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(54) **Door, of the type that has at least one openable wing equipped with a combined translation and rotation movement about a vertical axis**

(57) The finding concerns a door, of the type that has at least one openable wing equipped with combined translation and rotation movement about a vertical axis, to take it from a position perpendicular to its doorpost (closed position) to a position parallel to the aforementioned doorpost (open position) and vice-versa. Such a door is **characterised in that** the wing (A) is equipped with rotating-translation movement, which makes the opening/closing movement automatically, equally effectively in the two directions, i.e. from the side where the user who is waiting to pass through the door is located, who is detected by sensors arranged on both sides of the door itself.

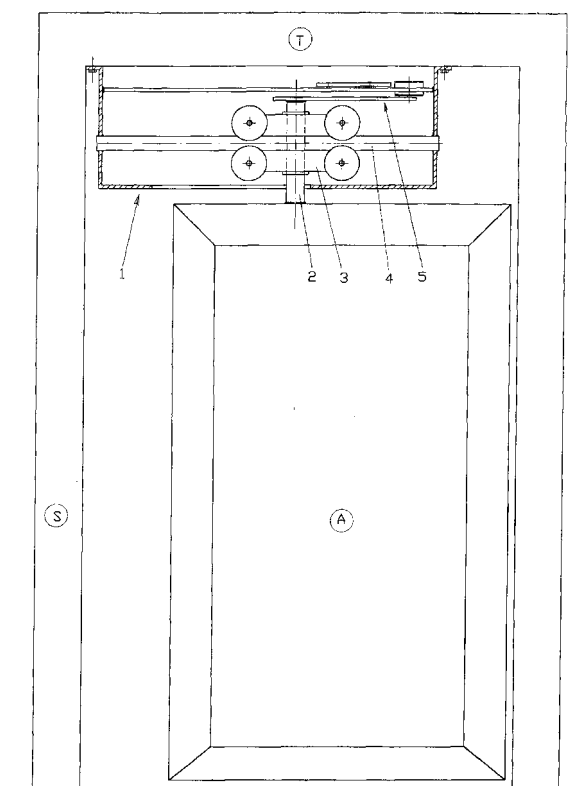


FIG.1

Description

[0001] The present finding concerns an openable wing equipped with combined translation and rotation movement about a vertical axis, according to the general part of claim 1.

[0002] In buildings open to the public, such as supermarkets, shopping centres, places of entertainment, waiting rooms for stations, airports and similar, doors with sliding wings are often installed that open when a signal of a user being present near to the door is received, sliding sideways and going into special seats formed at the side with respect to the free space of the door itself.

[0003] Doors have also been made with wings equipped with means suitable for causing a combined translation and rotation movement about a vertical axis on the aforementioned wings at the time of opening, to take them from a position perpendicular to their doorpost to a position parallel to the aforementioned doorpost.

[0004] In this way, there is no need to provide side spaces to receive the wings; moreover it is possible to foresee panic devices capable of allowing doors to be opened immediately, even when there is no electrical energy, only after said wings have been pressed.

[0005] As an example we quote patent documents no. VI91A000138 and VI2003A000213, which describe doors with wings sliding with rotating-translation movement in which each of the wings is engaged, at its outer edge, with a vertical shaft, which has the dual function of supporting the wing and of moving it, to make the door open/close automatically.

[0006] In the current state of the art, in such constructive solutions the wing always opens according to a single direction, normally inwards, i.e. to the side where the user is waiting for the door to open.

[0007] This one-directional operation of the door (always opening according to a single direction) and a substantial bulk towards the inside, caused by the wing, rotated by 90°, which rests at the doorpost, which therefore has a width equal to the width of the wing itself, constitute operative drawbacks that limit the use of sliding doors of the type described above.

[0008] For example, we quote the doors used in the dining halls of restaurants, where it is necessary for them to open quickly in both directions, to allow the waiters to pass quickly; at the same time, when they are open, they need to have a minimum lateral bulk due to the confined nature of the rooms in which they are applied.

[0009] The purpose of the present finding is to make a door equipped with one or more wings provided with rotating-translation movement, which does not have the operative drawbacks of similar known products.

