(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 296 488 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
21.03.2018 Bulletin 2018/12

(51) Int Cl.:
E05B 65/10 *(2006.01)* ***E05F 15/63*** *(2015.01)*

(21) Application number: **17184187.7**

(22) Date of filing: **01.08.2017**

(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

(30) Priority: **14.09.2016 IT 201600092680**

(71) Applicant: **BERTOLDO S.R.L.**
36034 Malo (VI) (IT)

(72) Inventor: **BERTOLDO, Fabio**
36034 Vicenza (IT)

(74) Representative: **Bettello, Pietro**
Via Col d'Echele, 25
36100 Vicenza (IT)

(54) **AUTOMATIC SWINGING DOOR**

(57) The finding concerns an automatic swinging door, to be installed in highly visited locations in which, upon a signal of presence of the user in proximity of the door, the wings open automatically. Said door is provided with an "anti-panic" device, which is able to "unlock" the door, even manually, by means of a simple pressure exerted on the wing by the user when inside the place dangerous situations occur, due for example to fire, at the same time locking the power supply distribution, or following accidental impacts which can cause injuries to the users and which is able to bring it back to the normal operating conditions when the emergency situation has been overcome. Said automatic swinging door is characterised in that it provides a device for the "unlock" of the door positioned from its motorized driving group (200) that is simple to construct, easy to install, that requires very little maintenance and operates in total safety.

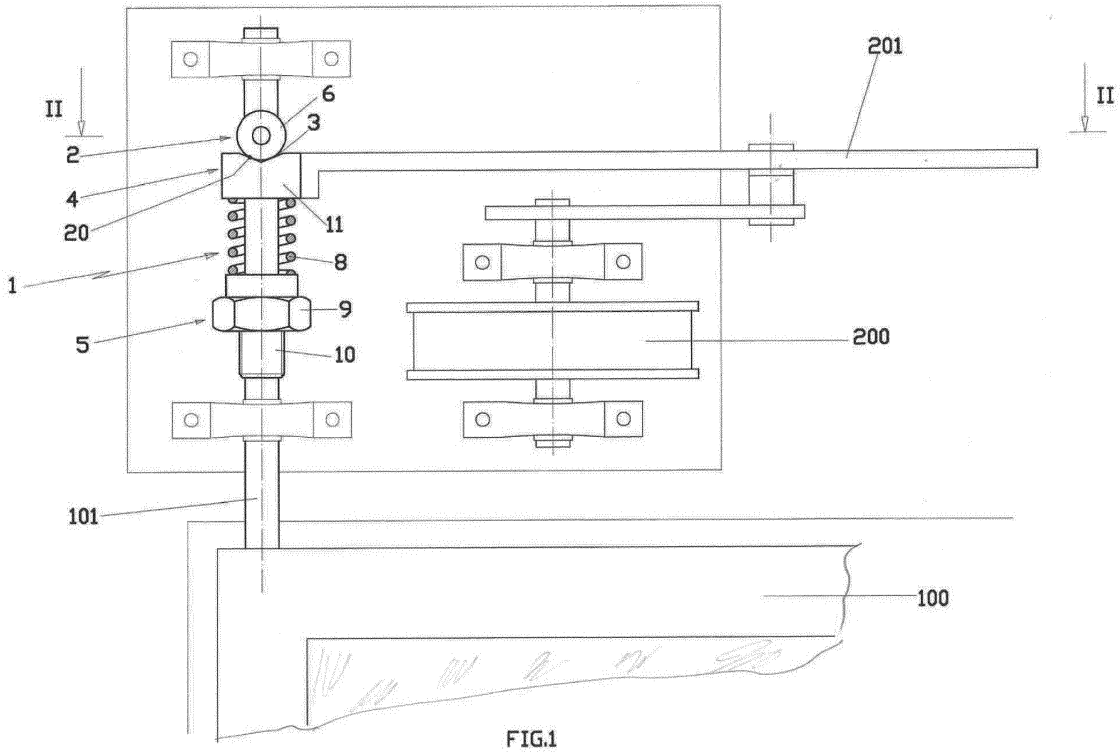


FIG.1

EP 3 296 488 A1

Description

[0001] of the invention entitled "Automatic swinging door" in the name of Bertoldo srl.

[0002] The present invention relates to an automatic swinging door, according to the general part of claim 1.

[0003] In places such as supermarkets, shopping centres, banks and other highly visited locations, doors are installed which, upon a signal of presence of the user in proximity of the door, open automatically, sliding laterally, until they are positioned laterally relative to the clear width of the door.

[0004] Safety regulations prescribe that, in case of panic inside such a place, due, for example, to a fire, with simultaneous shut-down of power supply distribution, or as a result of accidental impacts that can potentially cause injuries to users, automatic doors must be "panic-proof", so they are fitted with a so-called "unlock" device, able to determine the opening of the door even manually, by means of a simple pressure which the user has to exert on the wing.

[0005] In the prior art, there are several types of mechanisms that allow the so-called "unlocking" of the door from its motorized automatic driving group, so as to enable its manual opening in case of panic and to bring it back to normal operating conditions after it is opened in emergency conditions.

[0006] By way of example, reference is made to the patent document EP 0 554 438 B1, wherein a traverse strut (ref.9), hinged on a vertical rod (ref.2) which supports a leaf (ref.1), is provided, at its end oriented towards the centre of the door, with an elastic plate (ref.10), able to engage with a hook-shaped component (ref.11), hinged on the rod itself so that, in an emergency situation, the strut/leaf mutual engagement can be overcome (unlocking) by a force exerted on the leaf when the door is in the closed position.

