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(54) **BLOCKING DEVICE FOR THE CAR OF AN ELEVATOR SYSTEM**

(57) A car blocking device for a car of an elevator system comprising a latching device, a guide body for the latching device - wherein the guide body can be fastened to the car, preferably a car sling - and a latch receiver which can be fastened to a guide rail, the latching device lying displaceably in the guide body and being able to engage in the latch receiver in an extended position, wherein the latching device consists of two separate latches, one of which, in a locked position, engages in

a first latch receiving opening of the latch receiver and the other of which engages in a second latch receiving opening, different therefrom, of the latch receiver, the first latch receiving opening being located on a first side of the guide rail to which the latch receiver is fastened and the second latch receiving opening being located on a second side, different therefrom, of the guide rail to which the latch receiver is fastened.

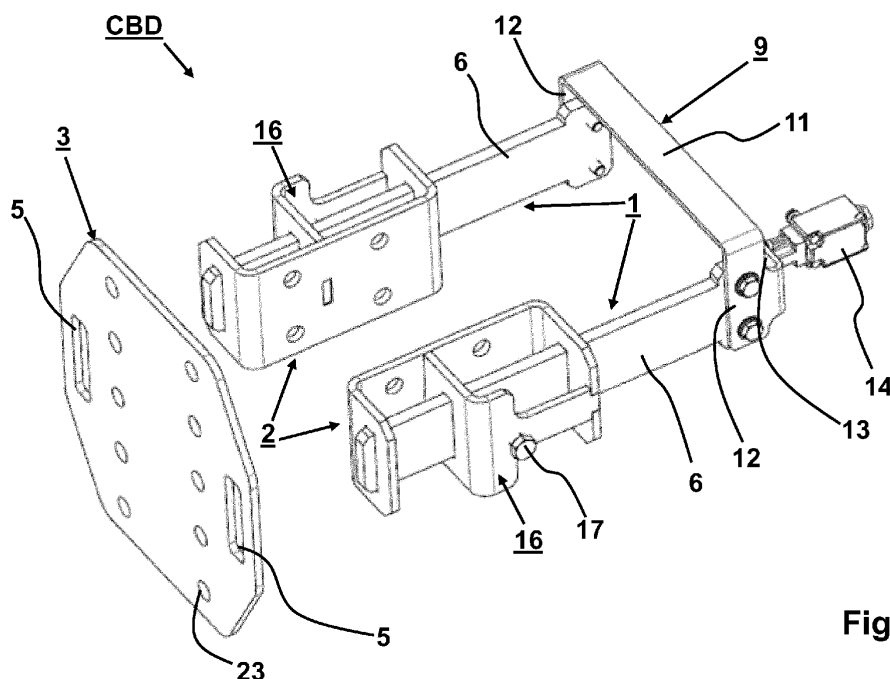


Fig. 1

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Description

[0001] The invention relates to a blocking device for the car of an elevator system according to the generic term of claim 1.

[0002] The invention further relates to the correspondingly equipped elevator system according to the generic term of claim 10.

TECHNICAL BACKGROUND

[0003] Even with modern elevator systems, manual maintenance work often has to be carried out. This occurs, for example, during regular maintenance or repairs to maintain the safety of the elevator system, such as a rope change or motor replacement.

[0004] For this purpose, the sling (sometimes also referred to as "frame") of the car and the car itself must be fixed to the car guide rails in such a way that the car and/or its sling are mechanically supported. This is necessary to protect the workers carrying out the maintenance work and/or to keep the car safe at a certain height, usually preferably in the area of the upper floors. It is also referred to as providing a protective space under or above the car. Such a protective space is characterized by the fact that it is large enough to ensure enough survival space for at least one worker between the shaft bottom and the car or between the shaft top and the car even if the car starts moving uncontrollably in the direction of the shaft bottom or the shaft top, for example as a result of brake failure under the influence of gravity or as a result of incorrect operation.