[0010] Specifically, the purpose of the finding is to make a door with one or more wings provided with rotating-translation movement, which opens automatically, equally effectively in the two directions, and configured so that, in open position, the wings occupy a minimum lateral bulk.

[0011] Such a purpose is accomplished with a door in which the wing is connected to a motor group equipped with a trolley that makes the aforementioned wing move linearly in either direction (perpendicular to the doorpost) and with a lever mechanism, which makes the same wing rotate angularly by 90°, so as to obtain the rotating-translation movement to open/close the door.

[0012] Moreover, the lever mechanism engages in a cam equipped with a profile that is symmetrical with respect to the direction defined by the wing in closed position.

[0013] In this way, the wing can open equally effectively in both directions, in relation to the position of the user who is waiting for the door to open, who is detected by the sensors arranged on both sides of the door itself.

[0014] In practice, the user can arrive on either side of the door and always find that the wing (single door) or the two wings (double door) open inwards, i.e. to the side where he is waiting to pass through the door.

[0015] The finding shall be better defined through the description of a possible embodiment thereof, given as a non-limiting example, with the help of the attached tables of drawings, where:

Fig. 1 (table I) represents an elevated view of a door with a wing according to the finding;

Fig. 2 (table II) represents an elevated view of the trolley that moves the wing according to the finding;

Fig. 3 represents a section view according to the line III-III of what is illustrated in fig. 2;

Figs. 4, 5 and 6, 7 (table III) represent plan and detailed views of the wing in the two opening directions.

[0016] As can be seen in the figures, the door according to the finding is of the type in which the wing, indicated with reference letter A, makes a combined translation and rotation movement on the vertical plane, to go from the closed position A1 (perpendicular to the doorpost S) to the open position A2 (parallel to the wall of the doorpost itself) and vice-versa.

[0017] The movement of the wing A is carried out, according to the finding, through a motor group, wholly indicated with reference numeral 1, applied onto the transom T of the door and that supports the wing through a projecting pin 2, with vertical axis, welded onto the top part of the wing itself.

[0018] The pin 2 is applied idly onto a trolley, wholly indicated with reference numeral 3, which, sliding on guides 4, makes the wing translate rectilinearly.

[0019] Said pin 2 is connected to a lever mechanism, wholly indicated with reference numeral 5, consisting of a lever arm 6, welded to the aforementioned pin and equipped at its end with a pawl 7, engaged so as to slide on a cam, wholly indicated with reference numeral 8, made up of a shaped channel 9, formed on a fixed plate

10.

[0020] As can be seen in the figures in plan of the motor group 1, the shaped channel 9 consists of two curvilinear lozenges 9.1 and 9.2, arranged symmetrically with respect to the direction of linear sliding of the trolley 3, i.e. with respect to the direction of the wing in closed position.

[0021] Said curvilinear lozenges 9.1 and 9.2 have one of their ends, the one farthest from the doorpost, in common, and they are configured so that, keeping the distance between the rotation axis of the pin 2 and the rotation axis of the pawl 7 constant, following the linear sliding of the trolley 4 and the sliding in one of the two lozenges of the pawl 7, the wing A is made to move in rotating-translation in either direction that makes the door open/close.

[0022] In practice, as can be seen from the figures, thanks to the substantially C-shaped configuration of the shaped channel 9, when the pawl 7, pulled by the sliding of the trolley 3, is engaged so as to slide on one of the two lozenges 9.1 or 9.2, it transmits an angular rotation to the pin 2, through the lever arm 6, such that the wing passes from the closed position (perpendicular to the doorpost), when the pawl is arranged in the centre, i.e. in the meeting point of the two lozenges 9.1 and 9.2, to the open position (parallel to the doorpost), in one direction or in the opposite direction, when the aforementioned pawl has travelled the entire extension of the lozenge 9.1 or 9.2 and vice-versa.

[0023] The lever mechanism 5 is complete with a deviation device, wholly indicated with reference numeral 11, which forces the pawl 7 to travel across one of the two lozenges 9.1, 9.2, according to the position of the user, i.e. whether he is located on one side or the opposite side of the door to be passed through.

