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(54) CLOSURE MECHANISM FOR DOORS OF GOODS VEHICLES

(57) Locking mechanism for cargo vehicle doors, having a handle (7) which acts upon a slider (15), sliding on an anchorage (5) in the frame (4) of the door (2). The mechanism has a double torsion spring (13) fastened to the handle (7), with a central protrusion, and a compression spring (22) contacting with the second end of the slider (15). At the locking an end of the slider (15) is retained in the anchorage (5), and rotation of the handle (7) causes rotation of the double torsion spring (13) and pushing the central protrusion over the slider (15), which slides releasing from the anchorage (5) and opening the door (2). The compression spring (22) pushes the slider (15) towards its initial position fitting its end into the anchorage (5), thus allowing closing the door (2).

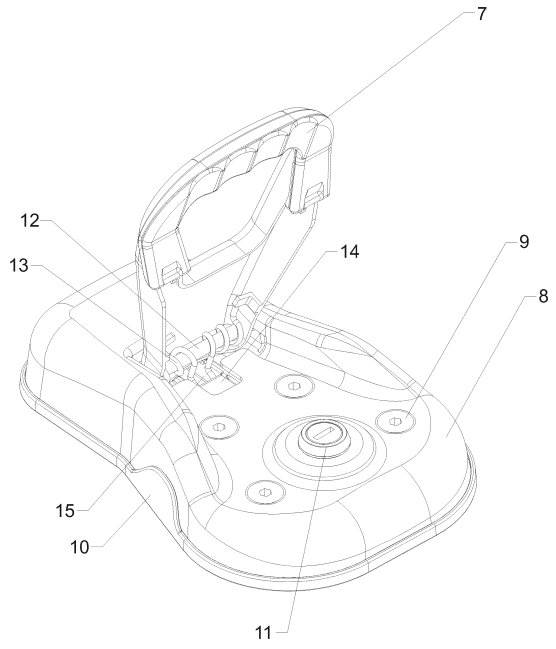

Fig. 4

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Description

Field of the invention

[0001] The present invention belongs to the technical field of locking mechanisms for doors, particularly to locking mechanisms for cargo vehicle doors, and more particularly for refrigerated delivery vehicles, such as trucks, vans and the like, which require their cargo compartment to feature safe and fast opening and closing.

[0002] The invention particularly refers to a locking mechanism for cargo vehicles, particularly refrigerated delivery vehicles, which is provided with a handle having a torsion spring, which upon the handle rotation actuates a slider which is released from an anchorage, allowing the door opening. The mechanism also comprises a compression spring that pushes the slide into its initial position making it fit into the anchorage, and thus locking the door.

Background of the invention

[0003] Currently, in the field of cargo vehicles and delivery vehicles, and particularly in refrigerated delivery vehicles, for products such as ice cream, there are known certain locking mechanisms where the handle opening movement is transmitted, through several metal and plastic parts, to a tilting system that causes the coupling to disengage, thus releasing the door. These mechanisms may comprise a key-operated locking and opening system from the inner side of the door.

[0004] Although these mechanisms are far better than prior existing mechanisms intended for the same or similar purpose, locking devices and other coupling and releasing means intended to achieve opening and closing positions, can be improved according to the present invention.

[0005] Particularly, the existing mechanisms so far have the problem that when the locking system is key-activated, the handle is blocked, so actuation thereof in this position can cause it breaks, with the immediate problems this may cause in the locking mechanism.

[0006] Therefore, a locking mechanism is desirable for cargo vehicle doors providing a fast, safe and efficient opening and closing, avoiding the existing drawbacks from prior locking mechanisms for state-of-the-art doors.

Description of the invention

[0007] The present invention solves the problems of the state of the art by means of a locking mechanism for cargo vehicle doors, having a handle attached to a base fastened to the outer side of the cargo or refrigerated delivery vehicle door.

[0008] The handle is attached to the base by means of a rotation axis, and acts upon a slider arranged on the base. The slider has a first end being wedge shaped and a second end.

[0009] The slider can slide relative to an anchorage having a cylinder arranged at the outer frame of the door, in such a way that in a locking position of the door the first wedge shaped end of the slider is retained in the anchorage, thus locking the door.

[0010] The door locking mechanism additionally has a double torsion spring arranged in the rotation axis and fixed to the handle. Said double torsion spring has in turn a central protrusion.

[0011] Furthermore, the locking mechanism has a compression spring which contacts with the second end of the slider, pushing this towards its initial position.

[0012] At the locking position, the first wedge-shaped end of the slider is retained at the anchorage cylinder, while handle rotation around the rotation axis causes, in turn, the double torsion spring to rotate, and the central protrusion thereof to be pushed over the slider, which slides releasing the first end thereof from the anchorage cylinder, thus opening the door.

[0013] Once the door is opened, the compression spring pushes the slider towards its initial position, such that it allows fitting of the first slider end in the cylinder, and closing the door upon it being pushed by the user.

[0014] According to a particular embodiment of the invention, the locking mechanism has a sheet arranged onto the slider, through which the central protrusion of the double torsion spring pushes said slider, wherein said sheet moves along with the slider when it is actuated by the handle.

[0015] According to a preferred embodiment of the invention, a sheet end longitudinally projects from the second end of the slider. Furthermore, the locking mechanism has a lock arranged at the base thereof and a tab coupled to said lock, in such a way that the lock rotation makes the tab rotate, thereby interposing it in the way of the sheet end which longitudinally projects from the second end of the slider, thus blocking the slider displacement and thus preventing the door from opening.

[0016] Preferably, the locking mechanism object of the present invention has panic opening means provided, so as to open the door from inside in case the user is accidentally locked therein once the door has been closed. Panic opening means consist of a rotating control arranged at the inner side of the door, and a cam, connected to said rotating control, and a strip. The strip is in turn connected to the slider, such that the cam transforms the rotational movement of the rotating control into a linear movement of the strip, which upon moving drags the slider along with it. By performing its sliding movement, the slider causes the first end of the anchorage cylinder to release, thus causing the door to open from inside the vehicle. That is, the rotating control transmits its circular movement to the cam through one metal square bar. This cam rotation at about 45° causes the metal strip to slide with an end being integral to the slider.

[0017] In the case the locking mechanism is locked with a key, that is, the slider is blocked by the tab through the sheet, although it is impossible to open the door from the outside, it will be possible indeed to open it from the

inside thanks to the panic opening means described above, since the rotating control causes the slide to displace, the movement of which is independent from the metal sheet, which remains blocked by means of the tab.

