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(54) SECURITY LOCK FOR A CLOSING ELEMENT, IN PARTICULAR AN ARMORED DOOR

(57) Security lock (10) for a closing element (11), in particular an armored door, comprising: a containing structure (19) with a substantially box-like shape, a latch (23) able to be commanded by a first command mechanism (25), at least one bolt (27) able to be commanded by a second command mechanism (29), and actuation means (30) for the first command mechanism (25), which comprise both a drive member (31) disposed in a containing compartment (32) positioned outside the bulk of the containing structure (19) and preferably drivable manually, and a lever system (36) that mechanically connects the drive member (31) to the command mechanism (25) of the latch (23).

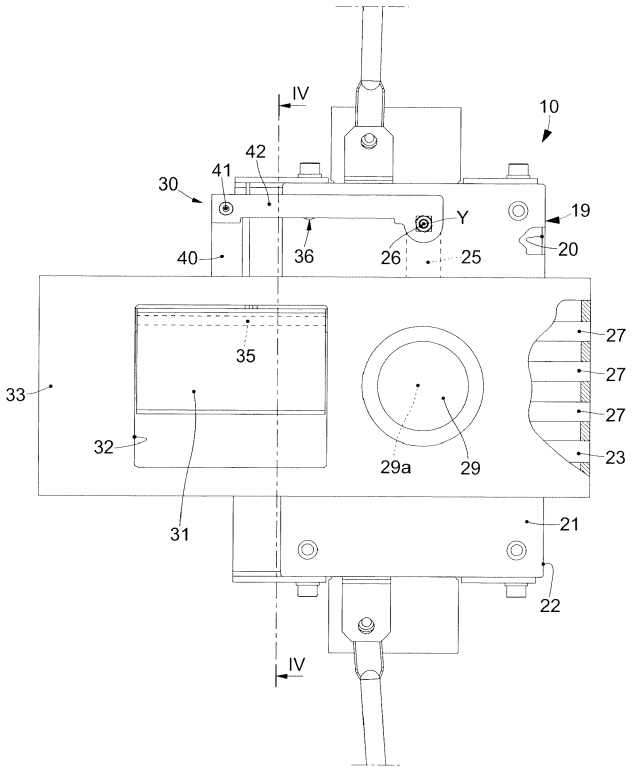

fig. 3

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Description

FIELD OF THE INVENTION

[0001] The present invention concerns a security lock for a closing element, in particular an armored door. The security lock can be of the type provided with a first command mechanism configured to manually command the selective opening and closing of a latch, and a second command mechanism configured to command, either manually, electrically or electronically, the selective opening and closing of one or more bolts, with respect to a fixed element, such as for example a support frame or structure.

BACKGROUND OF THE INVENTION

[0002] In the field of closing elements, such as for example armored doors, various types of security locks are known, which allow to command both a latch and also one or more bolts.

[0003] In fact, the state of the art in this field is very crowded and over time hundreds of locks have been designed and marketed.

[0004] Some command mechanisms to command a latch and/or one or more bolts are described, for example, in the German patent DE196968, which dates back to 1907, or in the more recent European patent applications EP0378.124, EP1.731.697, EP1.862.616 and EP2.123.852, or in the international patent application WO2007/072525.

[0005] Many of the known locks provide that the latch is driven, to take it from an operating position, in which it protrudes from the containing structure, to its retracted position, in which it is completely inside the latter; this operation is carried out manually by means of a classic handle which can be gripped with one hand by the user.

[0006] This makes known locks non-esthetic and sometimes difficult to drive.

[0007] Therefore, one purpose of the present invention is to provide a security lock for closing elements, such as for example armored doors, which is robust, simple to make and reliable and which, at the same time, allows an easy and convenient command to drive the latch.

[0008] The Applicant has devised, tested and embodied the present invention to overcome the shortcomings of the state of the art and to obtain these and other purposes and advantages.

SUMMARY OF THE INVENTION

[0009] The present invention is set forth and characterized in the independent claim, while the dependent claims describe other characteristics of the invention or variants to the main inventive idea.