[0024] Such a device comprises a bracket 12, hinged idly on a pin 13 of the plate 10 and that has the end shaped like a point 14.

[0025] Specifically, the point 14 projects with respect to the internal profile K of the channel 9, so as to constitute, respectively, the extension of the channel with one side 14.1 and the narrowing of the aforementioned channel with the opposite side 14.2.

[0026] In this way, the pawl 7, which when the wing is closed is advantageously held in the recessed seat 15, with the movement of the trolley 3, at the start of the door opening, is taken into contact with the point 14 and is deviated by it to slide on one of the two lozenges 9.1 or 9.2, according to the orientation of the position of the bracket 12, i.e. the two positions P1 or P2 taken up by the aforementioned bracket when the wing is required to open in one direction or in the opposite direction.

[0027] The two movements that engage the motor group 1, i.e. the linear sliding either way of the trolley 11 on the guides 4 and the angular rotation of the bracket 12 on the pin 13 are obtained, respectively, with a stepper motor and with an electromagnet or with other commercial devices suitable for the purpose.

[0028] In doors with two wings two motor groups 1 are

used that operate in symmetry with each other and they can be activated individually or simultaneously, according to how the door needs to open.

[0029] Of course, embodiments different to the one described are also possible, according to the size, use and the components used without, for this reason, departing from the scope of protection of the following claims

10 Claims

1. DOOR, OF THE TYPE THAT HAS AT LEAST ONE OPENABLE WING EQUIPPED WITH A COMBINED TRANSLATION AND ROTATION MOVEMENT ABOUT A VERTICAL AXIS, to take it from a position perpendicular to its doorpost (closed position) to a position parallel to the aforementioned doorpost (open position) and vice-versa, said door being **characterised in that** the wing (A) is equipped with rotating-translation movement, which makes the opening/closing movement automatically, equally effectively in the two directions, i.e. from the side where the user who is waiting to pass through the door is located, who is detected by sensors arranged on both sides of the door itself
2. DOOR, according to claim 1, **characterised in that** the wing is connected to a motor group (1) equipped with a trolley (3), which makes the wing move linearly in either direction, perpendicular to the doorpost and with a lever mechanism (5), which makes the same wing rotate angularly by 90°, according to both directions, so as to obtain the rotating-translation movement to open/close the door in both of said directions.
3. DOOR, according to claim 2, **characterised in that** the lever mechanism (5) engages in a cam (8) equipped with a profile that is symmetrical with respect to the direction defined by the wing in closed position.
4. DOOR, according to one or more of the previous claims, of the type in which the wing (A) makes a combined translation and rotation movement on the vertical plane to go from the closed position perpendicular to the doorpost (S), to the open position, parallel to the wall of the doorpost itself and vice-versa, said door being **characterised in that** the movement of the wing is made with a motor group (1), applied on the transom (T) of the door and that supports the wing through a projecting pin (2), with vertical axis, welded onto the top part of the wing itself and said pin (2) is applied, so as to be idle, on a trolley (3) that, sliding on guides (4), makes the wing translate rectilinearly in either direction..
5. DOOR, according to claim 2, **characterised in that**

the pin (2) is connected to a lever mechanism (5), consisting of a lever arm (6), welded to the aforementioned pin and equipped, at its end, with a pawl (7), engaged to slide on cam (8).