[0007] However, the most important document of the prior art is EP1529911 A2, filed by the holder of the present application, which describes an automatic swinging door, to be installed in places such as supermarkets, shopping centres, banks and other highly visited locations in which, upon a signal of presence of the user in proximity of the door, the wings open automatically and slide laterally until arriving laterally with respect to the free space of the door itself, said door being further provided with a device, so-called "anti-panic", which is able to determine the opening of the door, the so-called "unlock", even manually, by means of a simple pressure exerted on the wing by the user when inside the place dangerous situations occur, due for example to fire, at the same time locking the power supply distribution, or following accidental impacts which can cause injuries to the users and which is able to bring it back to the normal operating conditions when the emergency situation has been overcome (claims 1 and 4; fig. 1 and 8).

[0008] An object of the present invention is to obtain a device to be applied on a swinging door that allows, in case of emergency, a manual opening that is simpler and more functional than similar devices of the prior art.

[0009] Specifically, the object of the present invention is to obtain a device for unlocking the door from its motorized driving group that is simple to construct, easy to install, that requires very little maintenance and operates in total safety.

[0010] This object is achieved by inserting, between the motorized driving group and the vertical upright supporting the wing, a device consisting of a mobile mechanism wherein some elements projecting from the vertical upright insert into corresponding cavities obtained on elements integral with the connecting arm of the driving group; said opposite elements are mutually retained thanks to the action of a contrast elastic group, which allows both the automatic actuation of the wing under normal opening operating condition ("locking" situation), and also the actuation of the wing under emergency operating conditions ("unlocking" situation), because said elements are susceptible to get unhooked from the mutual fitting following a minimal force exerted on the wing, when the door is in the closing position, in order to allow its opening in the direction from the inside to the outside.

[0011] The invention is better defined by the description of a possible embodiment thereof, provided merely by way of non-limiting example, with the aid of the accompanying drawings, where:

- Figures 1, 2 show two views, respectively front elevation and plan, of the swinging door of the invention;
- Figures 3, 4 and 5, 6 show, respectively, front elevation and perspective view of the wing-supporting shaft of the invention, in the conditions, respectively, with closed wing and with open wing;
- Figures 7, 8, 9 show, respectively, orthogonal and perspective views of the connecting rod present in the door of the invention;
- Figures 10, 11, 12 show perspective views of the wing of the doors of the invention, respectively in the closed condition, open in motorized mode and open in manual mode.

[0012] As shown in Figures 1 and 2, between the wing 100 and the automatic opening/closing mechanism, indicated with the reference 200, a device is inserted consisting of a mobile mechanism, indicated in its entirety with the reference 1, positioned coaxially with the vertical upright 101 that supports the wing; said mechanism is provided with elements 2 projecting from the vertical upright, which are inserted into corresponding cavities 3 obtained on an element 4 integral with the connecting arm 201 of the driving group 200. Said opposite elements 2 and 4 are mutually retained thanks to the action of a contrast elastic group, indicated in its entirety with the reference 5, which allows the wing 100 to move from the closed position (see Figure 10), to the normal open position, with a 90° rotation of the wing towards the interior of the space (see Figure 11), by automatic actuation; or

said group can allow the wing 100 to move from the closed position (see Figure 10) to the emergency opening, with a rotation of the wing outwards (see Figure 2) by a manual push (arrow "F").

[0013] Constructively, as shown in Figures 3-6, the projecting elements 2 consist of two casters 6, being preferably two rolling bearings, mounted on the two arms of a crosspiece 7, positioned in the upper part of the upright 101.

[0014] As shown in Figures 3-6, the contrast elastic group 5 comprises a helicoidal spring 8 supported by a threaded body 9, such as a nut provided with a resting bushing, screwing on a threaded portion 10 obtained on the upright 101.

[0015] As shown in Figures 7-9, the connecting arm 201 terminates at the part connecting with the wing with a small block 11 which, through a central hole 12, inserts into the upright 101 and it is centrally provided with a cavity 3, which, advantageously, has the shape of an upset dome where the two opposite inclined walls 13 define the seat of a tangent rest of the caster 6. In this way, by effect of the thrust of the spring 8, a locked fitting 20 is obtained, whose locking force is defined by the value of the pre-load of the spring 8, which is adjusted by the screwing/unscrewing of the nut 9 on the threaded portion 10 of the upright 101 (see Figure 1).

[0016] Operatively, in the situation with the door closed (see Figure 10), the wing 100 is retained in the closed position (pos. A) by the stopping of the driving group 200 which, through the locked fitting 20, prevents the rotation of the vertical upright 101.

[0017] For the normal opening (see Figure 11) the wing 100 is rotated by 90° (pos. A1) by the actuation of the driving group 200 which, through the locked fitting 20, causes the rotation by 90° of the vertical upright 101 ("locking" situation).

[0018] Conversely, in emergency opening situations (see Figure 12), from the closed door position, ensured by the stopping of the driving group 200, the wing 100 is rotated outwardly (pos. A2) through a manual thrust (arrow "F"). This is made possible by the elasticity of the mobile mechanism 1, allowing the casters 6, with the rotation by 90° of the upright 101 and, specifically of the crosspiece 7, to exit the resting seat 3 and to get above the small block 11 and hence, in practice, to disengage from the connecting arm 201 and, more generally, from the whole automatic opening/closing driving mechanism 200, which vice versa remains motionless ("unlocking" situation).