[0010] In accordance with the above purposes, a security lock according to the present invention for a closing element, in particular an armored door, comprises:

- a containing structure with a substantially box-like shape that defines an internal compartment and has at least one front wall and one lateral wall;
- a latch slidable inside the containing structure between an operating position in which the latch has an external end protruding with respect to the lateral wall, and a retracted position in which the latch is completely inside the containing structure;
- a first command mechanism disposed inside the containing structure and configured to selectively command the movement of the latch between the operating position and the retracted position;
- at least actuation means to command the first command mechanism;
- at least one bolt disposed inside the containing structure and sliding between an inactive position, in which the bolt is completely inside the containing structure, and one or more closed positions, in which an external end of the bolt is outside the box-like containing structure, in correspondence with the lateral wall;
- and a second command mechanism configured to command the selective movement of the bolt between the inactive position and the one or more closed positions.

[0011] In accordance with a characteristic aspect of the present invention, the actuation means comprise an actuation element disposed in a containing compartment having an open side and positioned outside the bulk of the containing structure and preferably drivable manually, and connection means which connect the actuation element to the first command mechanism.

[0012] In accordance with another characteristic aspect of the present invention, the drive member comprises a plate, substantially rectangular for example, attached to an internal element pivoted on a fixed horizontal pin mounted on lateral walls of the containing compartment.

[0013] In accordance with another characteristic aspect of the present invention, the connection means comprise a lever system, disposed outside the containing structure and mechanically connecting the drive member to an actuation element connected to the first command mechanism, for its actuation.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] These and other characteristics of the present invention will become apparent from the following description of some embodiments, given as a non-restrictive example with reference to the attached drawings wherein:

- fig. 1 is a first front view of a security lock according to the present invention, mounted on a closing element shown in a closed position with respect to a fixed support frame, in accordance with a first em-

bodiment;

- fig. 2 is a second front view of a security lock according to the present invention, mounted on a closing element shown in a closed position with respect to a fixed support frame, in accordance with a second embodiment;
- fig. 3 is a front view, on an enlarged scale, of the security lock in fig. 1;
- fig. 4 is a longitudinal section along the line IV-IV of fig. 3, on a more enlarged scale, of the security lock in fig. 1;
- fig. 5 is a front view, on a more enlarged scale and with some components removed, in order to better show other parts of the security lock in fig. 1;
- fig. 6 is a right lateral view, on a more enlarged scale, of the security lock in fig. 1.

[0015] We must clarify that, in the present description and claims, the words vertical, horizontal, lower, upper, left, right, top and bottom, with their declinations, have the sole function of illustrating the present invention better, with reference to the drawings, and must in no way be used to limit the scope of the invention or the field of protection defined by the attached claims. For example, by the word vertical we mean an axis or plane that can be both perpendicular to the line of the horizon and also inclined, even by some degrees, for example up to 30°, with respect to said perpendicular position.

[0016] Furthermore, in the different embodiments described below, the same reference numbers refer to similar or identical components of the security lock according to the present invention.

DETAILED DESCRIPTION OF SOME EMBODIMENTS

[0017] With reference to fig. 1, according to a first embodiment, a security lock 10 according to the present invention is shown mounted on a closing element 11, for example an armored door.

[0018] For example, the closing element 11 is mounted hinged along a vertical hinging axis X, on a support frame 12, by means of two hinging devices 13 and 14, the first mounted inside an upper zone of the closing element 11 and the second inside a lower zone of the closing element 11. In this case, the hinging axis X is parallel and distant from a left lateral edge 15 of the closing element 11.

[0019] According to the first embodiment, the security lock 10 is mounted adjacent to a right lateral edge 16 of the closing element 11, opposite the left lateral edge 15, to cooperate with a jamb 17, on the right in the example shown in fig. 1, of the support frame 12.

[0020] According to a second embodiment, shown in fig. 2, the closing element 11 is mounted specular on the support frame 12, so that the security lock 10 is mounted adjacent to the left lateral edge 15 of the closing element 11 to cooperate with the jamb 18, on the left in the example shown in fig. 2, of the support frame 12.

[0021] The security lock 10 (figs. 3 and 5) comprises a containing structure 19 with a substantially box-like shape, which defines an internal compartment 20 and has at least one front wall 21 and one lateral wall 22 (fig. 6).