6. DOOR, according to claim 5, **characterised in that** the cam (8) consists of a shaped channel (9) inside which the pawl (7) is engaged so as to slide and formed on a fixed plate (10). 5
7. DOOR, according to claim 6, **characterised in that** the shaped channel (9) consists of two curvilinear lozenges (9.1, 9.2) arranged symmetrically with respect to the direction of linear sliding of the trolley (3), i.e. with respect to the direction of the wing in closed position.. 10
8. DOOR, according to claim 7, **characterised in that** the shaped channel (9) has a C-shaped configuration so that, when the pawl (7), pulled by the sliding of the trolley (3), is engaged to side on one of the two lozenges (9.1, 9.2), it transmits an angular rotation to the pin (2), through the lever arm (6), such that the wing passes from the closed position, perpendicular to the doorpost, when the pawl is arranged in the centre, i.e. in the meeting point of the aforementioned two lozenges, to the open position, parallel to the doorpost, in one direction or the opposite direction, when the aforementioned pawl has travelled the entire extension of the lozenge and vice-versa. 20
9. DOOR, according to one or more of the previous claims, **characterised in that** the lever mechanism (5) is complete with a deviation device (11), which forces the pawl (7) to travel along one of the two lozenges (9.1, 9.2), according to the position of the user, i.e. whether he is located on one side or the opposite side of the door to be passed through. 25
10. DOOR, according to claim 9, **characterised in that** the deviation device (11) comprises a bracket (12), hinged idly on a pin (13) of the plate (10) and that has the end shaped like a point (14). 30
11. DOOR, according to claim 10, **characterised in that** the point (14) projects with respect to the internal profile (K) of the channel (9), so as to constitute the extension of the channel with one side (14.1) and the narrowing of the aforementioned channel with the opposite side (14.2). 35
12. DOOR, according to one or more of the previous claims, **characterised in that**, with the wing closed, the pawl (7) is held in a recessed seat (15). 40
13. DOOR, according to one or more of the previous claims, **characterised in that** the pawl (7), at the 45

start of the wing being opened, at the moment of movement of the trolley (3), is taken into contact with the point (14) and is deviated by it to slide on one of the two lozenges (9.1, 9.2), according to the orientation of the position of the bracket (12), i.e. the two positions (P1, P2) that the aforementioned bracket takes up when the wing is required to open according to one direction or according to the opposite direction. 50

