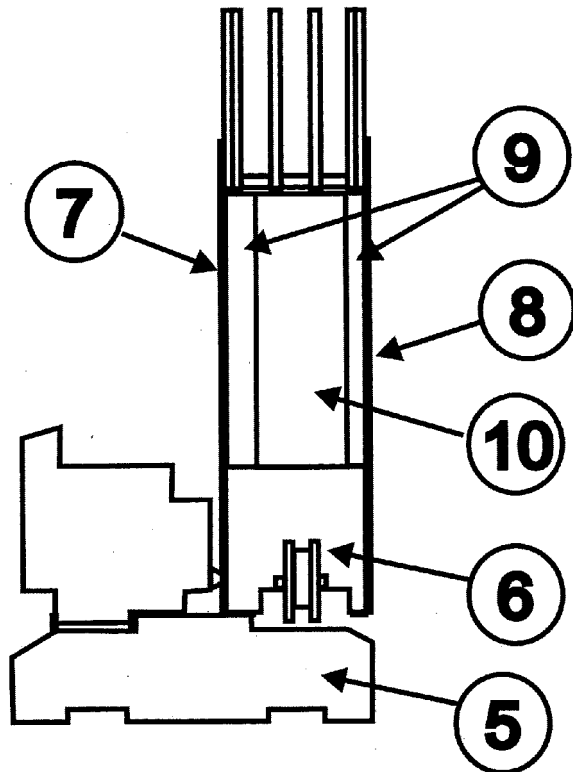
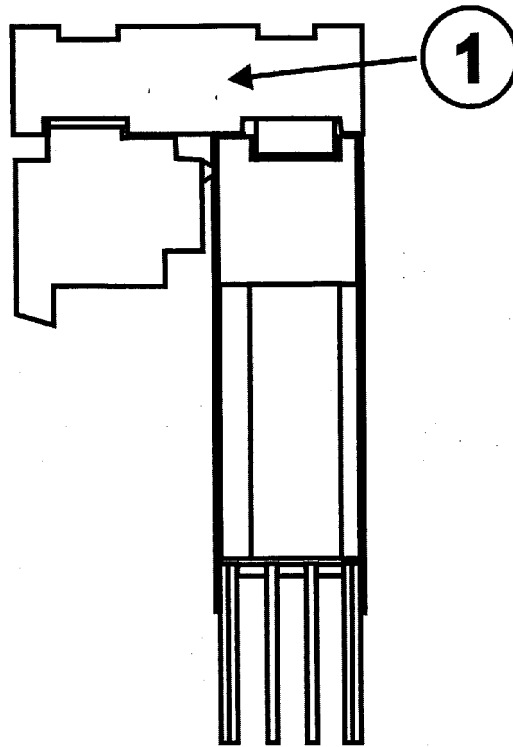
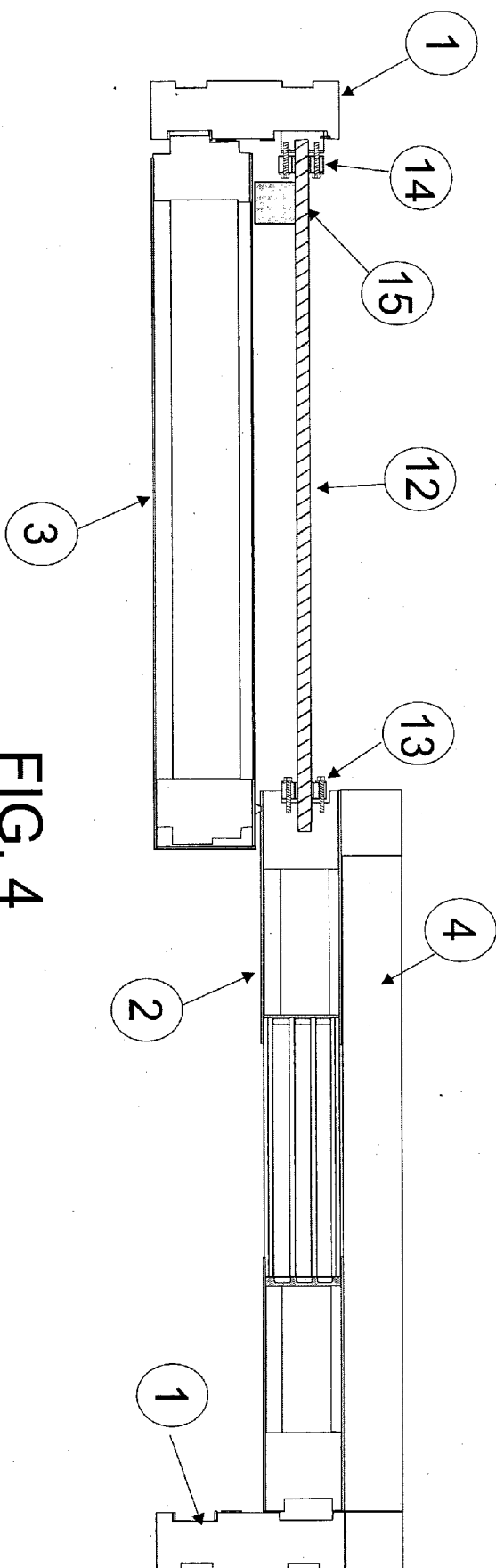