[0022] A substantially cylindrical latch 23 (figs. 5 and 6) is mounted axially sliding inside the containing structure 19, between an operating position, shown in fig. 5, in which it has an external end 24, wedge-shaped, protruding with respect to the lateral wall 22, and a retracted position, shown schematically in fig. 3, in which the latch 23 is wholly or partly inside the containing structure 19.

[0023] A first command mechanism 25 (figs. 3 and 5) is associated with the latch 23, and can be of any known type, or a type which will be developed in the future, disposed inside the containing structure 19 and having an actuation element 26 which protrudes slightly from the front wall 21, so that the first command mechanism 25 can be commanded from outside the containing structure 19. The actuation element 26 is rotatable around an axis of rotation Y with respect to the containing structure 19 and the first command mechanism 25 is configured so that a rotation in a counter-clockwise direction, for example by an angle of about 40°, of the actuation element 26 causes the latch 23 to move from its operating position to its retracted position.

[0024] The security lock 10 also comprises one or more bolts 27, substantially cylindrical and disposed parallel to one another inside the containing structure 19. The bolts 27 are all able to slide together between an inactive position, in which they are completely inside the containing structure 19 (fig. 3), and one or more closed positions, in which their external ends 28 (fig. 5) are outside the box-like structure, in correspondence with the lateral wall 22.

[0025] In the example provided here, there are three bolts 27, but there could be even more or less, or even just one.

[0026] A second command mechanism 29 (figs. 3 and 5) is associated with the latches 27, and can be of any known type, or a type which will be developed in the future, and which is disposed inside the containing structure 19 and can be driven from outside the latter, for example by means of a key, or by means of electrical and/or electronic devices positioned anywhere.

[0027] For example, the first command mechanism 25 and the second command mechanism 29 can be of the type described in any of the patent documents cited above.

[0028] The security lock 10 also comprises actuation means 30 (figs. 3, 4 and 5) to command the rotation of the actuation element 26 of the first command mechanism 25.

[0029] According to one characteristic of the present invention, the actuation means 30 comprise a drive member 31, which acts as a handle, which is disposed in a containing compartment 32 made in an external plate 33 parallel to the front wall 21 of the containing structure 19 and therefore outside the bulk of the latter.

[0030] Advantageously, the containing compartment 32 (figs. 3 and 5) is positioned laterally with respect to the actuation zone 29a of the second command mechanism 29, on the opposite side with respect to the lateral wall 22 of the containing structure 19.

[0031] In particular, the drive member 31 consists of a substantially rectangular plate attached to an internal element 34 (figs. 4 and 5) pivoted on a fixed horizontal pin 35, mounted on the lateral walls of the containing compartment 32.

[0032] The actuation means 30 also comprise a lever system 36 which mechanically connects the drive member 31 to the actuation element 26 (figs. 4 and 5) of the first command mechanism 25.

[0033] The lever system 36 comprises in turn a first L-shaped lever 37, having one end attached to the internal element 34 and the other end provided with a hole 38 (fig. 4), into which a first peg 39 is inserted, with ample play.

[0034] The first peg 39 is attached to one end of a second lever 40 (figs. 3, 4 and 5), which has another end on which a second peg 41 is attached. A third lever 42 has one end attached to the actuation element 26 (figs. 3 and 5) and the other end connected to the second peg 41.

[0035] In this way, by making the drive member 31 rotate forward (fig. 3) with respect to the fixed pin 35, a corresponding rotation in a counter-clockwise direction of the actuation element 26 is caused with respect to the axis of rotation Y, sufficient to open the latch 23, that is, to take it to its retracted position. An elastic element, present in the first command mechanism 25 and not shown in the drawings, is able to return and maintain the drive member 31 in an inactive condition, parallel to the external plate 33 and completely inserted inside the containing compartment 32.

[0036] Preferably, the drive member 31 can be driven manually. For this reason the width of the containing compartment 32 is comprised between about 80 mm and about 150 mm, preferably about 100 mm, and its height is much greater than that of the drive member 31, so that below the latter there is a free space to allow the insertion of some fingers of the hand of a user of the security lock 10, to incline the drive member 31 with respect to the fixed pin 35 and thus open the latch 23.