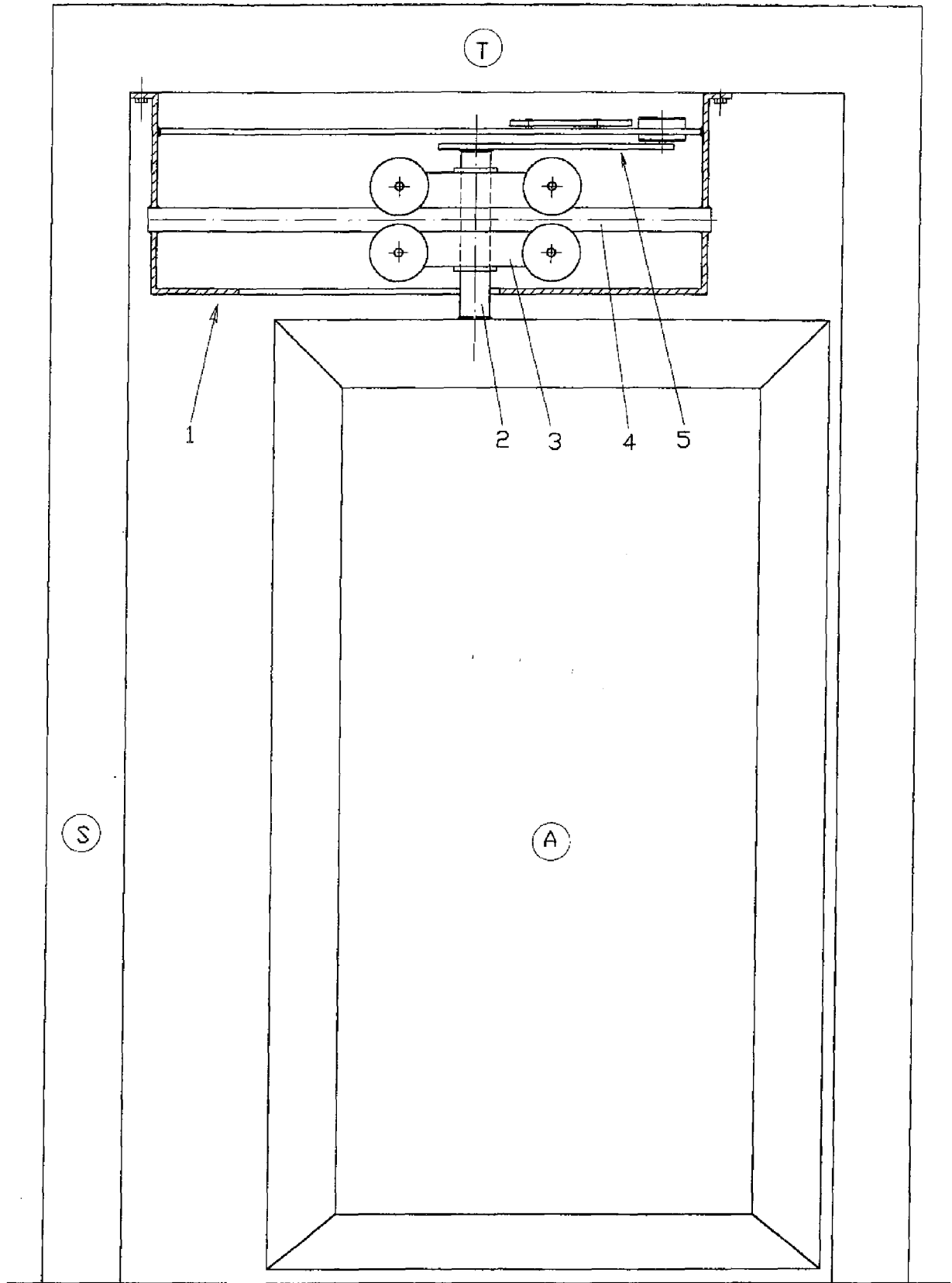
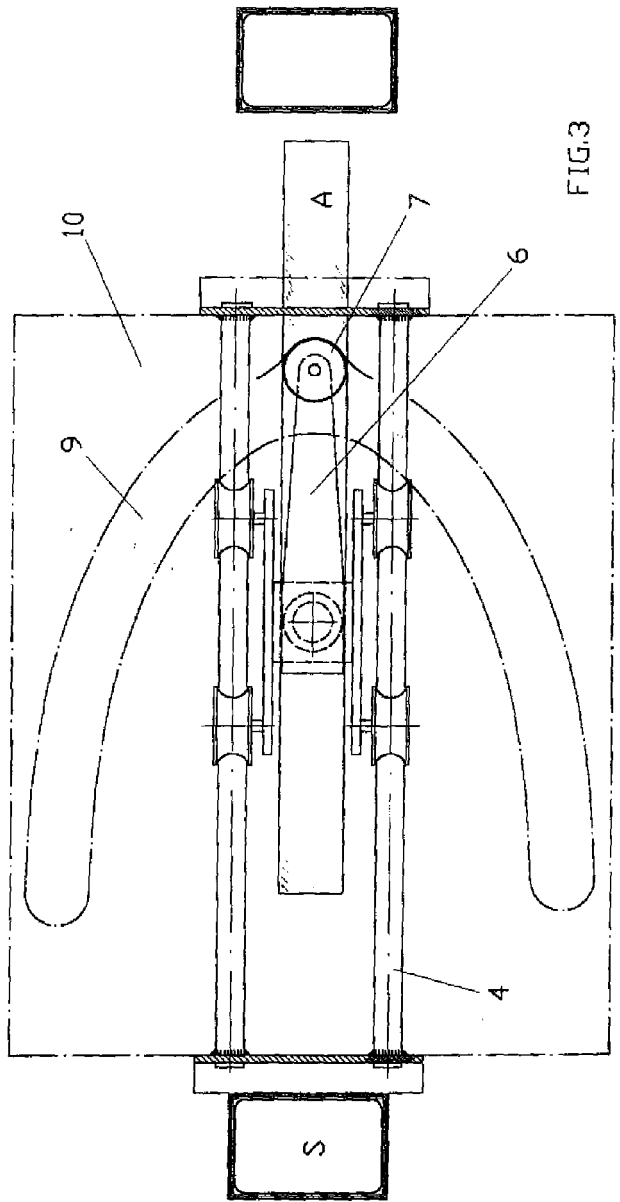
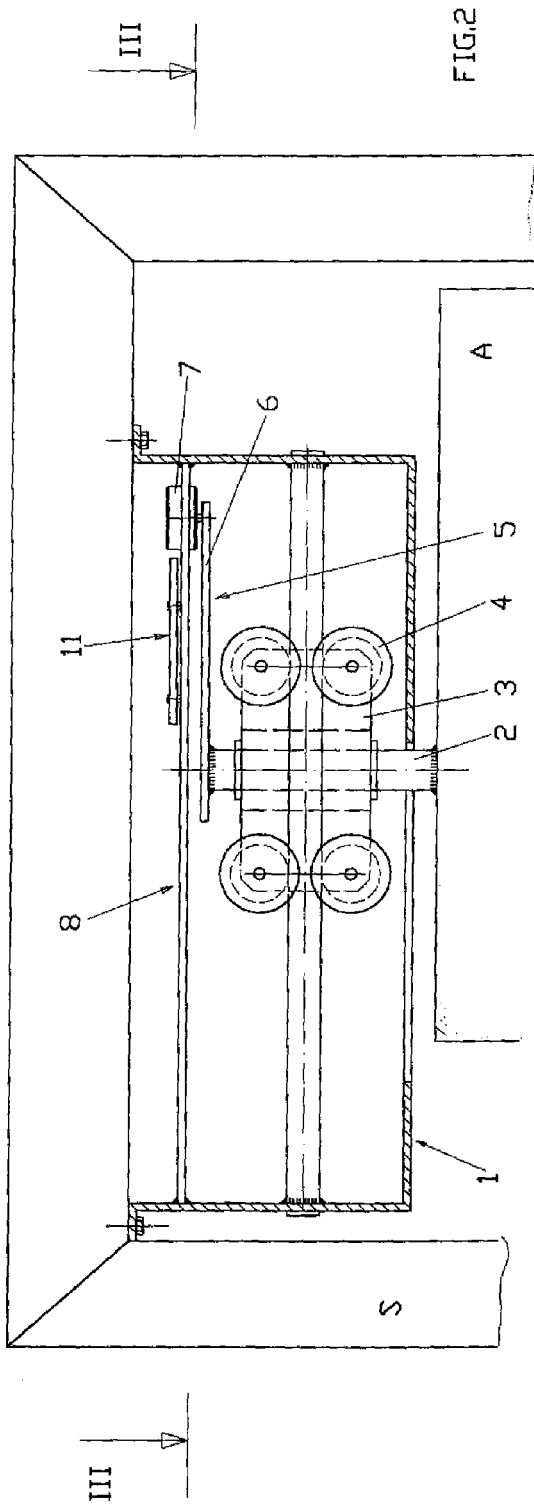