[0018] Therefore, this embodiment of the locking mechanism meets three features being highly required in the market, those being:

- Panic opening system so as to allow opening the door from inside the vehicle.
- This panic opening system meeting the target of allowing opening the door from inside the vehicle, whether or not it is locked with a key.
- In case the lock is locked with a key, the handle moves freely although the door opening does not take place, preventing said handle to be tampered or broken thus rendering the mechanism useless, as it happens in many currently existing locks in which, when the lock is key-locked the handle will remain blocked, fixed, which may cause the mechanism to break if it is tempered, rendering it useless. This advantage is achieved thanks to the double torsion spring which absorbs the handle movement when the slider is blocked and does not slide.

Brief description of the drawings

[0019] In order to provide a better understanding of the invention, by way of illustration but not limited thereto, there follows a description of an embodiment of the invention referring to a series of figures.

Figure1 is a partial schematic and perspective view of the side of the box of a truck or the like, having three doors, each of which have a locking mechanism object of the present invention.

Figure 2 is a detailed view of one of the doors from figure 1.

Figure 3 shows a detail of the anchorage of the locking mechanism.

Figure 4 is an upper perspective view of the handle and the base of an embodiment of the locking mechanism, with the handle opened.

Figure 5 is a lower perspective view of the handle and the base of figure 4.

Figure 6 is a view similar to figure 5 with the lower cover being removed so as to show the inner elements of the base.

Figure 7 is a longitudinal section of an embodiment of the locking mechanism, with the handle opened.

Figure 8 is an exploded perspective view of all the components of the locking mechanism, according to a particular embodiment.

Figure 9 is a lower perspective view of a locking mechanism wherein panic opening means are included, which is to be fixed at the inner side of the door.

Figure 10 is a longitudinal section of an embodiment of the locking mechanism comprising the anchorage, and the essential elements of said embodiment.

[0020] In these figures, reference is made to a set of elements, these being:

1. full lock mounted on the outer side of the door
2. door
3. door hinges
4. doorframe
5. anchorage in the door frame
6. anchorage cylinder
7. handle
8. base of the locking mechanism
9. fastening screws for fixing the base to the door
10. lower cover of the locking mechanism base
11. lock
12. rotation axis of the handle to the base
13. double torsion spring
14. sheet over the slider
15. slider
16. cam of the panic opening means
17. cam fastening screw
18. strip of the panic opening means
19. screw for attachment of the strip to the slider
20. slider support
21. tab coupled to the lock
22. compression spring
23. rotation control of the panic opening control

Description of the invention

[0021] The object of the present invention is a locking mechanism for cargo vehicle doors, applied to every type of cargo boxes of vans, transport trucks and mainly refrigerated delivery vehicles, requiring at the delivery boxes thereof a safe and fast opening and closing mechanism.

[0022] Figure 1 shows how the locking mechanism object of the present invention is mounted on doors 2 at the side or rear part of a vehicle which could be a van, truck, container, etc. In said figure 1, three doors 2 can be observed being articulated to the vehicle box by means of hinges 3, with the doors 2 at the right being closed by means of the locking mechanism 1 of the invention, and the door 2 at the left being half open after having acted upon the handle 7.

[0023] As it can be seen in the figures, the locking mechanism for cargo vehicle doors object of the invention has a handle 7 attached to a base 8 fixed at the outer side of the door 2 of a cargo vehicle by means of a rotation axis 12.

[0024] The base 8 can be fastened to the outer side of the door 2 with any conventional fastening means, although it is preferably fastened by means of screws.

[0025] The handle 7 acts upon a slider 15 arranged onto the base 8, having a first wedge-shaped end and a second end. The slider 15 slides relative to an anchorage

5 with a cylinder 6 arranged at the outer frame 4 of the door 2. Figure 2 and, above all, figure 3 show the anchorage 5 in detail, which allows closing the door 2, being screwed to the outer frame of the door 2.

[0026] The locking mechanism for doors additionally has a double torsion spring 13 arranged at the rotation axis 12 and fastened to a handle 7, comprising in turn a central protrusion, and a compression spring 22 contacting with the second end of the slider 15.

[0027] Thus, in the locking position the first wedge-shaped end of the slider 15 is retained in the cylinder 6 of the anchorage 4. The handle 7 rotation around the rotation axis 12 causes rotation of the double torsion spring 13 subsequently pushing its central protrusion over the slider 15. Due to this pushing, the slider 15 slides releasing the first end thereof from the cylinder 6 of the anchorage, thereby opening the door 2.

[0028] After the opening takes place, the compression spring 22 pushes the slider 15 towards its initial position, thus allowing fitting the first end of the slider 15 into the cylinder 6 and closing the door 2 by it being pushed by the user.

[0029] Figures 4 to 10 show in detail an embodiment of the locking mechanism with its essential elements, and illustrate the opening and closing operations indicated above. That is, opening of the door 2 takes place by holding the handle 7 and making it rotate around a rotation axis 12. As the double torsion spring 13 is attached to the handle 7, this rotates integrally thereto, such that the central protrusion thereof pushes the slider 15, making it slide over its support 20, thus separating the cylinder 6 from the anchorage 5. Thus, the anchorage 5 is released and, therefore, if the handle 7 keeps on being pulled the door 2 will rotate around the hinges 3, thereby opening the door. After delivery or unloading of the vehicle, the closing of the door 2 can take place by simply pushing it, making it rotate around the hinges 3 until the slider 15 contacts the cylinder 6 of the coupling 5. Due to the wedge shape of the first end of the slider 15, it tends to slide by retracting after overcoming the strength exerted by the compression spring 22. Once the slider 15 exceeds the cylinder 6, it comes back to its initial position by the effect of the spring 22 recovery, the first end of the slider 15 being locked up underneath the cylinder 6 of the anchorage 5. This is the usual way of locking the door by pushing it.

[0030] According to a particular embodiment of the invention, the mechanism has a sheet 14 arranged onto the slider 15 through which the central protrusion of the double torsion spring 13 pushes said slider 15.

[0031] Preferably, the end of the sheet 14 longitudinally projects from the second end of the slider 15, as it can be seen in figure 7. Furthermore, according to this preferred embodiment, the locking mechanism has a lock 11 arranged on the base 8 and a tab 21 coupled to said lock 11, such that rotation of the lock 11 makes the tab rotate interposing it in the way of the end of the sheet 14 longitudinally projecting from the second end of the slider 15, thus blocking the slider 15 displacement and preventing the door 2 from opening. Figure 10 shows the tab 21 coupled to the lock 11 rotated to the position it is key-locked.

[0032] Therefore, once the door 2 is locked the usual thing is that this is key-blocked so that no one can access to the cargo inside the vehicle. Thus, by actuation of a key introduced in the lock 11, the tab 21 is rotated such that it interposes in the way describing the metal sheet 14. Thus, as this metal sheet 14 actuates the central protrusion of the double torsion spring 13 by rotating the handle 7, if the door 2 is to be opened, upon rotation of the handle 7 the spring 13 will try to make the sheet 14 slide, but this will not move since it is blocked by the tab 21. Therefore, the rotation movement of the handle 7 will be only absorbed by the double torsion spring 13. Once there is no force exerted on the handle 7, the spring 13 will release the elastic energy being stored taking the handle 7 towards its original position. This allows that, when key-locked, the handle 7 cannot be tampered or broken, since it rotates freely.