[0037] Moreover, according to a variant, in the internal wall 43 (fig. 4) of the containing compartment 32, that is, the one parallel to the front wall 21 of the containing structure 19, one or more actuation push buttons 44 can be disposed, to command the second command mechanism 29, if the latter were able to be electrically and/or electronically driven.

[0038] It is clear that modifications and/or additions of parts may be made to the security lock 10 as described heretofore, without departing from the field and scope of the present invention.

[0039] It is also clear that, although the present invention has been described with reference to some specific examples, a person of skill in the art shall certainly be able to achieve many other equivalent forms of security locks, having the characteristics as set forth in the claims and hence all coming within the field of protection defined thereby.

Claims

1. Security lock (10) for a closing element (11), in particular an armored door, comprising: a containing structure (19) with a substantially box-like shape that defines an internal compartment (20) and has at least one front wall (21) and one lateral wall (22); a latch (23) slidable inside said containing structure (19) between an operating position in which said latch (23) has an external end (24) protruding with respect to said lateral wall (22), and a retracted position in which said latch (23) is completely inside said containing structure (19); a first command mechanism (25) disposed inside said containing structure (19) and configured to selectively command the movement of said latch (23) between said operating position and said retracted position; actuation means (30) to command said first command mechanism (25); at least one bolt (27) disposed inside said containing structure (19) and sliding between an inactive position, in which it is completely inside said containing structure (19) and one or more closed positions, in which an external end (28) of said at least one bolt (27) is outside said box-like containing structure (19), in correspondence with said lateral wall (22); and a second command mechanism (29) configured to command the selective movement of said at least one bolt (27) between said inactive position and said one or more closed positions, **characterized in that** said actuation means (30) comprise a drive member (31) disposed in a containing compartment (32) positioned outside the bulk of said containing structure (19) and preferably drivable manually, and connection means (36) which connect said drive member (31) to said first command mechanism (25).

2. Security lock (10) as in claim 1, **characterized in that** said drive member (31) comprises a plate attached to an internal element (34) pivoted on a fixed horizontal pin (35), mounted on lateral walls of said containing compartment (32).

3. Security lock (10) as in claim 1 or 2, **characterized in that** said connection means comprise a lever system (36), disposed outside said containing structure (19) and mechanically connecting said drive member (31) to an actuation element (26) connected to said first command mechanism (25), for its actuation.

4. Security lock (10) as in claims 2 and 3, **characterized in that** said lever system (36) comprises a first

lever (37), having one end attached to said internal element (34) and the other end provided with a hole (38), into which a first peg (39) is inserted with ample play, said first peg (39) being attached to one end of a second lever (40), which has another end on which a second peg (41) is attached; a third lever (42) having one end attached to said actuation element (26) and the other end connected to said second peg (41).

5. Security lock (10) as in claim 2 and 3 when it depends on claim 2 or 4, **characterized in that** the width of said containing compartment (32) is comprised between about 80 mm and about 150 mm, preferably about 100 mm, and its height is much greater than that of said drive member (31), so that below said drive member (31) there is a free space to allow the insertion of some fingers of the hand of a user of said security lock (10), in order to incline said drive member (31) with respect to said fixed pin (35) and thus open said latch (23), taking it from said operating position to said retracted position.

6. Security lock (10) as in any claim hereinbefore, **characterized in that** in an internal wall (43) of said containing compartment (32), parallel to said front wall (21) of said containing structure (19), one or more actuation push buttons (44) are disposed, to command said second command mechanism (29), if the latter were able to be electrically and/or electronically driven.

7. Security lock (10) as in any claim hereinbefore, **characterized in that** said containing compartment (32) is positioned laterally with respect to an actuation zone (29a) of said second command mechanism (29), on the opposite side with respect to said lateral wall (22) of said containing structure (19).