[0005] Currently, mechanical car blocking devices are mostly used for this purpose, such as those described in CN107445007A. Such car blocking devices consist of a latch receiver which is mounted on a guide rail in a position corresponding to the outermost position that the car may occupy without interfering with the necessary protective space at the bottom of the shaft or in the shaft head. Furthermore, those car blocking devices simply consist of latches or pins placed on either side of the car which enter said latch receiver. During maintenance, the latches or pins on the car are extended forward and inserted into the holes in the latch receiver. In this way, the car is mechanically locked in the vertical direction.

[0006] Traditionally, two car blocking devices are used for an elevator system. Usually, each blocking device is placed on an opposite side of a car sling, either in line or diagonally to each other, and therefore the blocking devices usually comprise a horizontal spacing from one another. This is necessary both because of the difficulty of packaging in the design and to use less mechanism parts and safety switches, that is, not to increase the costs. However, this means that each latch or pin will be loaded with half the total car load. In addition, this means that the latch receiver is loaded to half the total car load and is furthermore loaded asymmetrically. This is a technical problem in terms of latch or pin and latch

receiver strength, especially in high load capacity elevators. Parts need to be designed larger so that the latch or pin and latch receiver are strong enough. This results in loss of space in horizontal and vertical placement.

THE OBJECT OF THE INVENTION

[0007] In the light of this, it is the object or "task" of the invention to provide a means by which parts of the car blocking device of an elevator car can be reduced in their size without impairing the stability of the car blocking device.

THE SOLUTION ACCORDING TO THE INVENTION

[0008] This task is solved by a blocking device with the features of claim 1.

[0009] According to the invention, a blocking device for the car of an elevator system is proposed for this purpose.

20 This car blocking device (also called CBD) comprises a latching device, a guide body for the latching device - wherein the guide body can be fastened to the car, preferably a car sling - and a latch receiver which can be fastened to a guide rail. It is preferred that the guide body comprises two elements called "CBD Body" which will be explained later. The latching device is lying displaceably in the guide body and is able to engage in the latch receiver in an extended position. This engaging is only working, when the latching device is at a correspondingly aligned height with respect to the latch receiving opening of the latch receiver. The extended position furthermore is on hand, when the latching device is moved in the direction of the latch receiver in a way that the latching device is at least protruding the thickness of the corresponding latch receiver.

35 [0010] The blocking device according to the invention is characterized in that the latching device consists of two separate latches, one of which, in a locked position, engages in a first latch receiving opening of the latch receiver. Furthermore, the other latch engages in a second latch receiving opening of the latch receiver, which is different from the first latch receiving opening. The first latch receiving opening is located on a first side of the guide rail to which the latch receiver is fastened, and the second latch receiving opening is located on a second, opposite side of the guide rail to which the same latch receiver is fastened, wherein the two sides are different from one another.

50 [0011] The locked position is on hand, when in the extended position of the latches, the latches engage with the latch receiver in a way that each latch of the latching device is protruding its corresponding latch receiving opening of the latch receiver.

55 [0012] Therefore, the car blocking device is using two latches placed symmetrically on one side of the car sling, preferred the upper cross beam of the car sling and a total of four latches on two sides. Therefore, the load on each car blocking latch and the corresponding latch receiver

are symmetrically and therefore less stressful compared to the traditionally used car blocking devices. In particular, the twisting action is reduced. Thanks to this design, smaller car blocking device parts, smaller car sling parts and a more compact layout are possible. In addition, thanks to the symmetrically balanced load, the latch receiver is much more compact.

PREFERRED DESIGN OPTIONS

[0013] Preferably, the two separate latches of the latching device are connected to one another by a connecting element in such a way that they can be actuated together. This enables the two latches to move synchronized, which makes the actuation of the latching device easier and also less prone to mistakes.

[0014] Furthermore, it is preferred that the connecting element - usually in the area between the two separate latches and ideally above these latches and thus also above the cross beam of the car sling - forms a handle with the help of which the two latches can be pushed into their locked position or pulled out of their locked position together, preferably by the maintenance personnel. Therefore, the connecting element is in a much easier position to access from the top of the cabin or car compared to conventional car blocking devices.