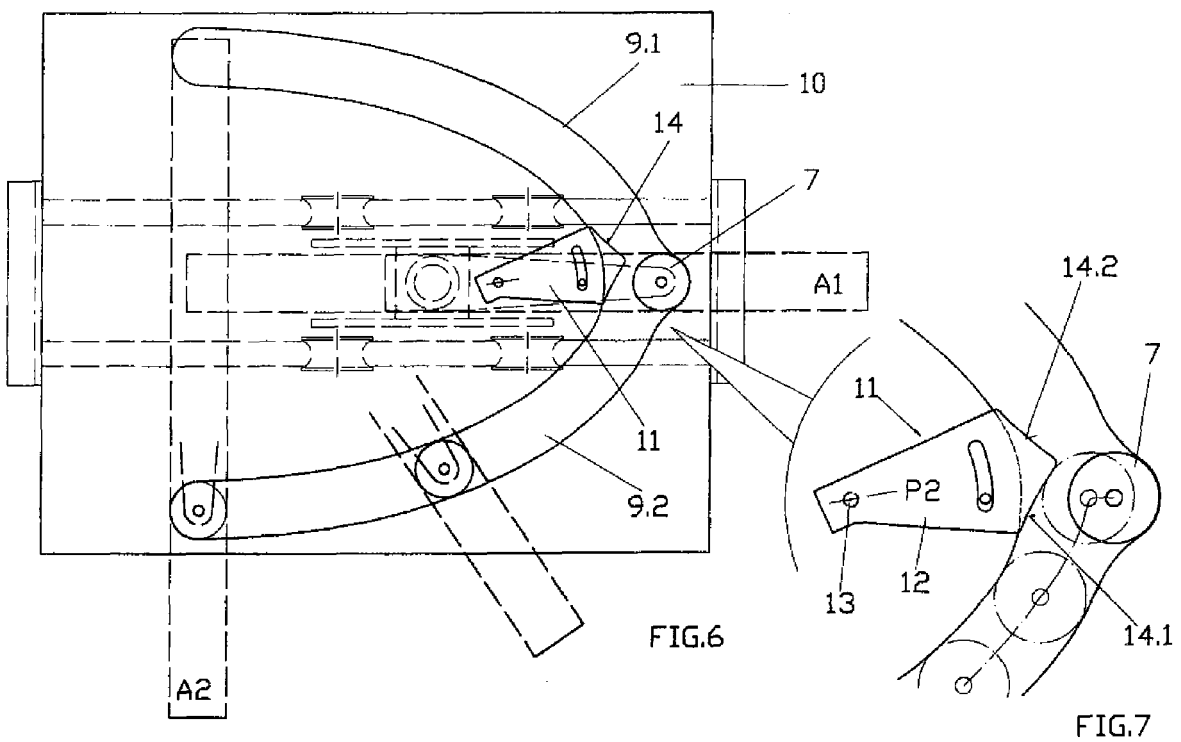
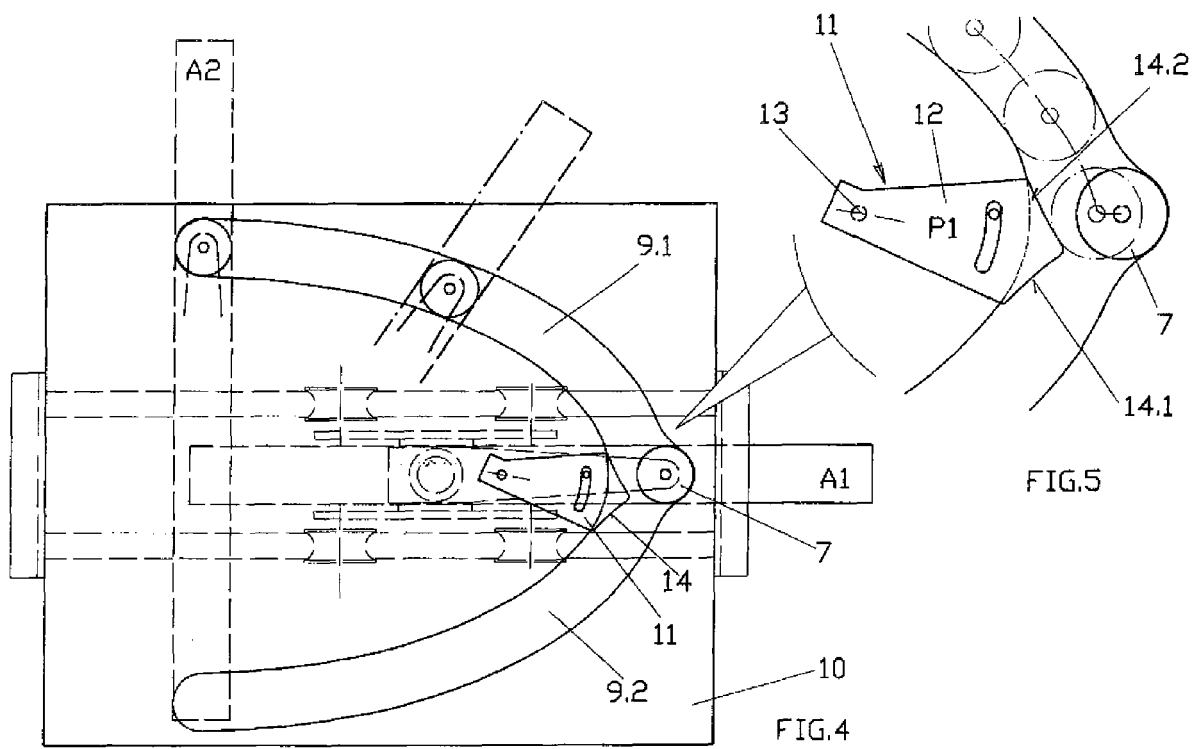


FIG.1





REFERENCES CITED IN THE DESCRIPTION

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