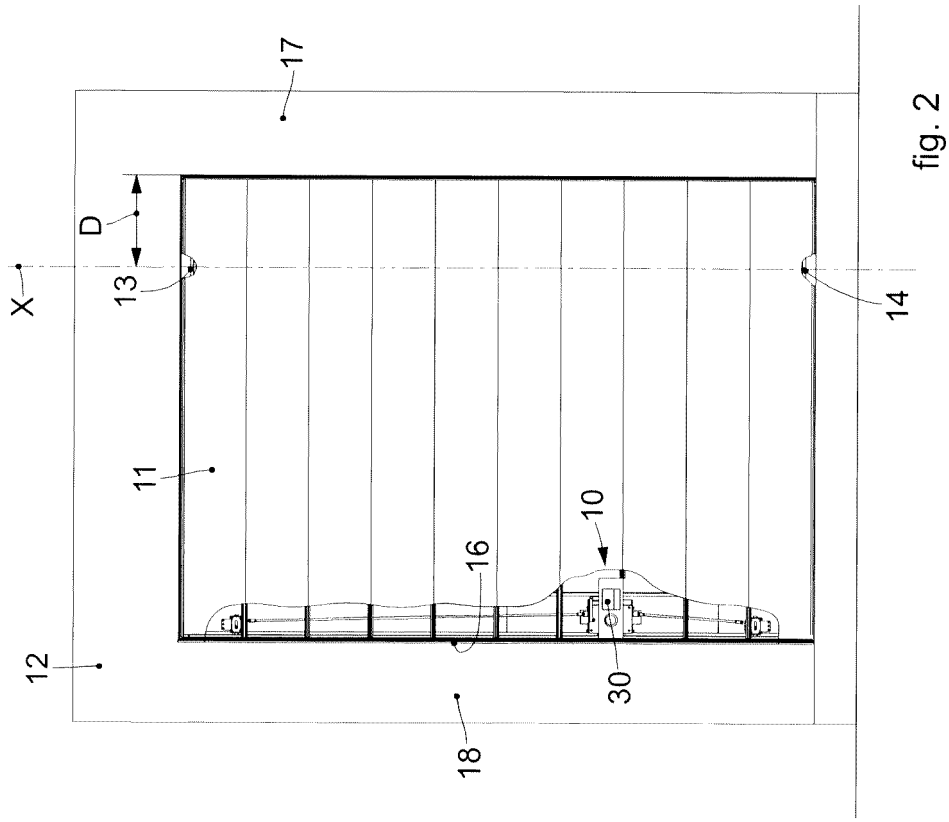

fig. 2

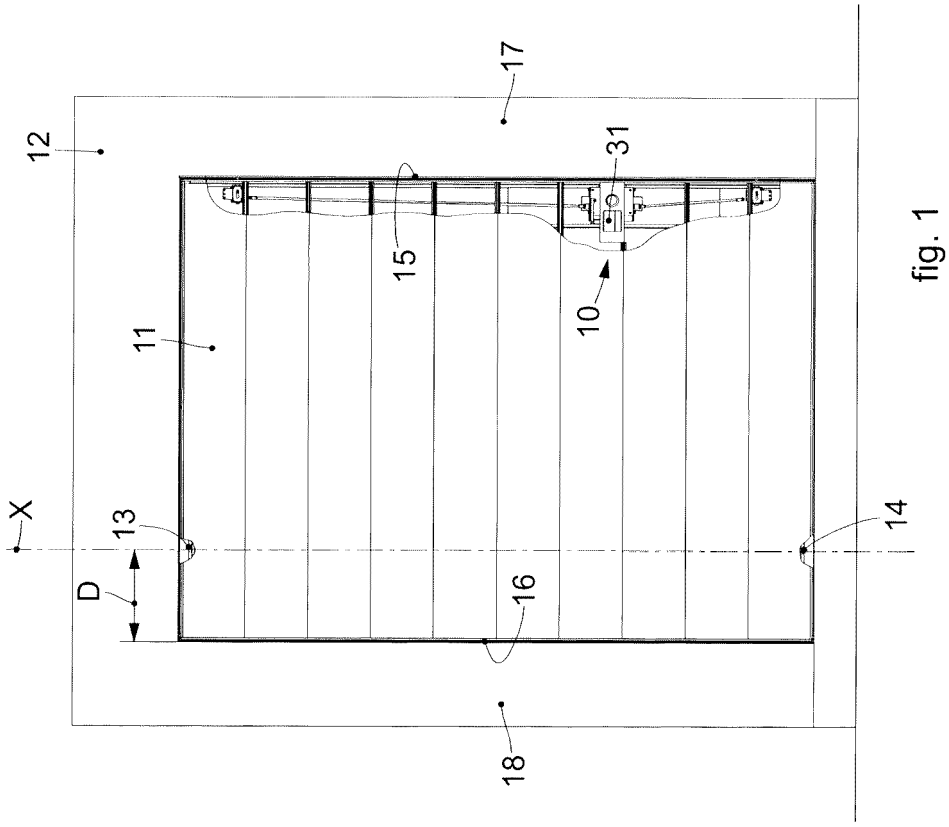

fig. 1