[0015] It is preferred that the connecting element is essentially a C-shaped structure and in particular a correspondingly bent sheet metal, with a central part and two legs projecting therefrom, each of the legs being connected with one of the latches. This provides a simple and safe way to ensure an easy-to-operate handle.

[0016] Moreover, it is preferred that the connecting element has a member, in particular in the form of a sheet metal tab, which protrudes from it and is usually bent and which, in the fully unlocked position, actuates a safety switch, preferably by means of a safety contact bridge which drives into a contactless connection - for example a reed contact - and thereby actuates it. Thanks to the safety contact bridge connected to one side of this connecting element, it is possible to monitor the position of the two latches with a single safety contact. In this way, the number of switches is one even though the number of latches is two. This ensures both low cost and simple electrical wiring.

[0017] Furthermore, it is preferred that the guide body for the latching device comprises two elements, preferably two CBD bodies, wherein one element of the guide body is attachable to a vertical side of the upper cross beam of the car sling, and the other element of the guide body is attachable on the other vertical side of the upper cross beam of the car sling. The vertical side is the flat, vertically running side that is facing outwards, to the shaft walls.

[0018] Further possible configurations, modes of operation and advantages result from the dependent claims and/or the subsequent description of the exemplary embodiment and/or with reference to the Figures.

FIGURE LIST

[0019]

5 Figure 1 shows a CBD according to the invention in three-dimensional view in an unlocked position.

10 Figure 2 shows two CBDs according to the invention in three-dimensional view, wherein the two CBDs are aligned to one another like in the preferred mounting position, both CBDs in an unlocked position.

15 Figure 3 shows a CBD according to the invention in three-dimensional view in a locked position.

20 Figure 4 shows a CBD according to the invention in three-dimensional view in an unlocked position, wherein the latch receiver is mounted to a guide rail as intended.

25 Figure 5 shows the upper part of a car sling equipped with two CBDs according to the invention in three-dimensional view.

Figure 6 shows a CBD body in three-dimensional view.

PREFERRED EMBODIMENT

30 **[0020]** Fig. 1 to Fig. 6 show the preferred embodiment for the car blocking device CBD and its parts according to the invention.

35 **[0021]** The CBD preferably consists of two CBD bodies 16 (see Fig. 6) placed symmetrically on the upper cross beam 19 of the car sling 18 (more to that later on). These CBD bodies 16 preferably each consist of a U-shaped part 20 and an L-shaped part 21 attached to this U-shaped part 21. The L-shaped part 21 makes the CBD body 16 more structurally sound. At the same time, while the preferably rectangular cutout in its leg is bearing the movable latch 6, it ensures that the latch 6 is fixed in both extended and retracted positions with the fixing bolt 17 connected to a hole or threaded hole on it.

40 **[0022]** While the U-shaped part 20 is connected to the car sling's upper cross beam 19 with the holes on its base surface, it bears the latch 6 with preferably rectangular cutouts on its two legs. The latch 6 lies displaceably in the CBD body 16 and, in the extended position, can enter a latch receiving opening 5 of the latch receiver 3 when the latch 6 is at a correspondingly aligned height to the respective latch receiving opening 5 of the latch receiver 3.

45 **[0023]** The movable latch 6 preferably has a rectangular cross section and, when extended, enters the corresponding latch receiving opening 5 on the latch receiver 3 and locks the car. The preferable expansion of the cross section of the latch 6 at the rear of the latch 6 limits the most forward position of the latch 6. Preferably in this

area, the latch 6 is also connected to the connecting element 9, preferably via screws.

[0024] The connecting element 9 preferably is a sheet metal part that connects the two movable latches 6. This connecting element 9 is also a suitable handle for the maintainer to move the two latches 6, that form the latching device 1, forward or backward. Said "handle" is preferably formed by the central part 11 of the connecting element 9. With the latches 6 entering the latch receiving openings 5, it prevents the movement of the car in the maintenance position.