[0019] Once the emergency situation is overcome, the wing 100 is brought back to the closed position (Figure 10), the so-called "reset", by means of a manual action opposite to the previous one, which is made faster. Thanks to the upset dome conformation of the seat 3, which facilitates the positioning of the casters 6 into said seat ("facilitated reset"). From the above description, it is readily apparent that the set objects were achieved by means of a mechanism 1 that operates in normal "locking" conditions, but that is able to operate in an extremely effective manner in the "unlocking" conditions, in the presence of emergency situations that should occur in the space which the automatic swinging door closes.

[0020] The invention thus conceived is susceptible to many modifications and variations, and its construction details can be replaced by other technically equivalent elements, without thereby departing from the scope of the inventive concept defined by the appended claims.

Claims

1. AUTOMATIC SWINGING DOOR, to be installed in places such as supermarkets, shopping centres, banks and other highly visited locations in which, upon a signal of presence of the user in proximity of the door, the wings open automatically, said door being further provided with a device, so-called "anti-panic", which is able to determine the opening of the door, the so-called "unlock", even manually, by means of a simple pressure exerted on the wing by the user when inside the place dangerous situations occur, due for example to fire, at the same time locking the power supply distribution, or following accidental impacts which can cause injuries to the users and which is able to bring it back to the normal operating conditions when the emergency situation has been overcome,
said automatic swinging door **being characterised in that** the "anti-panic" device for the "unlock" of the door is positioned between a motorized driving group (200) and a vertical upright (101) supporting a wing (100) and consisting of a mobile mechanism (1), wherein some elements (2) projecting from the vertical upright (101), insert into corresponding cavities (3) obtained on an element (4) integral with a connecting arm (201) of the driving group (200), said opposite elements (2, 4) being mutually retained thanks to the action of a contrast elastic group (5) which allows both the automatic actuation of the wing under normal opening operating conditions ("locking" situation), and also the actuation of the wing under emergency operating conditions ("unlocking" situation), because said elements are susceptible to get unhooked from the mutual fitting following a minimal force exerted on the wing when the door is in the closing position, in order to allow its opening in the direction from the inside to the outside.

2. AUTOMATIC SWINGING DOOR, according to claim 1, **characterised in that** the projecting elements (2) consist of two casters (6), being preferably two rolling bearings, mounted on the two arms of a crosspiece (7), positioned in the upper part of the upright (101).

3. AUTOMATIC SWINGING DOOR, according to claim 1, **characterised in that** the contrast elastic group

(5) comprises a helicoidal spring (8) supported by a threaded body (9), such as a nut provided with a resting bushing, screwing on a threaded portion (10) obtained on the upright (101).

4. AUTOMATIC SWINGING DOOR, according to claim 1, **characterised in that** the element (4) integral with the connecting arm (201), mounted on the part connecting with the wing, consist of a small block (11) which, through the central hole (12), inserts into the shaft (101), the cavity (3), arranged in the centre, having the shape of an upset dome, where the two opposite inclined walls (13) define the seat in which a tangent rest of the caster (6) is obtained, so that, thanks to the thrust of the spring (8), a locked fitting (20) is obtained.

5. AUTOMATIC SWINGING DOOR, according to claim 4, **characterised in that** the locking force of the locked fitting (20), due to the action of the thrust of the spring (8), is determined by the value of the preload of the spring (8), which is adjusted by the screwing/unscrewing of the nut (9) on the threaded portion (10) of the upright (101).

6. AUTOMATIC SWINGING DOOR, according to the preceding claims, **characterised in that**, in the situation of closed door, the wing (100) is retained in the closing position by the stopping of the driving group (200) which, through the locked fitting (20), prevents the rotation of the vertical upright (101).

7. AUTOMATIC SWINGING DOOR, according to the preceding claims, **characterised in that**, for the normal opening of the door, the wing (100) is rotated by 90° by the actuation of the driving group (200) which, through the locked fitting (20), causes the rotation by 90° of the vertical upright (101) ("locking" situation).

8. AUTOMATIC SWINGING DOOR, according to the preceding claims, **characterised in that**, in the situation of emergency opening, from the closed door position, ensured by the stopping of the driving group (200), the wing (100) is rotated outwardly through a manual thrust (F), which is made possible by the elasticity of the mobile mechanism (1) allowing the casters (6), thanks to the rotation by 90° of the upright (101) and, specifically of the crosspiece (7), to exit the resting seat (14), and to get above the small block (11), thereby disengaging from the connecting arm (201) and, more generally, from the whole automatic opening/closing driving mechanism (200), which remains stationary.

9. AUTOMATIC SWINGING DOOR, according to the preceding claims, **characterised in that**, once the emergency situation has been overcome, the wing (100) is brought back to the closed position, the so-called "reset", by means of a manual action opposite to the previous one which causes the opposite rotation of the upright (101) and, more precisely, of the crosspiece (7), so that the casters (6) are positioned again into the corresponding seats (3).

10. AUTOMATIC SWINGING DOOR, according to claim 9, **characterised in that** the upset dome conformation of the seat (3) facilitates the positioning of the casters 6 into said seat ("facilitated reset").