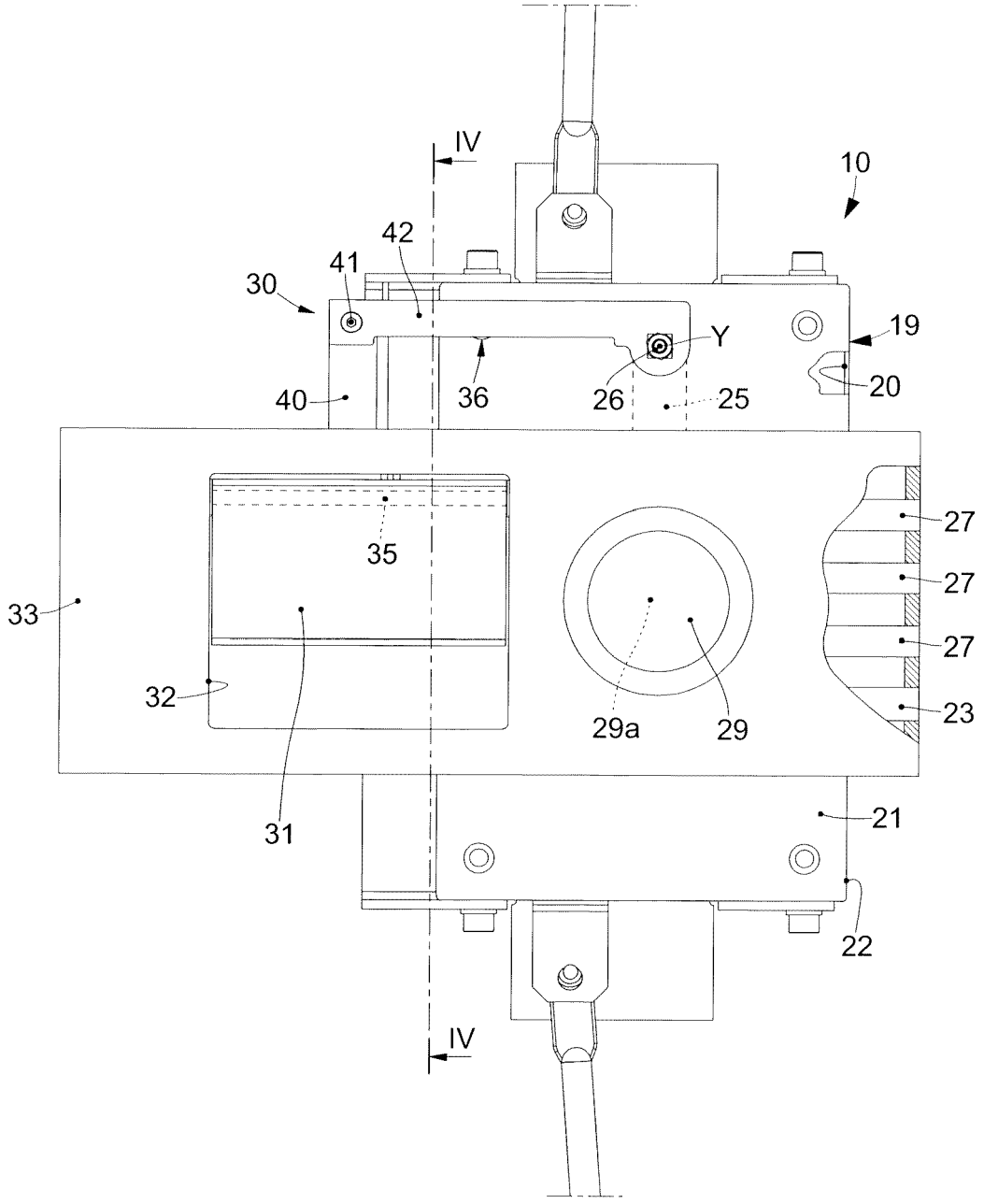
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fig. 3