[0033] According to a preferred embodiment of the invention, shown in detail in figures 6 and 9, the locking mechanism has panic opening means, which in turn have a rotating control 23 arranged at the inner side of the door 2, and a cam 16 which is connected to said rotating control 23 and to a strip 18. This strip 18 is connected to the slider 15, in such a way that the cam 16 transforms the rotation movement of the rotating control 23 into a linear movement of the strip 18, which, upon moving, drags the slider 15 along with it, this sliding and thus releasing the first end thereof from the cylinder 6 of the anchorage 5, thereby opening the door 2 from inside the vehicle.

[0034] Thus, these panic opening means make it possible to open the door 2 from inside, in case someone is trapped inside the vehicle cargo box, even with the door 2 being key-locked. Inside the door 2 around the lock, there is a plastic cup having a rotating control 23 in the middle, by means of which after rotating about 45°, this rotation is transmitted through a metal square bar that fits into a cam 16 located at the outer side of the door 2. This rotating movement makes the cam 16 act over a screw 17 head causing it to linearly slide. This screw 17 drags the strip 18 which, in turn, drags another screw 19 being integral to the slider 15. Therefore, movement is transmitted by means of the rotating control 23 from inside the vehicle box, so as to cause the slider 15 to slide and thus open the door 2.

[0035] It is noted that in order to open from the inside, it is irrelevant if the door is key-locked or not, since when opening from the inside the slider 15 is directly acted upon, while the tab 21 of the lock 11 only acts on the sheet 14, which, although being in contact with the slider 15, is independent from it. This functionality also allows closing the door 2 by pushing, regardless it is key-locked or not.

[0036] Once having clearly described the invention, it should be noted that the particular embodiments de-

scribed above are liable to undergo detail modifications provided that these do not alter the fundamental principle and essence of the invention.

Claims

1. Locking mechanism for cargo vehicle doors, comprising

- a handle (7) attached to
- a base (8) fastened to the outer side of a door (2) of the cargo vehicle by means of
- a rotation axis (12), actuating said handle (7) upon
- a slider (15) arranged on the base (8), having a first wedge-shaped end and a second end, and sliding relative to
- an anchorage (5) with a cylinder (6) being arranged on the outer frame (4) of the door (2),

the locking mechanism being **characterized in that** it comprises

- a double torsion spring (13) arranged on the rotation axis (12) and fastened to the handle (7), which in turn comprises a central protrusion,
- and a compression spring (22) contacting the second end of the slider (15),

in such a way that

- in a locking position the first wedge-shaped end of the slider (15) is retained in the cylinder (6) of the anchorage (5),
- rotation of the handle (7) around the rotation axis (12) causes rotation of the double torsion spring (13) and pushing of its central protrusion over the slider (15) which slides releasing the first end thereof from the cylinder (6) of the anchorage (5), thus opening the door (2),
- and the compression spring (22) pushes the slider (15) towards its initial position allowing fitting the first slider (15) in the cylinder (6) and closing the door (2) by it being pushed by the user.

2. Locking mechanism for cargo vehicle doors, according to claim 1, **characterized in that** it comprises a sheet (14) arranged on the slider (15) through which the central protrusion of the double torsion spring (13) pushes said slider (15).

3. Locking mechanism for cargo vehicle doors, according to the previous claim, **characterized in that**

- an end of the sheet (14) longitudinally projects from the second end of the slider (15),
- **in that** the locking mechanism comprises
  - a lock (11) arranged at the base (8)
  - a tab (21) coupled to said lock (11),
- and **in that** the ration of the lock (11) makes the tab rotate, interposing it in the way of the end of the sheet (14) longitudinally projecting from the second end of the slider (15), blocking the slider (15) displacement and preventing the door (2) from opening.

4. Locking mechanism for cargo vehicle doors, according to any of the previous claims, **characterized in that** it comprises panic opening means, which in turn comprise

- a rotating control (23) arranged at the inner side of the vehicle door (2),
- and a cam (16) connected to said rotating control (23) and to
- a strip (18), which in turn is connected to the slider (15),

such that the cam (16) transforms the rotation movement of the rotating control (23) into a linear movement of the strip (18), which drags upon moving, the slider (15) along with it, which slides releasing its first end from the cylinder (6) of the anchorage (5), thus opening the door (2).

5. Locking mechanism for cargo vehicle doors, according to any of the previous claims, **characterized in that** the base (8) is made of a metal sheet.