[0025] Figure 1 and Figure 2 show a CBD according to the invention in three-dimensional view in an unlocked position. Here, the latching device 1 that comprises the two latches 6 can be seen. The two latches 6 are connected with each other via a connecting element 9 that preferably has a central part 11, two legs 12 and one sheet metal tab 13, preferably protruding from one leg 12. The sheet metal tab 13 preferably carries the safety contact bridge 15 that interacts with the safety switch 14. The latches 6 each lie displaceable in a CBD body 16, wherein the whole latching device 1 lies displaceable in the guide body 2 that comprises the two CBD bodies 16. The corresponding latch receiver 3 preferably comprises two latch receiving openings 5 for the interaction with the latches 6 of the latching device 1. Said interaction is shown in Fig. 3, wherein the CBD is shown in the locked state. In this case, the safety contact bridge 15 is no longer in contact with the safety switch 14.

[0026] Fig. 4 furthermore shows the latch receiver 3 as it is mounted as intended onto a guide rail 4. Here, the aforementioned first side 7 of the guide rail with its corresponding first latch receiving opening 5a and also the second side 8 of the guide rail with its corresponding second latch receiving opening 5b can be seen. One of the two separate latches 6 - in a locked position - engages in the first latch receiving opening 5a of the latch receiver 3 and the other latch 6 engages in the second latch receiving opening 5b, different from the first one. The first latch receiving opening 5a is located on a first side 7 of the guide rail 4 to which the latch receiver 3 is fastened. The second latch receiving opening 5b is located on a second side 8, different from the first side, of the guide rail 4 to which the latch receiver 3 is fastened.

[0027] The latch receiver 3 is mountable to a guide rail 4 and therefore preferably attached to the guide rail 4. The CBD body 16, which preferably carries the latch 6, is mountable to the car sling 18 already mentioned and therefore preferably attached to the car sling 18. The car and its sling 18 can thus be fixed to the guide rails 4 in such a way that the car is completely immobilized.

[0028] The CBD thus comprises few and easy-to-manufacture parts that contribute to the simplicity of the entire system and can be manufactured at low cost so that they can preferably remain permanently in the elevator system in question. With the design according to the invention, a very reliable, simply constructed and yet highly resilient CBD for an elevator car is created.

[0029] Preferably, the latch 6 is borne at least at three areas in the CBD body 6, which are more than insignificantly spaced apart from each other as seen in the horizontal direction. In this way, a particularly high load capacity of the CBD is achieved. Most preferred the three areas are window embrasures.

[0030] As already mentioned, the CBD body 16 comprises or consists of a U-shaped part 20 and an L-shaped part 21 that are connected to each other, preferably welded. The connection or welding are then ideally such that the shorter leg of the L-shaped part 21 is perpendicular to the base area of the U-shaped part 20 and at least one leg of the U-shaped part 20 is perpendicular to the longer leg of the L-shaped part 21, the legs of the U-shaped part 20 being substantially parallel to the shorter leg of the L-shaped part 21. In other words, one leg of the L-shaped part 21, usually the shorter one, lies between the two legs of the U-shaped part 20. The other leg of the L-shaped part 21 can then form a positive or "form fit" connection with a recess in one leg of the U-shaped part 20, which can also be secured by optional welding. In this way, two simple sheet metal parts are combined to form a CBD body 16 that is particularly resilient and therefore also particularly resistant to possible operating errors.

[0031] The CBD body 16 comprises at least or (preferred) exactly three aligned openings through which the latch 6 can be guided and held such that the latch 6 lies displaceably in the CBD body 16. The U-shaped part 20 preferably also comprises holes in the area of the base surface. These holes are used for fastening the CBD body 16 to the car sling 18 of the car, which will also be described and shown in more detail later.