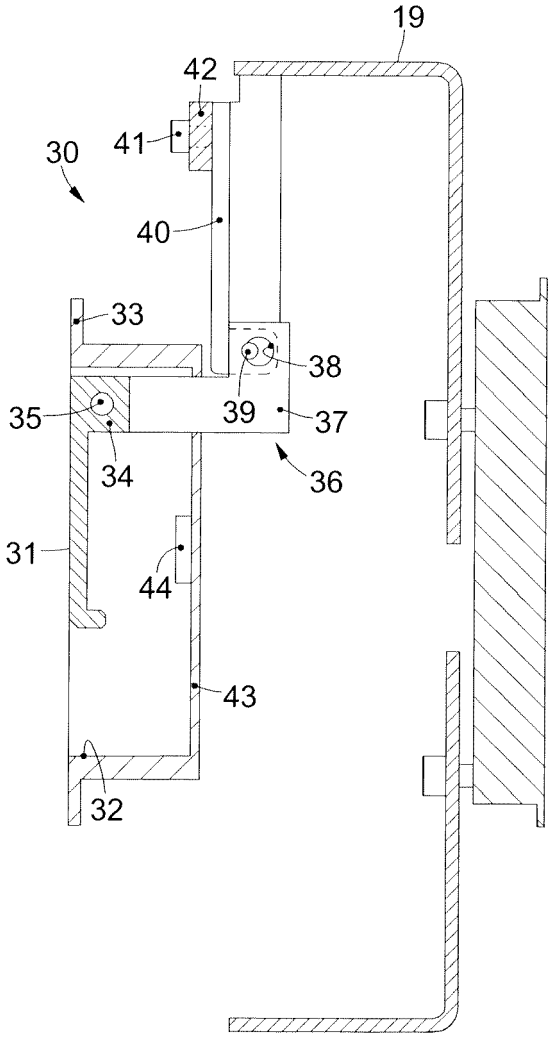
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fig. 4

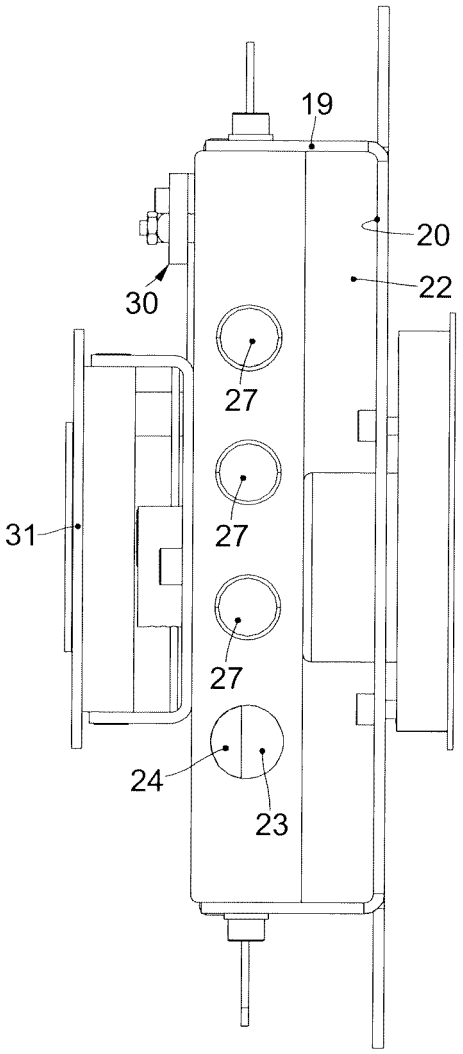
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fig. 6