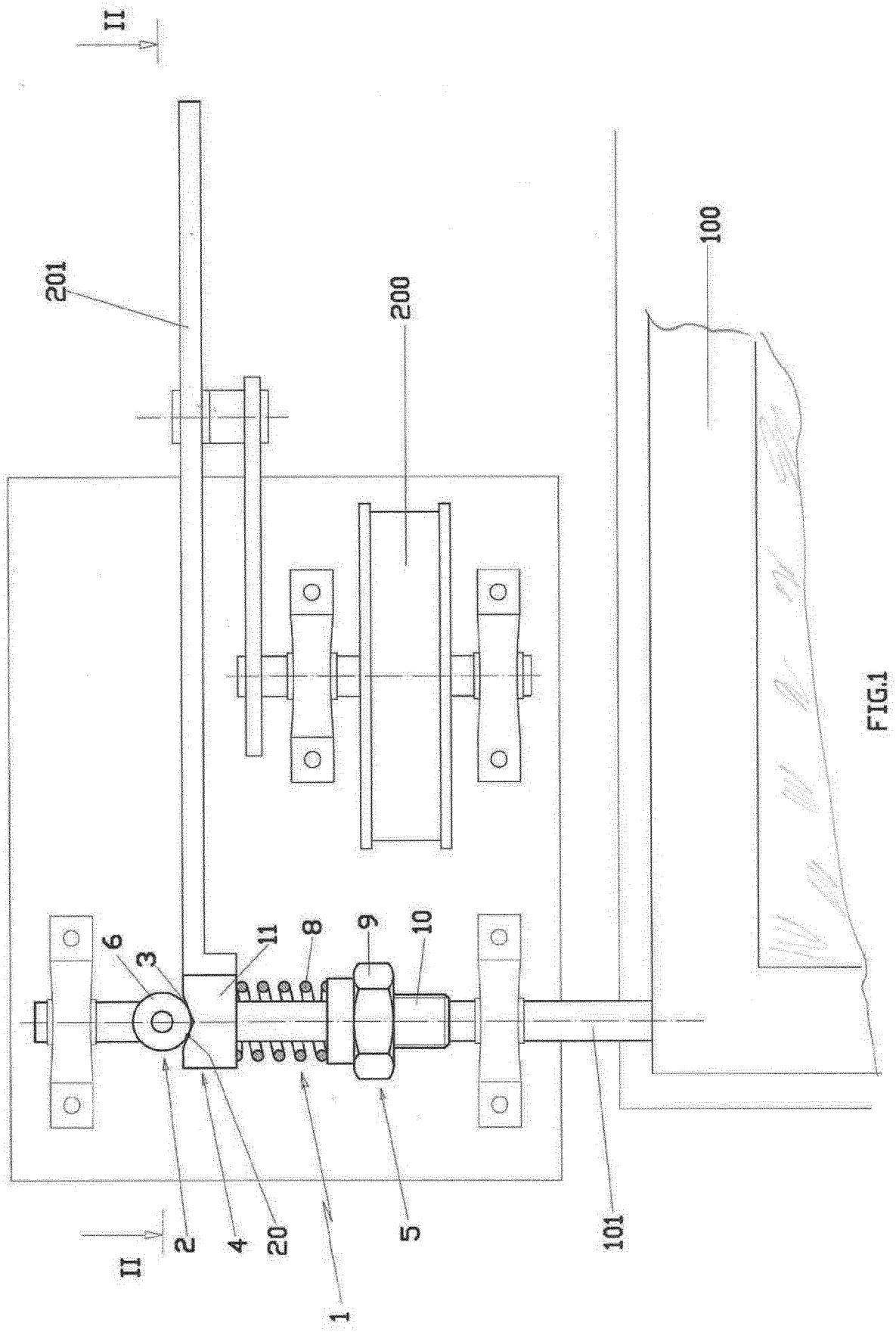


FIG.1

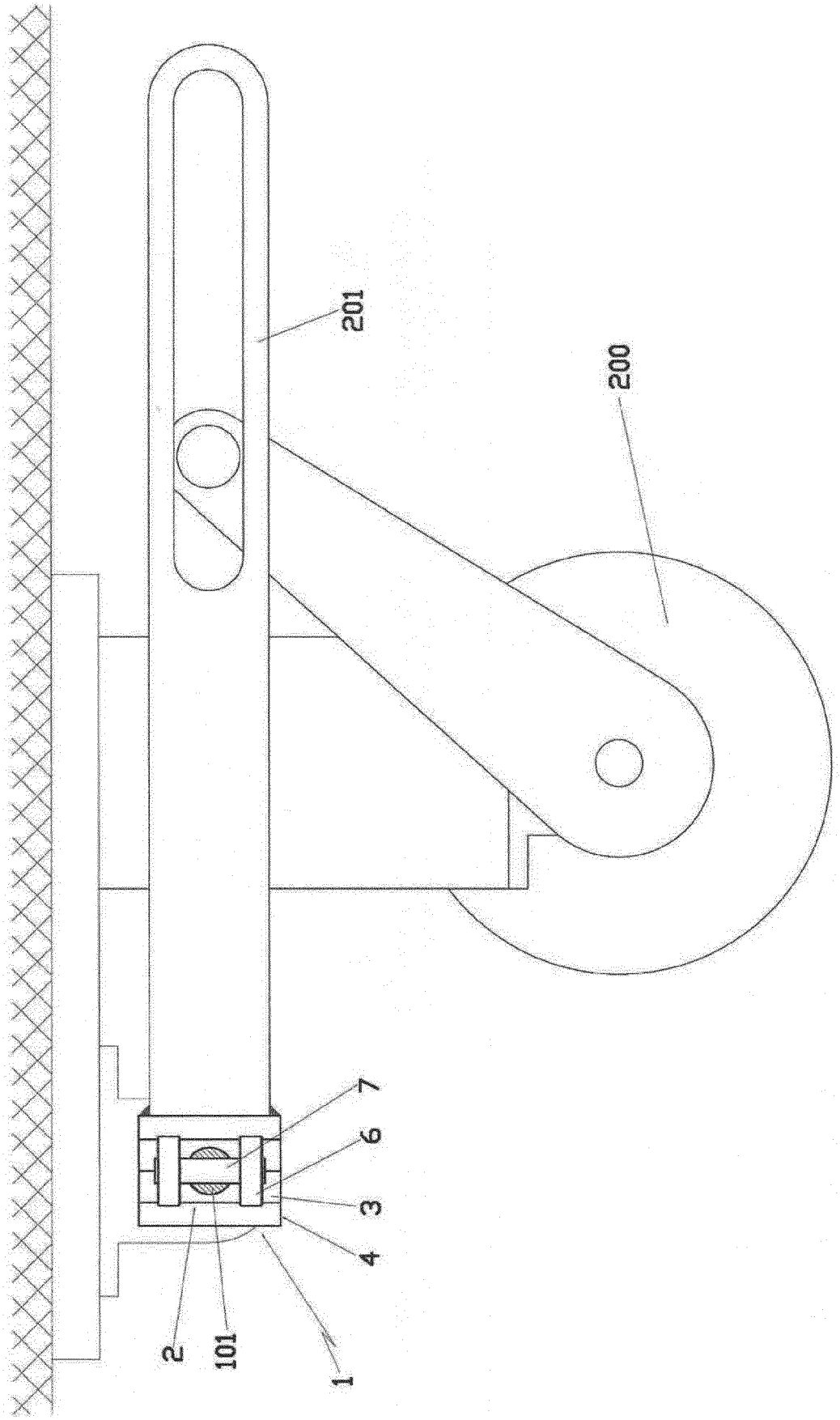


FIG.2

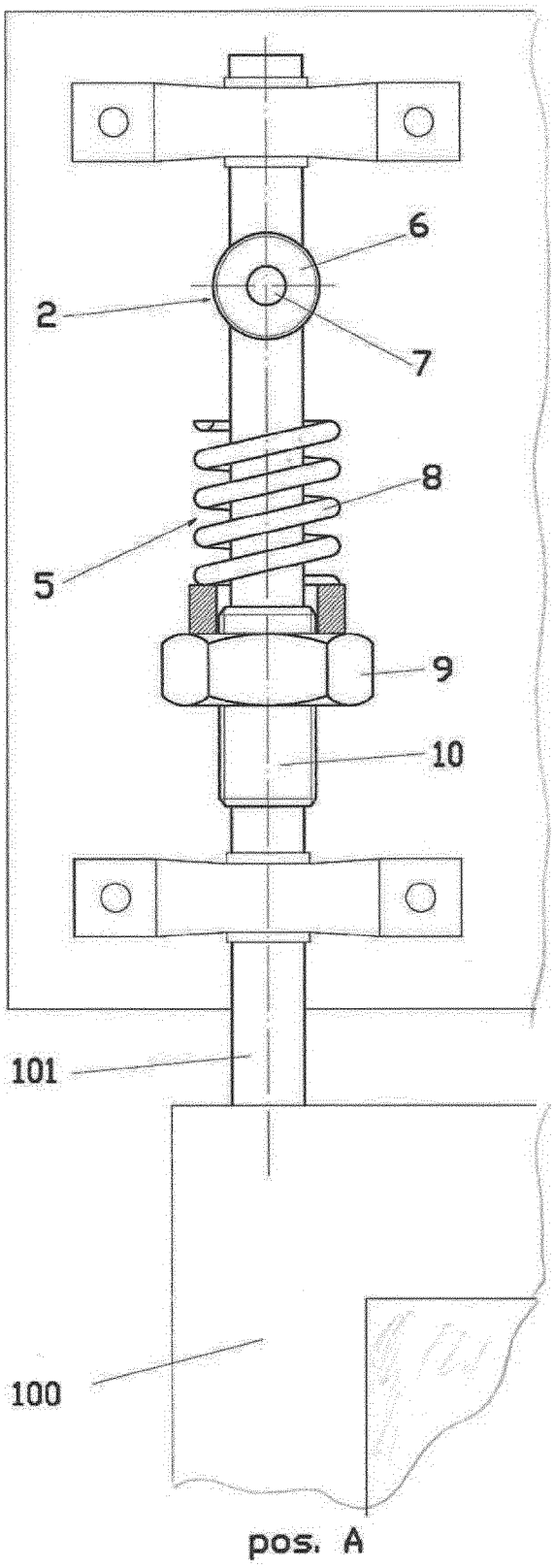


FIG.3

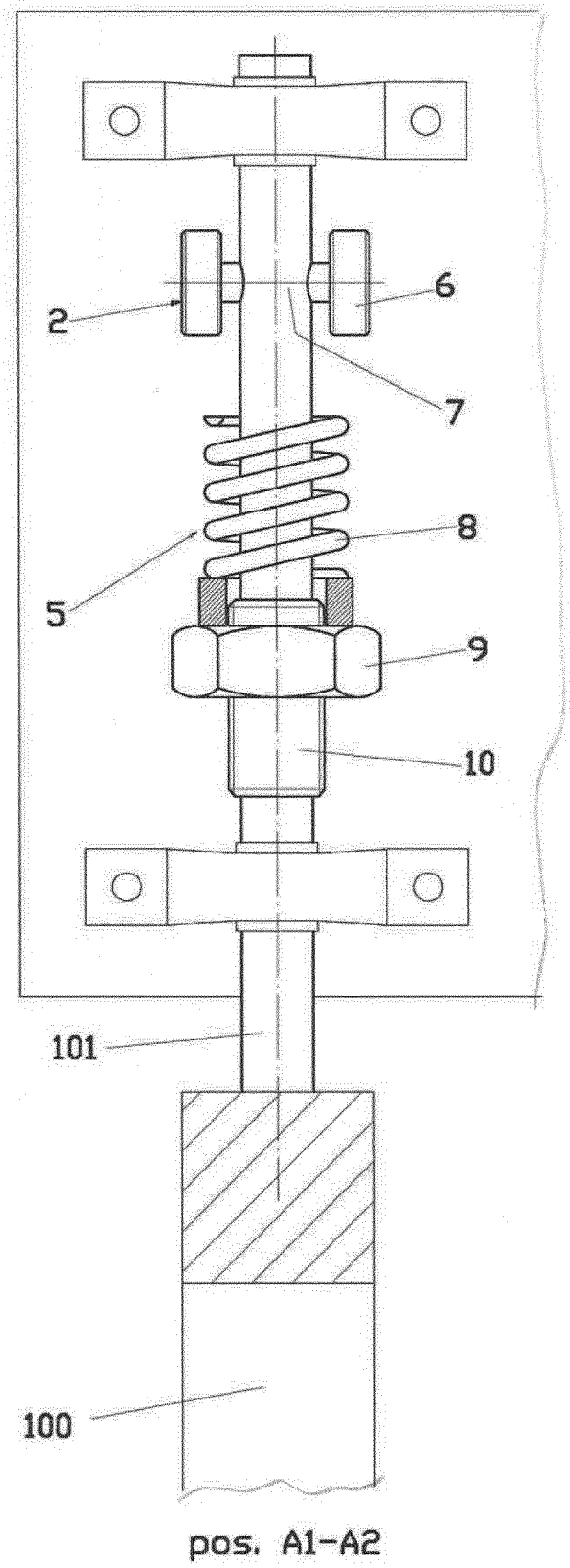


FIG.4

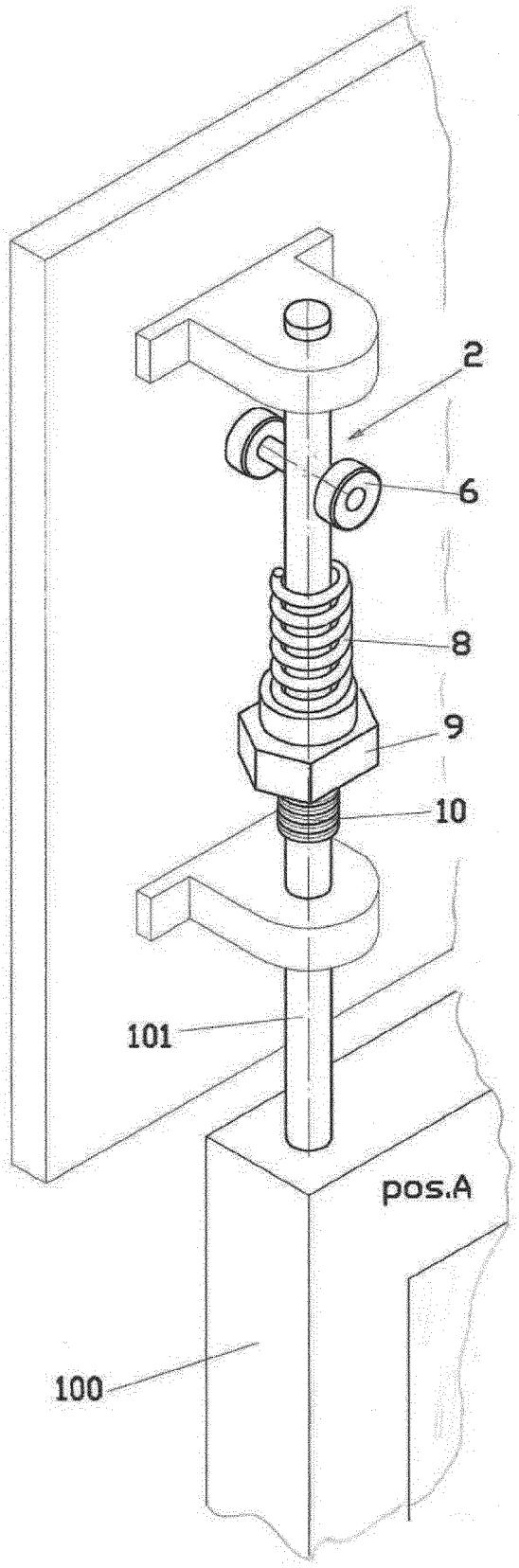


FIG.5

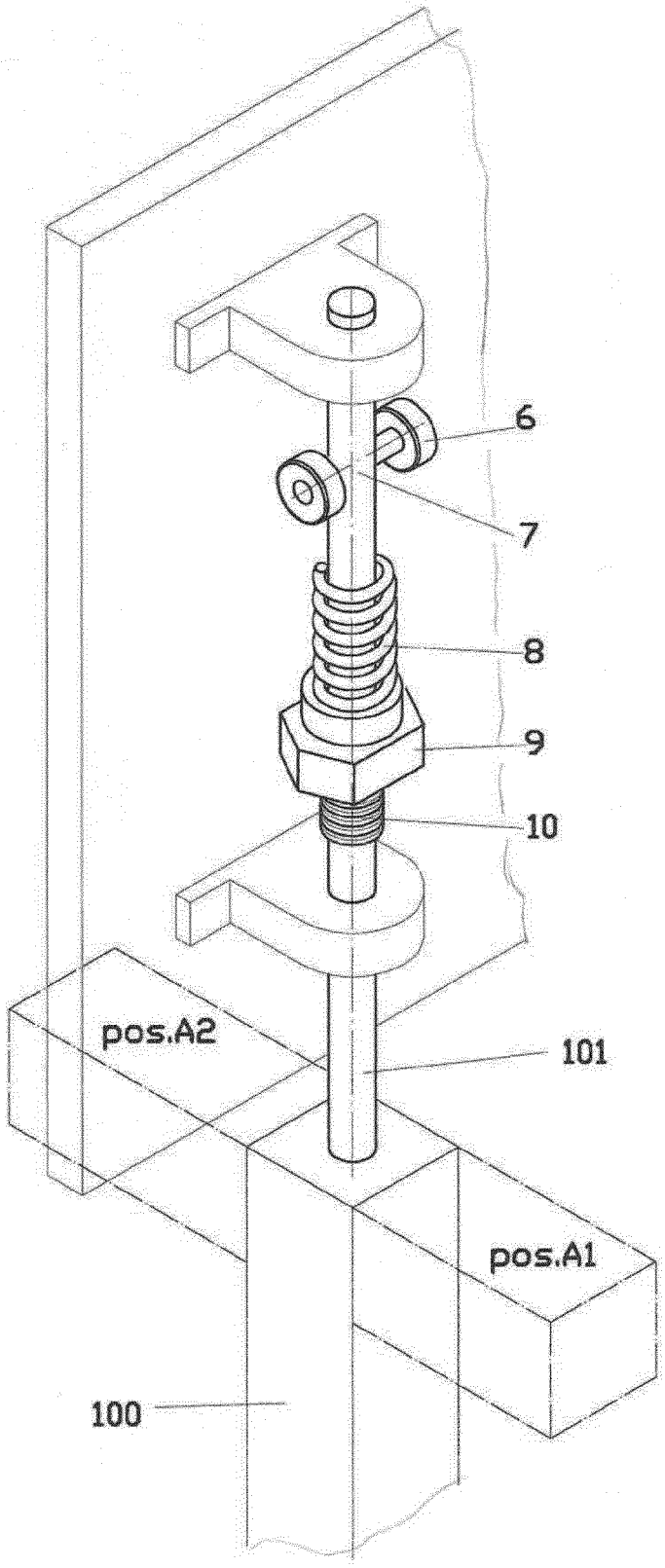