[0032] The L-shaped part 21 also usually has a hole in the area of the longer leg. A fixing bolt 17 - preferably in the form of a screw - is guided through this hole. In this case, the hole is preferably threaded. When completely screwed in, the fixing bolt 17 presses against the latch 6 in such a way that unintentional displacement of the latch 6 is at least made more difficult, preferably even impossible. In the long term, it is therefore impossible for the latch 6 to become acoustically noticeable during normal operation under the influence of operational vibrations or even to be gradually displaced in such a way that it eventually becomes an unintentional obstacle.

[0033] If the latch 6 is to be moved, the fixing bolt 17 must first be loosened. It is therefore preferable to leave the fixing bolt 17 screwed in at all times, both in extended position and the retracted position, in order to make unintentional displacement even less likely in both positions. The fixing bolt 17 and the thread cooperating with it are designed in such a way that the fixing bolt 17 - even for complete loosening - does not have to be unscrewed completely and can therefore always remain captive in place.

[0034] In the shown embodiment, the openings of the CBD body 16 have a rectangular cross-section, since the latch 6 has a rectangular cross-section.

[0035] Fig. 5 shows how CBDs are preferably attached

to the sling 18 of a car. For this purpose, each CBD is attached to one horizontal side of the upper cross beam 19 of a car sling 18. The CBD bodies 16 of the respective car blocking devices CBD are screwed to the respective vertical side of the upper cross beam 19 of the car sling 18. The CBD bodies 16 are fixed to the vertical sides of the upper cross beam 19 via the holes in the base area of the U-shaped part 20 of the CBD body 16.

[0036] It has to be mentioned that the upper cross beam 19 itself can consist out of several beams - as it is also shown in Fig. 5, where the upper cross beam 19 consists of two sperate beams. The CBD bodies 16 in this case preferably are screwed to the outermost vertical sides - facing the shaft walls - of the beams making up the cross beam 19.

[0037] It also can be useful that the latch receiver 3 is a flat plate - preferably a sheet metal - with latch receiving openings 5 and holes 23 for receiving screws and/or threaded pins. The holes 23 are preferably arranged in two vertical rows which have a horizontal spacing from one another of at least the width of a guide rail 4 and at most the width of a guide rail 4 plus 50 mm. These holes 23 each preferably receive a screw and/or the threaded pin of a guide rail clamp 22.

[0038] The guide rail clamp 22 itself is preferably designed in such a way that it comprises a clamping body and a threaded pin, the clamping body partially engaging around the guide rail 4 in the installed state and the threaded pin being guided through a hole 23 of the latch receiver 5 and, by tightening a nut which is screwed onto the threaded pin, fastening the latch receiver 3 to the car guide rail 4 in a frictionally locking manner.

[0039] Overall, it is also furthermore preferred that the U-shaped part 20, the L-shaped part 21 and/or the connecting element 9 are designed as folded sheets, preferably made of steel.

REFERENCE LIST

[0040]

- | | | |
|----|--|--|
| 1 | Latching device | |
| 2 | Guide body | |
| 3 | Latch receiver | |
| 4 | Guide rail | |
| 5 | Latch receiving opening | |
| 5a | First latch receiving opening | |
| 5b | Second latch receiving opening | |
| 6 | Latch | |
| 7 | First side of the guide rail | |
| 8 | Second side of the guide rail | |
| 9 | Connecting element | |
| 10 | not assigned | |
| 11 | Central part (of the connecting element) | |
| 12 | Leg (of the connecting element) | |
| 13 | Sheet metal tab | |
| 14 | Safety switch | |
| 15 | Safety contact bridge | |

- | | | |
|----|------------------|---------------------|
| 16 | CBD body | |
| 17 | Fixing bolt | |
| 18 | Car sling | |
| 19 | Upper cross beam | |
| 20 | U-shaped part | |
| 21 | L-shaped part | |
| 22 | Guide rail clamp | |
| 23 | Hole | |
| 10 | CBD | Car blocking device |