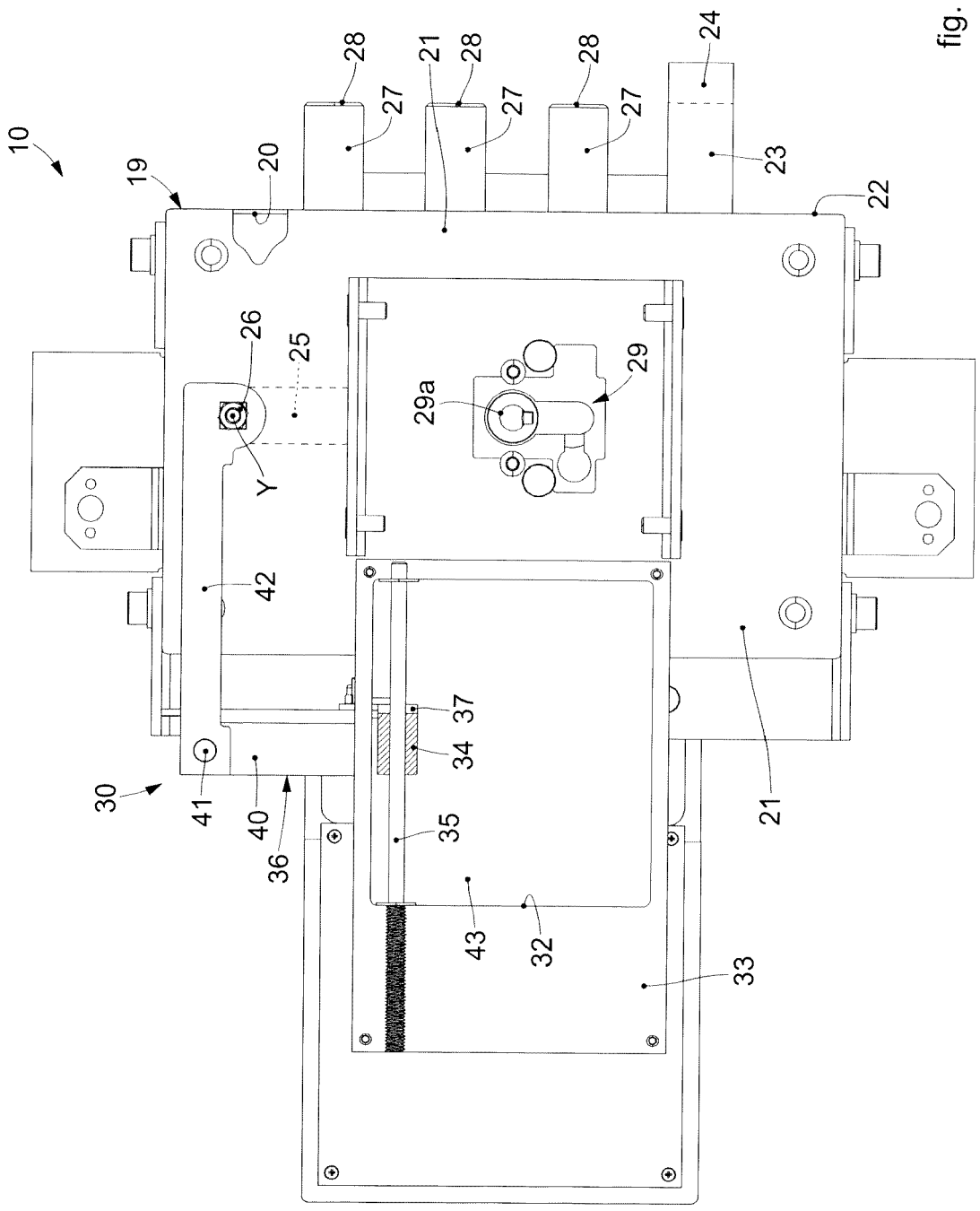
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fig. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 18 42 5082

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	29 March 2019	Cruyplant, Lieve

CATEGORY OF CITED DOCUMENTS

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