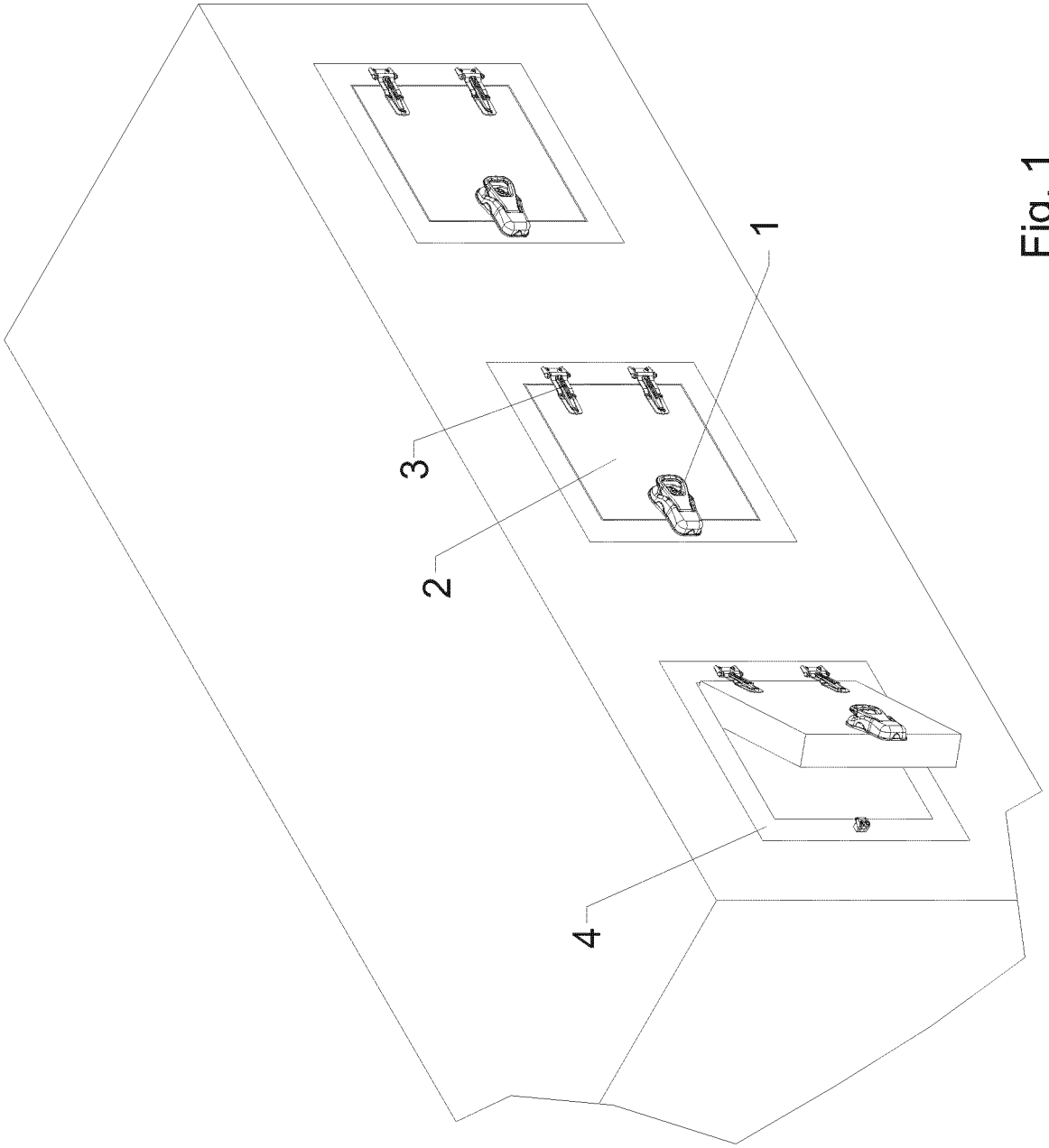

Fig. 1

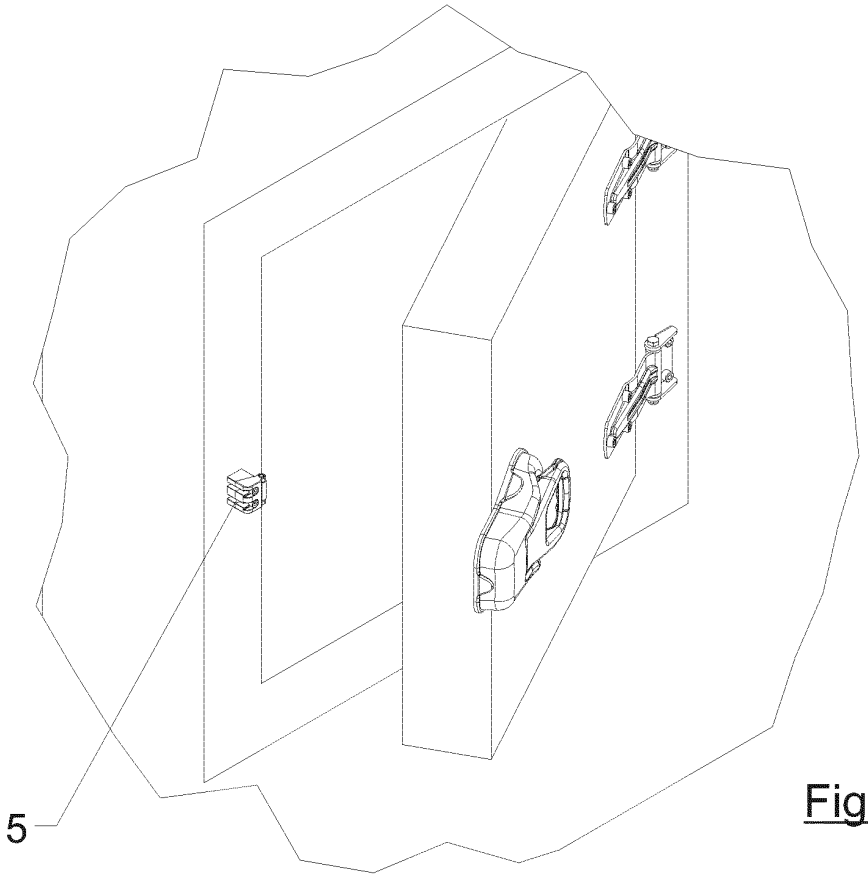

Fig. 2

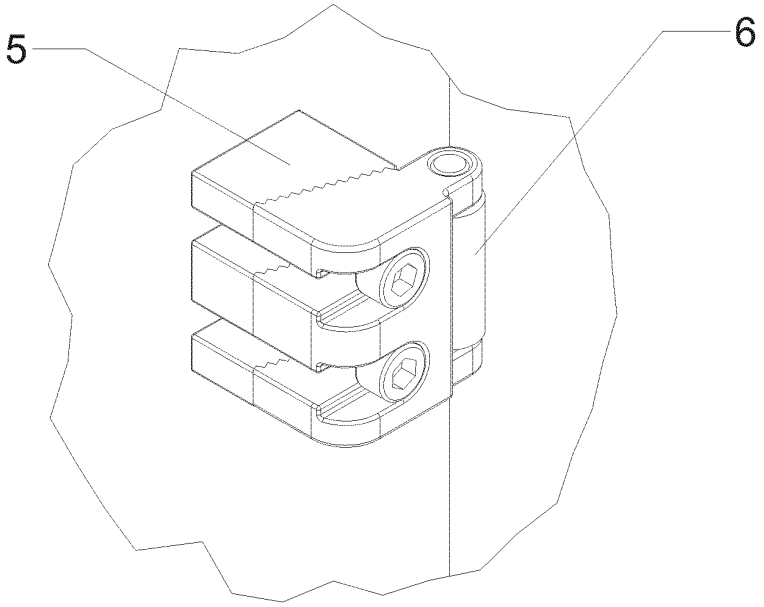

Fig. 3

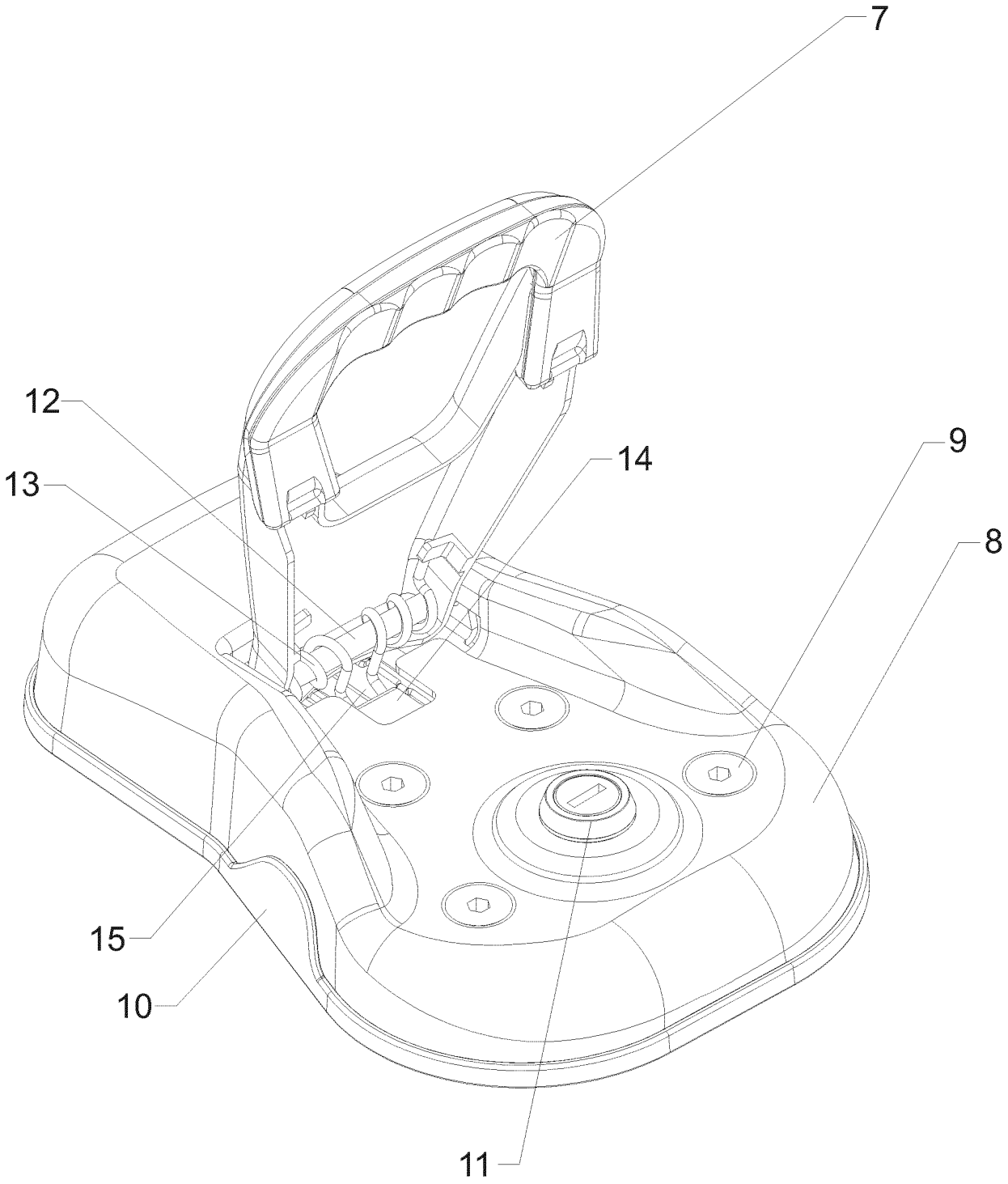

Fig. 4

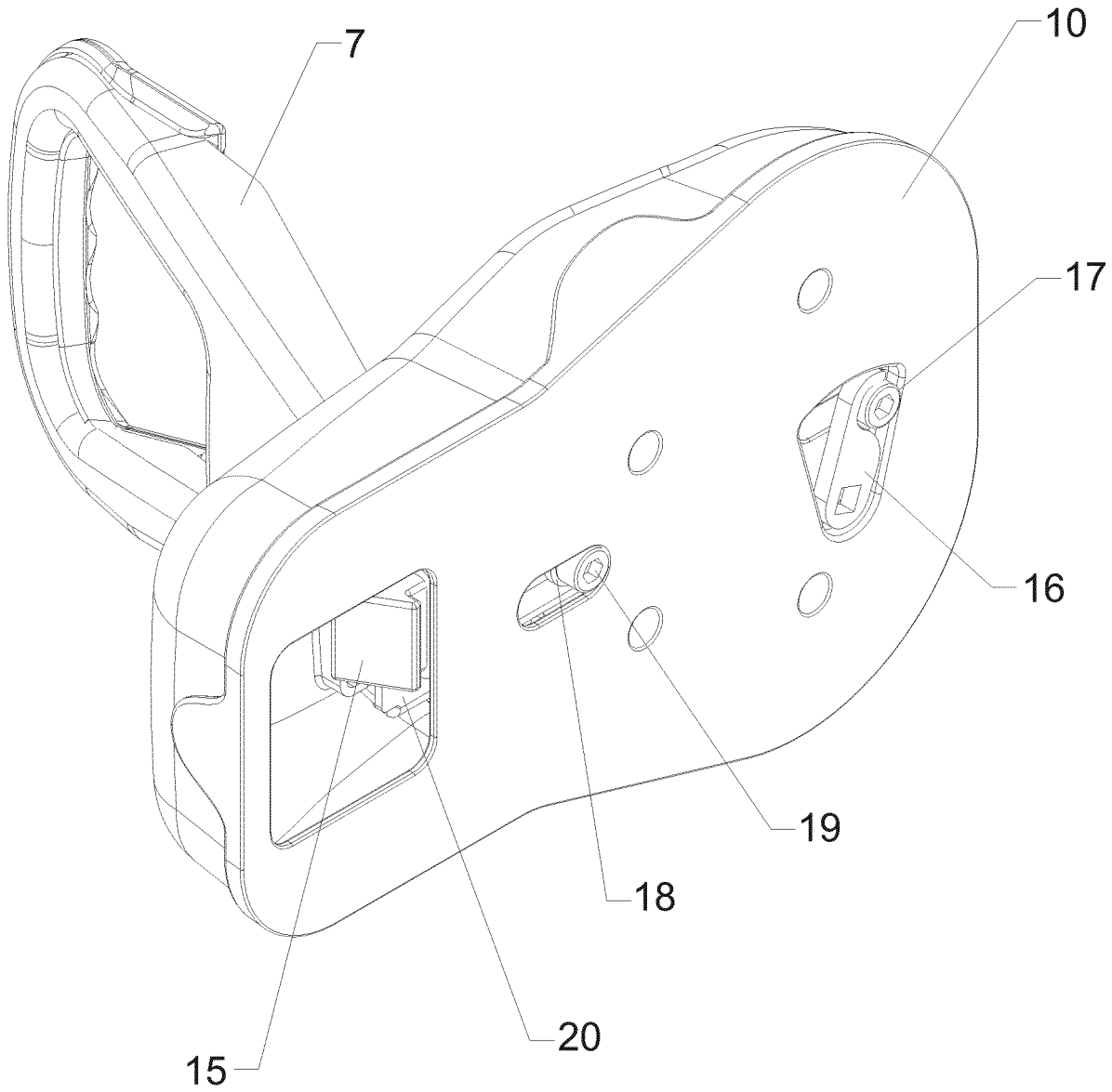

Fig. 5

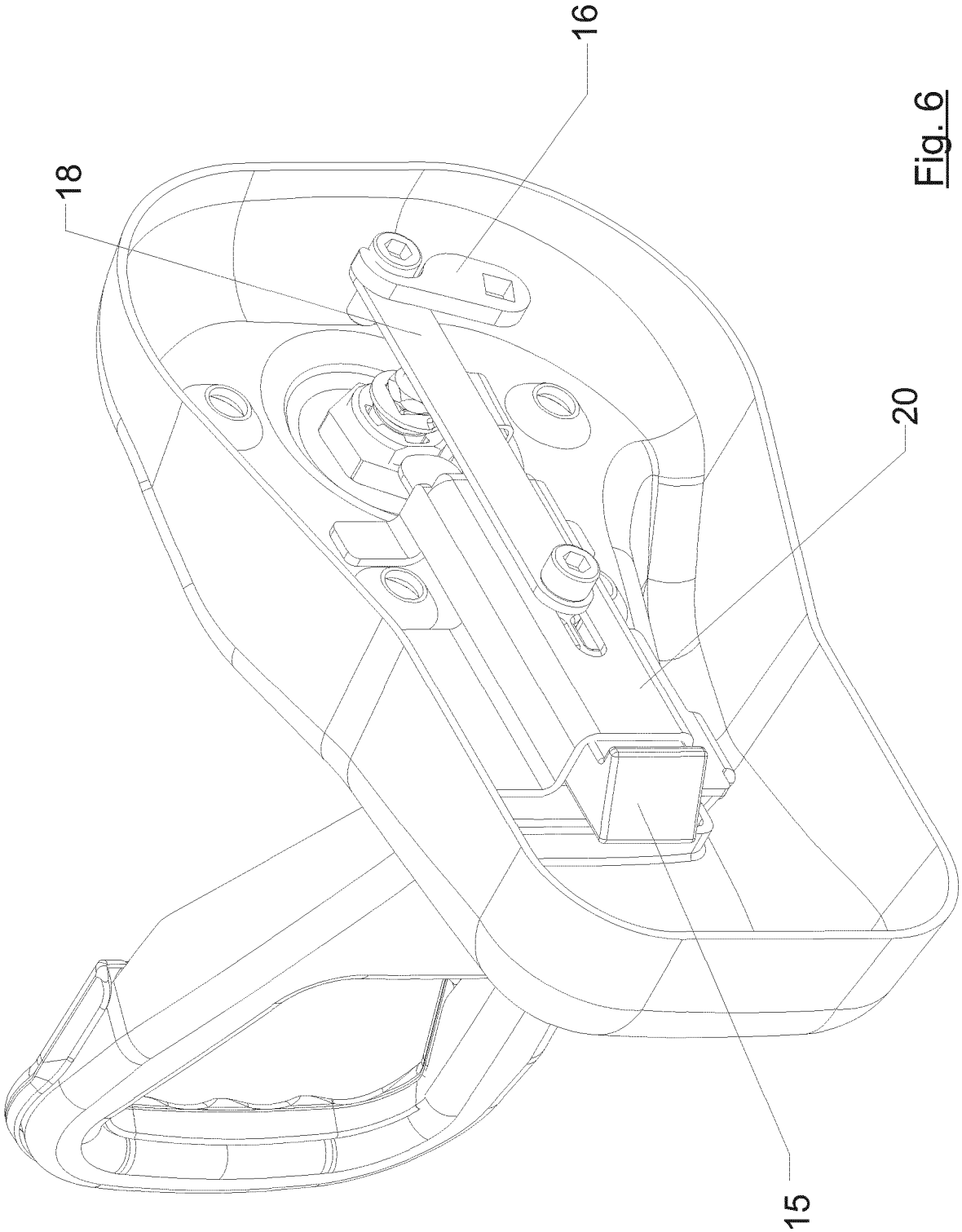

Fig. 6

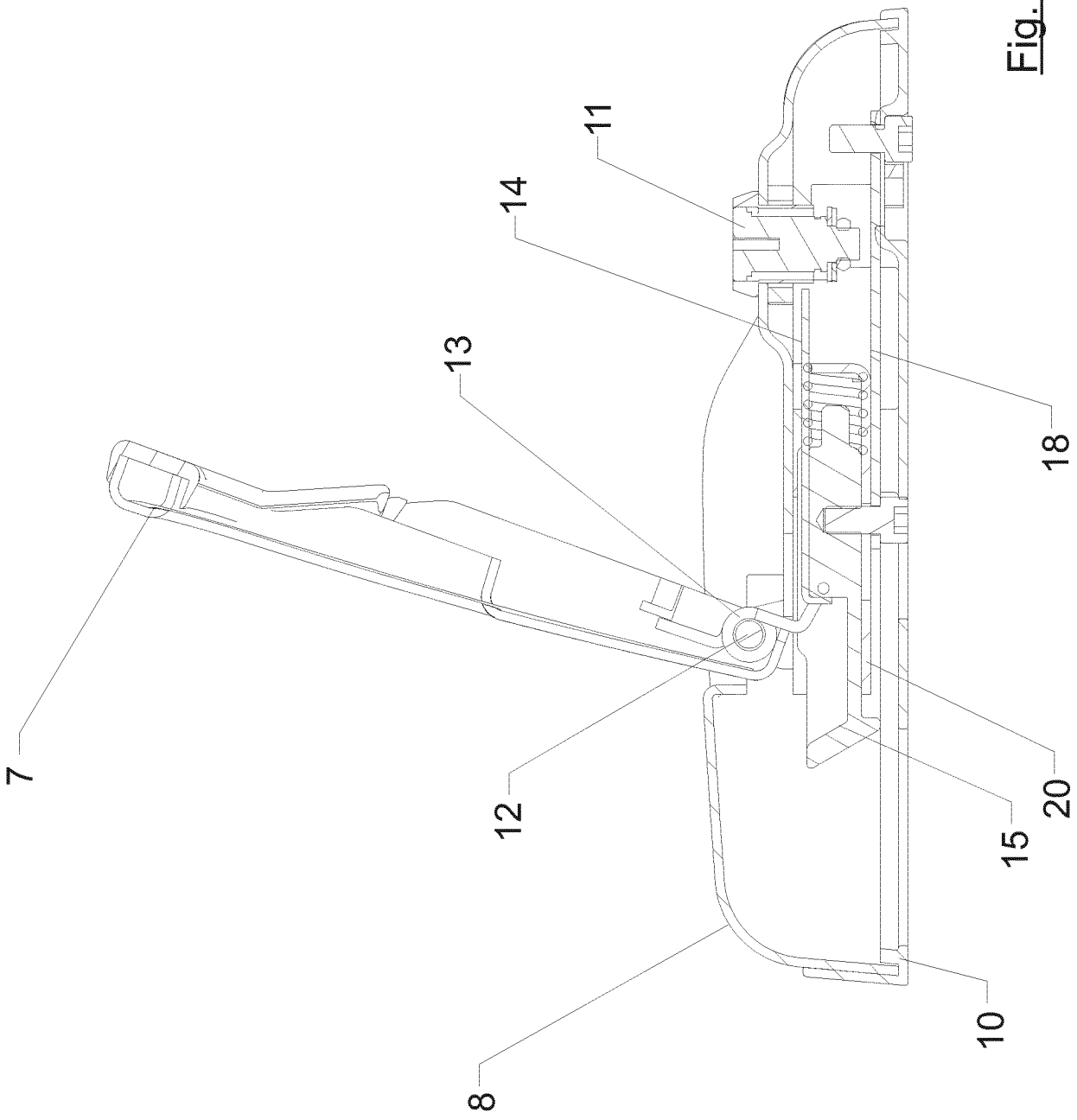

Fig. 7

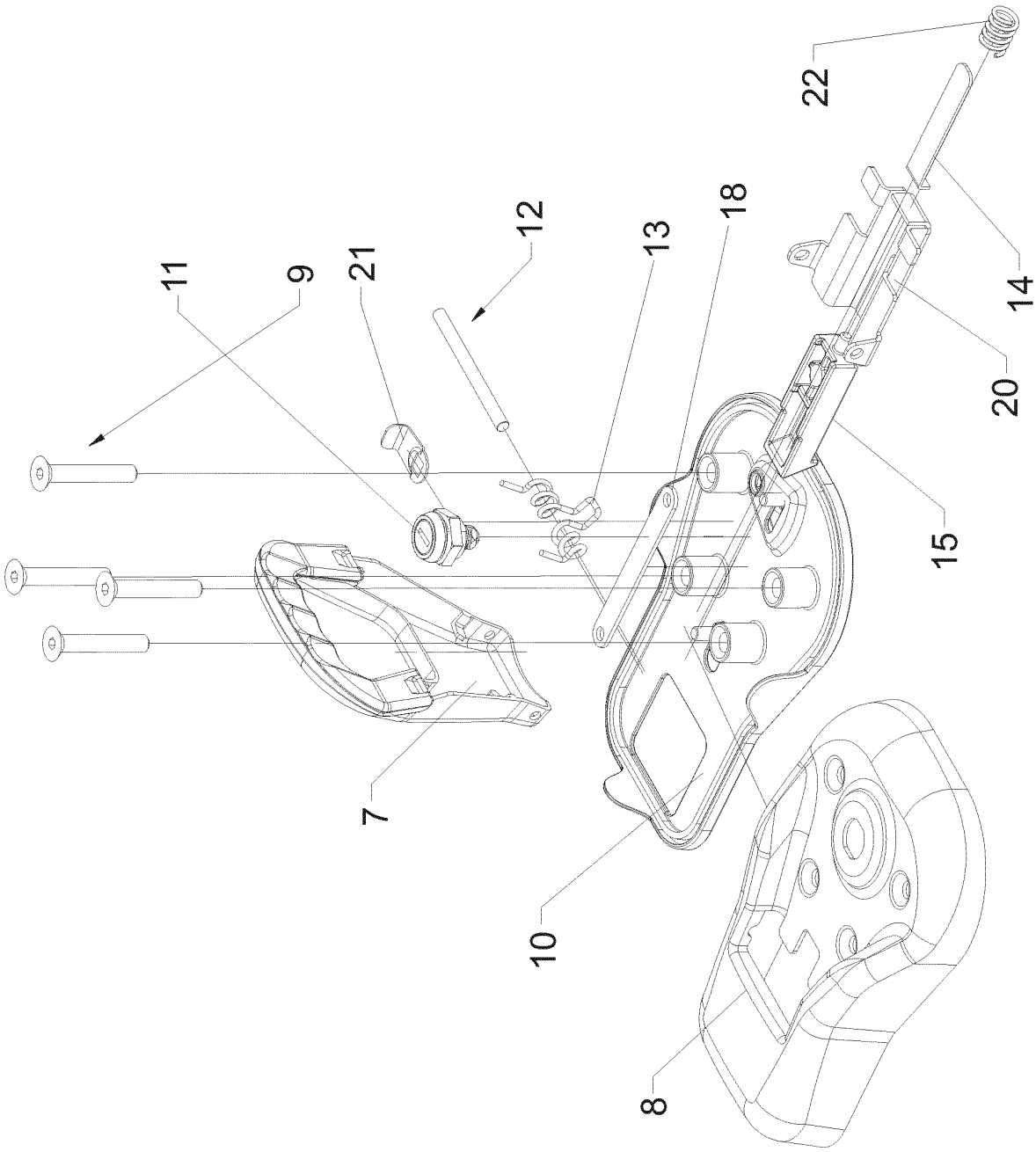

Fig. 8