Claims

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|----|--|--|
| 1. | A car blocking device (CBD) for a car of an elevator system comprising a latching device (1), a guide body (2) for the latching device (1) - wherein the guide body (2) can be fastened to the car, preferably a car sling - and a latch receiver (3) which can be fastened to a guide rail (4), the latching device (1) lying displaceably in the guide body (2) and being able to engage in the latch receiver (3) in an extended position, characterized in that the latching device (1) consists of two separate latches (6), one of which, in a locked position, engages in a first latch receiving opening (5a) of the latch receiver (3) and the other of which engages in a second latch receiving opening (5b), different therefrom, of the latch receiver (3), the first latch receiving opening (5a) being located on a first side (7) of the guide rail (4) to which the latch receiver (3) is fastened and the second latch receiving opening (5b) being located on a second side (8), different therefrom, of the guide rail (4) to which the latch receiver (3) is fastened. | |
| 2. | The car blocking device (CBD) according to claim 1, characterized in that the two separate latches (6) are connected to one another by a connecting element (9) in such a way that they can be actuated together. | |
| 3. | The car blocking device (CBD) according to any one of the preceding claims, characterized in that the connecting element (9) - usually in the area between the two separate latches (6) and ideally above these latches (6) and thus also above the cross beam of the car sling - forms a handle with the help of which the two latches (6) can be pushed into their locked position or pulled out of their locked position together, preferably by the maintenance personnel. | |
| 4. | The car blocking device (CBD) according to any one of the preceding claims, characterized in that the connecting element (9) is essentially a C-shaped structure and in particular a correspondingly bent sheet metal, with a central part (11) and two legs (12) projecting therefrom, each of the legs (12) being connected with one of the latches (6). | |

5. The car blocking device (CBD) according to any one of the preceding claims, **characterized in that** the connecting element (9) has a member, in particular in the form of a sheet metal tab (13) which protrudes from it and is usually bent and which, in the fully unlocked position, actuates a safety switch (14), preferably by means of a safety contact bridge (15) which drives into a contactless connection - for example a reed contact - and thereby actuates it.

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6. The car blocking device (CBD) according to any one of the preceding claims, **characterized in that** the guide body (2) for the latching device (1) comprises two elements, preferably two CBD bodies (16), wherein one element of the guide body (2) is attachable to a vertical side of the upper cross beam of the car sling and the other element of the guide body (2) is attachable on the other vertical side of the upper cross beam of the car sling.

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7. The car blocking device (CBD) according to any one of preceding claims, **characterized in that** the CBD body (16) comprises a U-shaped part (20) and an L-shaped part (21) which are connected to each other, preferably welded, such that the shorter leg of the L-shaped part (21) is perpendicular to the base area of the U-shaped part (20), and at least one leg of the U-shaped part (20) is perpendicular to the longer leg of the L-shaped part (21), wherein the legs of the U-shaped part (20) are substantially parallel to the shorter leg of the L-shaped part (21).

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8. The car blocking device (CBD) according to claim 7, **characterized in that** the U-shaped part (20) comprises two aligned openings for the passage of the latch (6), one opening being provided on each leg of the U-shaped part (20), said legs being preferably integrally connected.

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9. The car blocking device (CBD) according to claim 8, **characterized in that** the L-shaped part (21) comprises an opening on its shorter leg for the passage of the latch (6), the opening being aligned with the two openings of the U-shaped part (21).

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10. An elevator system with two car blocking devices (CBD), **characterized in that** each car blocking device (CBD) comprises at least one attribute from claims 1 to 9 that is targeted on the car blocking device (CBD).

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11. The elevator system with two car blocking devices (CBD) according to claim 10, **characterized in that** each car blocking device (CBD) is attached to one horizontal side of the upper cross beam (19) of a car sling (18)

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12. The elevator system with two blocking devices

(CBD) according to any one of the preceding claims, **characterized in that** the CBD bodies (16) of the respective car blocking devices (CBD) are screwed to the respective vertical side of the upper cross beam (19) of the car sling (18), each CBD fixed to one horizontal side of the upper cross beam (19), via the holes in the base area of the U-shaped part (20) of the CBD body (16).