FIG. 3



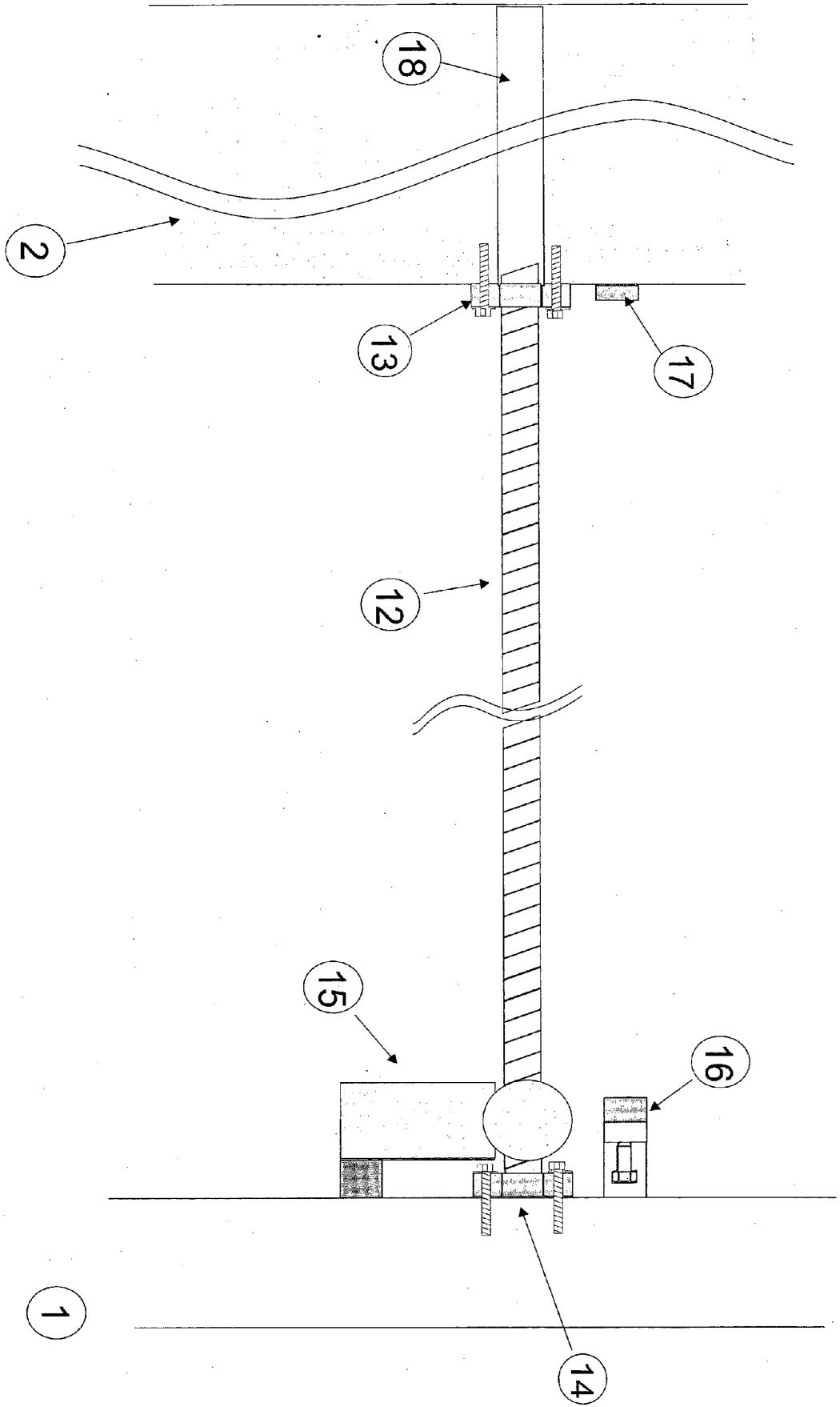


FIG. 5

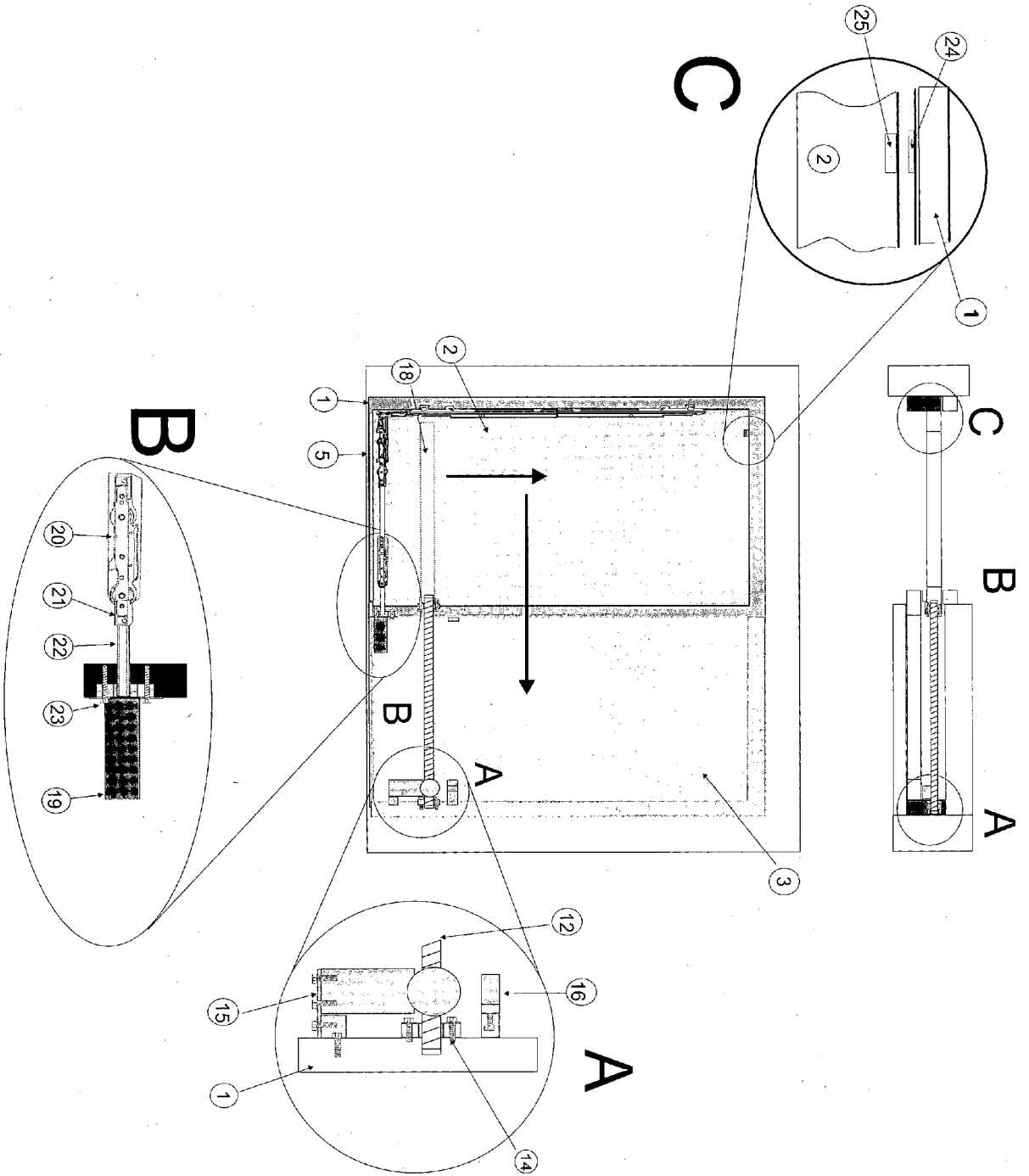


FIG.6

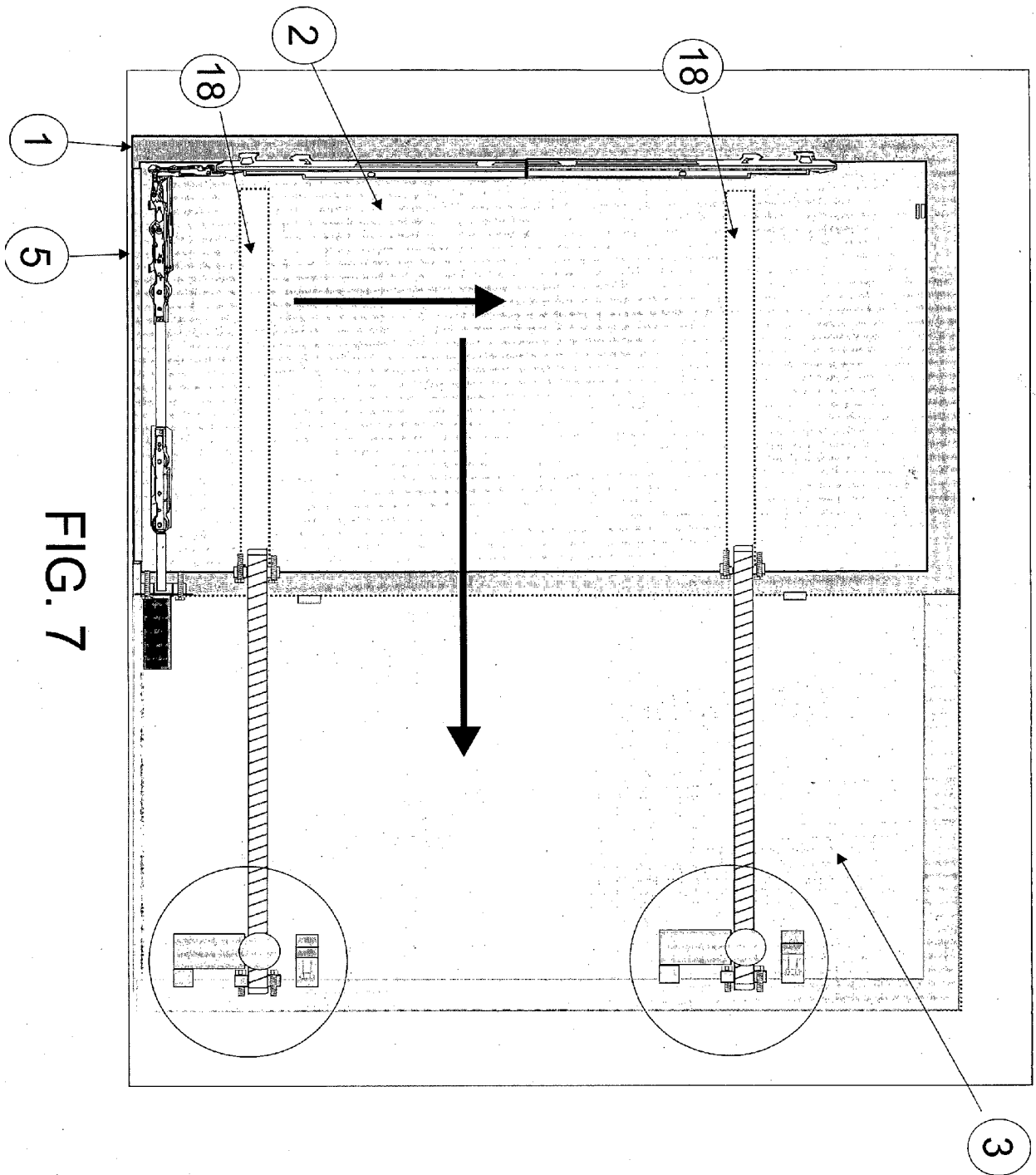


FIG. 7

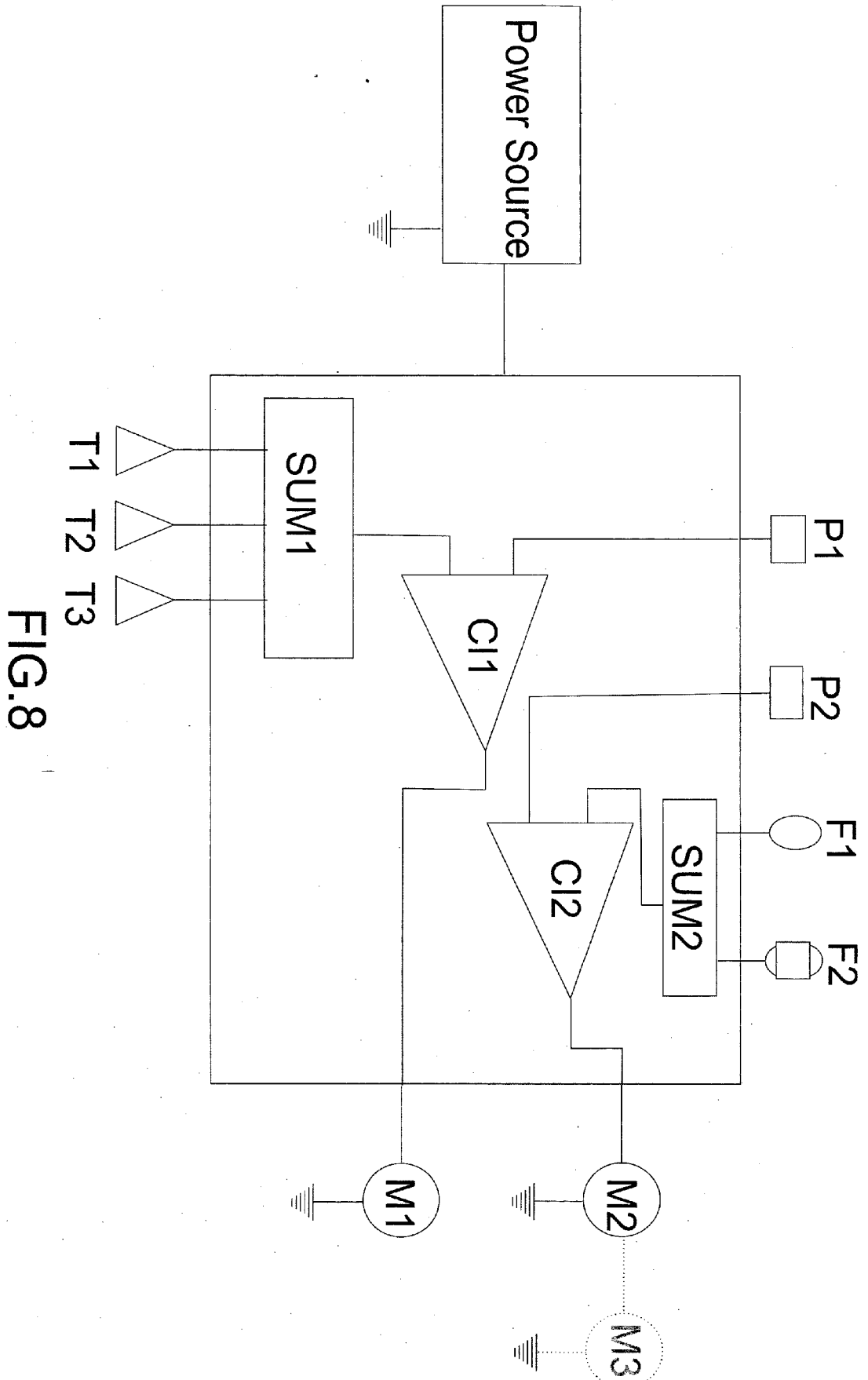


FIG.8



EUROPEAN SEARCH REPORT

Application Number
EP 16 00 0697

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X,D	RO 129 789 A0 (WELTHAUS S R L [RO]) 30 September 2014 (2014-09-30)	1	INV. E06B3/46 E05F15/652 E06B3/52
Y	* figures *	1,2	
Y	----- FR 2 744 756 A1 (COMMARMOND YVES ROBERT LAURENT [FR]) 14 August 1997 (1997-08-14)	1,2	
A	* page 3, line 16 - line 19; figures 1,9 * * page 9, line 1 - line 17 * -----	3	
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 29 November 2016	Examiner Verdonck, Benoit
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	

EPO FORM 1503 03/02 (P04/C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 16 00 0697

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

29-11-2016

10	Patent document cited in search report	Publication date	Patent family member(s)	Publication date
	RO 129789	A0	30-09-2014	-----
	FR 2744756	A1	14-08-1997	NONE
15	-----			
20				
25				
30				
35				
40				
45				
50				
55				

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82