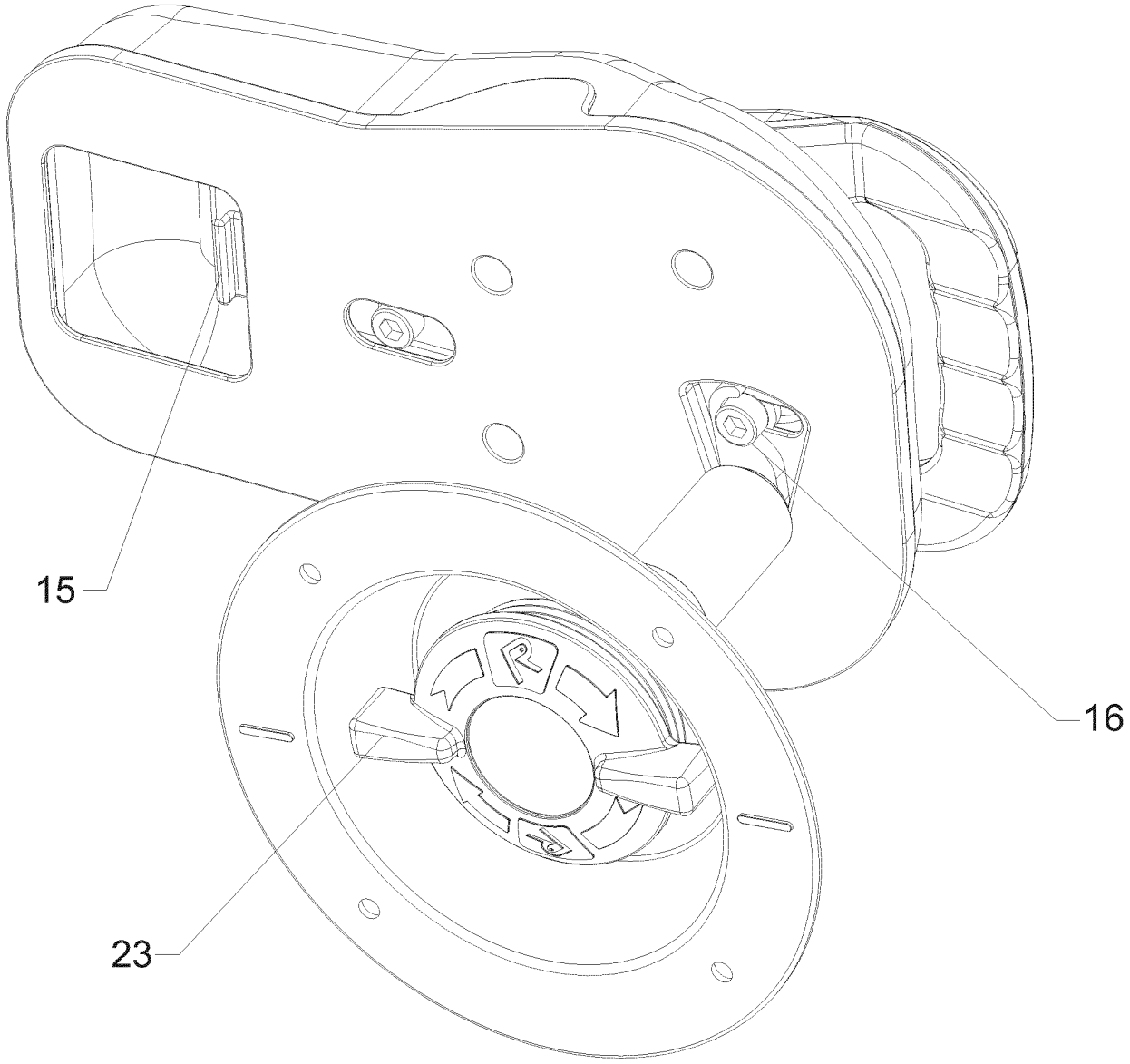

Fig. 9

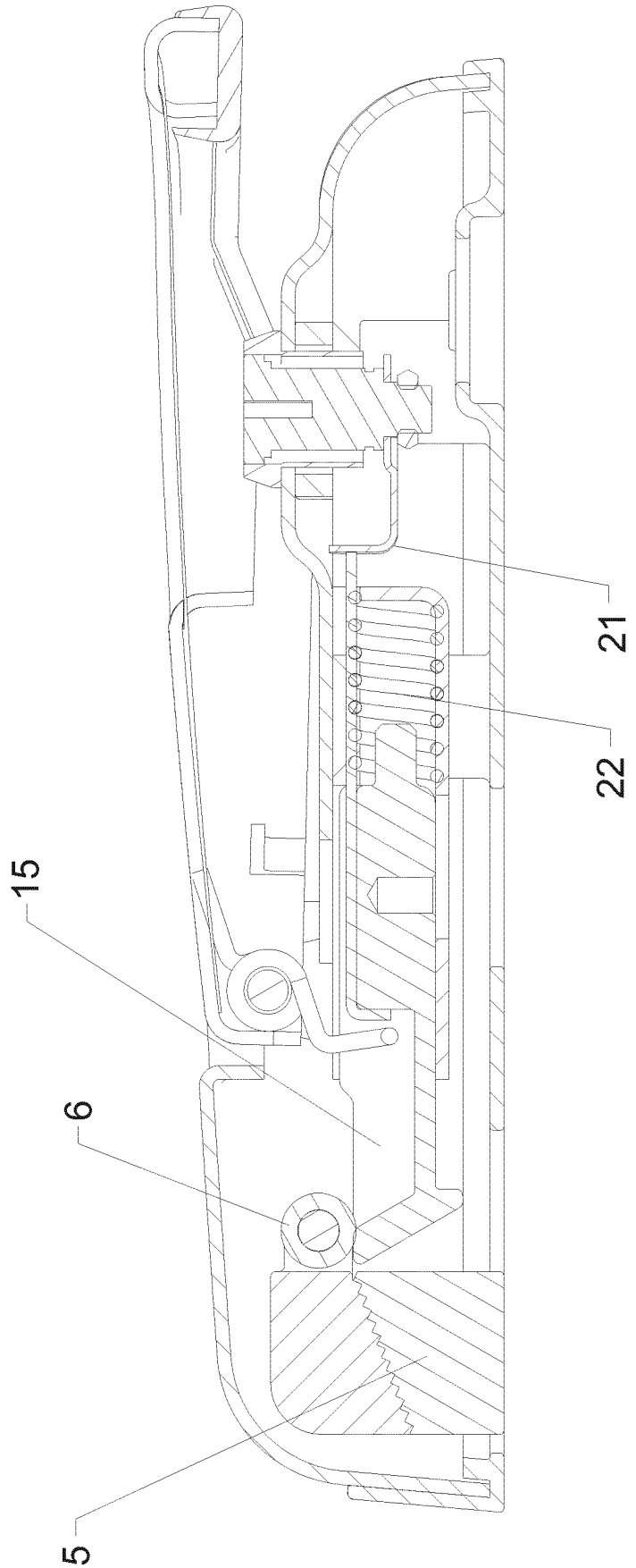

Fig. 10

INTERNATIONAL SEARCH REPORT

International application No
PCT/ES2017/070555

A. CLASSIFICATION OF SUBJECT MATTER
INV. E05B65/00 E05B83/02 E05C1/14 E05B13/00
ADD. E05B85/16 E05B85/22 E05B15/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
E05B E05C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 312 204 A (DAVIS EDWIN W) 26 January 1982 (1982-01-26) column 1, line 46 - line 63; figures 1-6	1-5
A	US 2016/138309 A1 (WOLLACOTT MARTIN [GB] ET AL) 19 May 2016 (2016-05-19) figures 1-5	2,3,5
A	EP 2 581 528 A1 (PASTORE & LOMBARDI SRL [IT]) 17 April 2013 (2013-04-17) paragraph [0021] - paragraph [0032]; figures 1-6	4
A	US 4 309 884 A (DAVIS EDWIN W) 12 January 1982 (1982-01-12) column 1, line 46 - line 63; figures 1-6	1

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

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Date of the actual completion of the international search	Date of mailing of the international search report
29 November 2017	07/12/2017

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Viethen, Lorenz

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No
PCT/ES2017/070555

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 312 202 A (PASTVA JR JOHN V ET AL) 26 January 1982 (1982-01-26) column 1, line 45 - line 61; figures 1-6 -----	1
A	US 2016/053510 A1 (YUN KYU JUNG [KR]) 25 February 2016 (2016-02-25) figure 1 -----	1

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
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