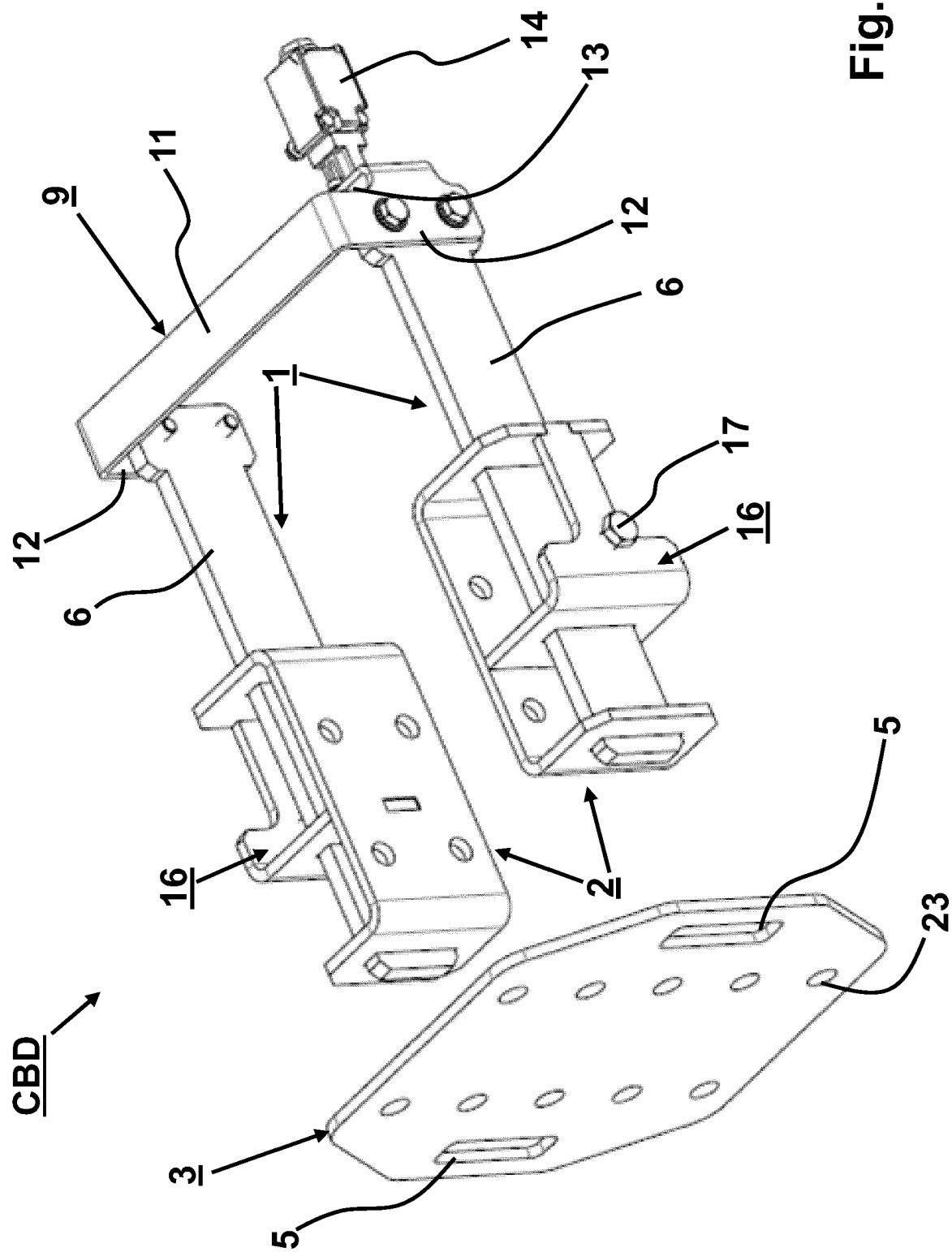


Fig. 1