FIG.6

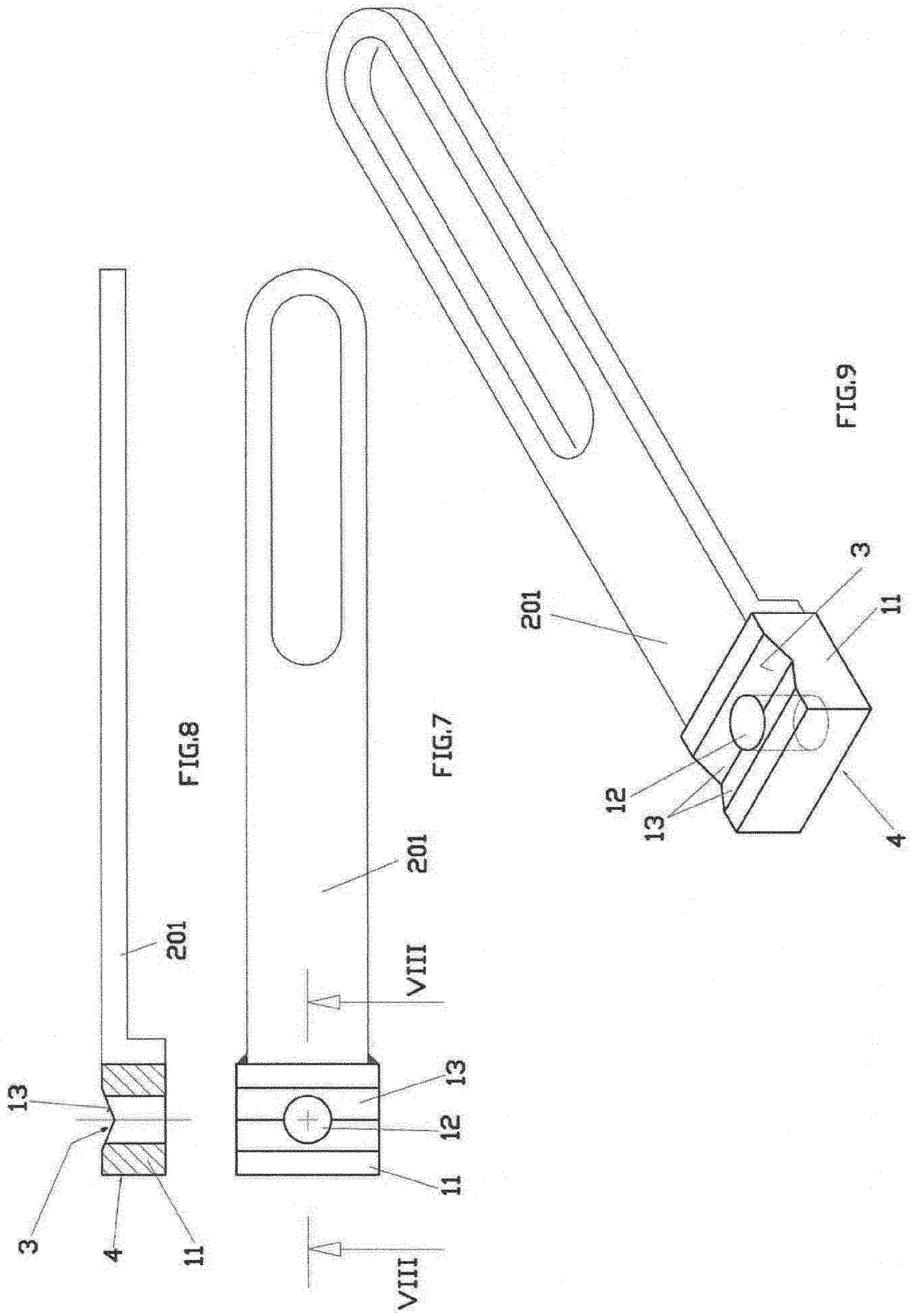
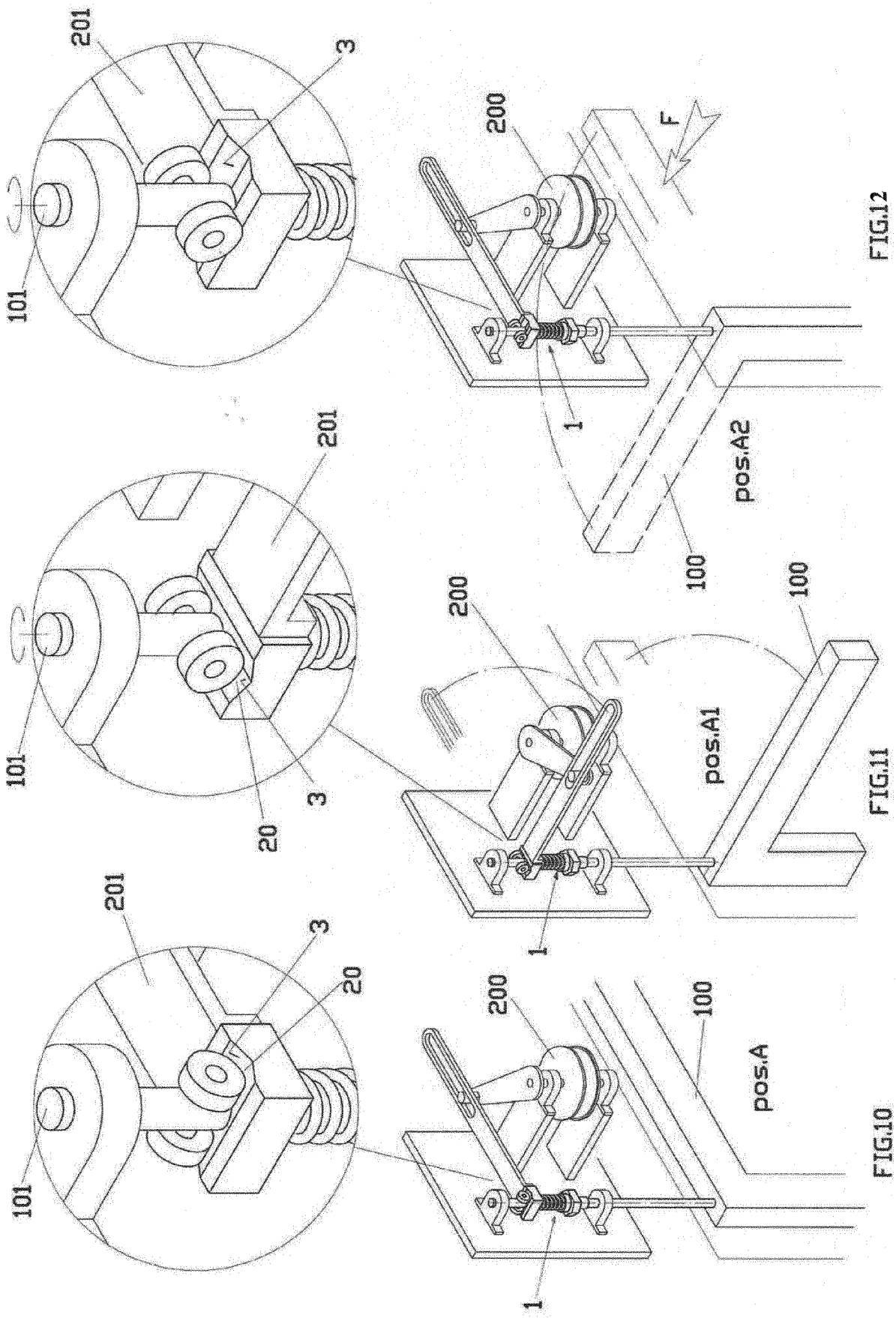


FIG.8
201
13
3
4
11
FIG.7
201
VIII
13
12
11
VIII
FIG.9
201
3
11
12
13
4


201
3
101
200
F
1
100
pos.A2
FIG.12
201
101
20
3
200
100
pos.A1
FIG.11
201
3
20
101
200
100
pos.A
FIG.10

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 17 18 4187

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	EP 1 529 911 A2 (BERTOLDO F LLI S N C [IT]) 11 May 2005 (2005-05-11) * claims 1, 4; figures 1, 8 * -----	1	INV. E05B65/10 E05F15/63

TECHNICAL FIELDS SEARCHED (IPC)

E05B
E05F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	11 January 2018	Crespo Vallejo, D

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 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 17 18 4187

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.

11-01-2018

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1529911 A2	11-05-2005	NONE	

EPO FORM P0459

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

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 0554438 B1 **[0006]**
- EP 1529911 A2 **[0007]**