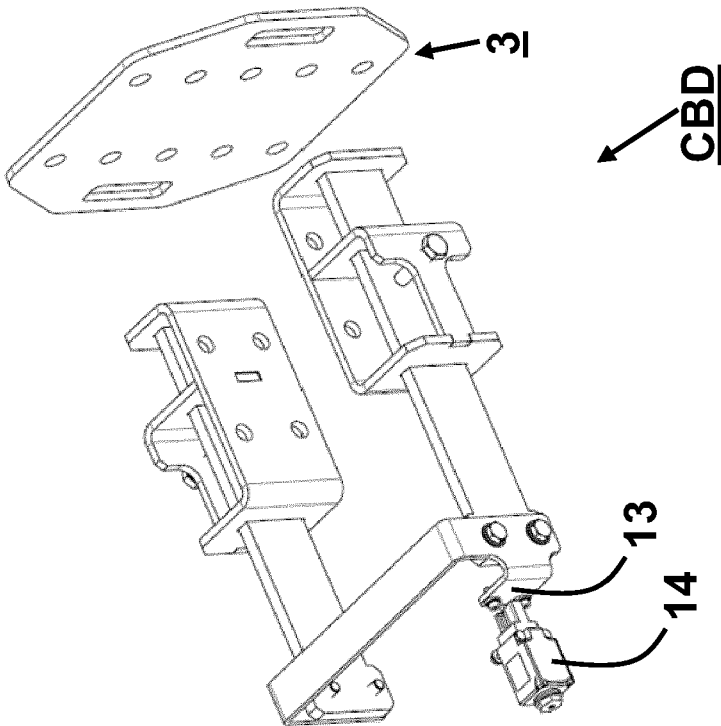
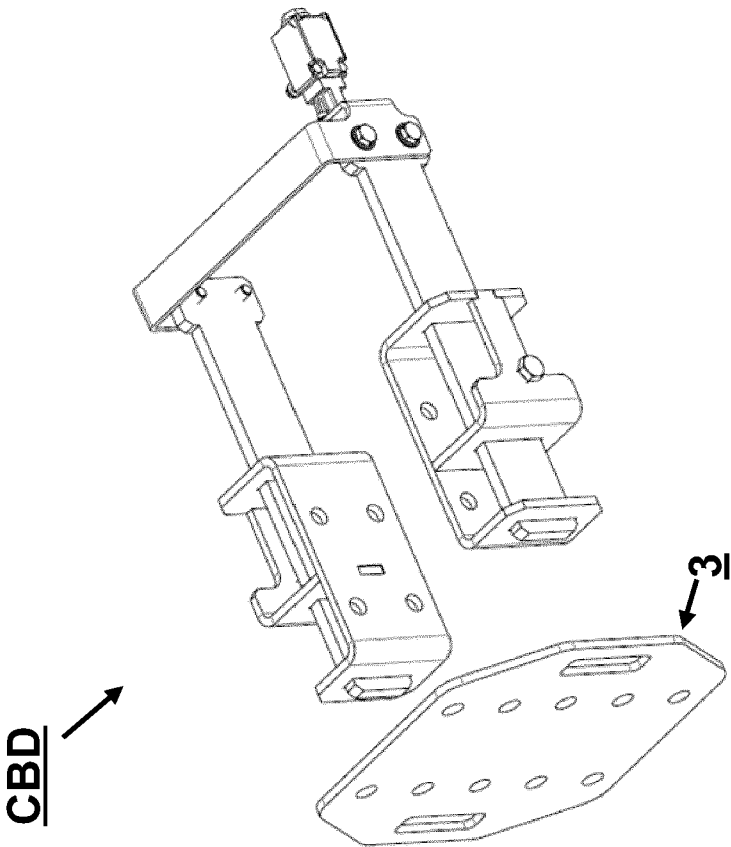
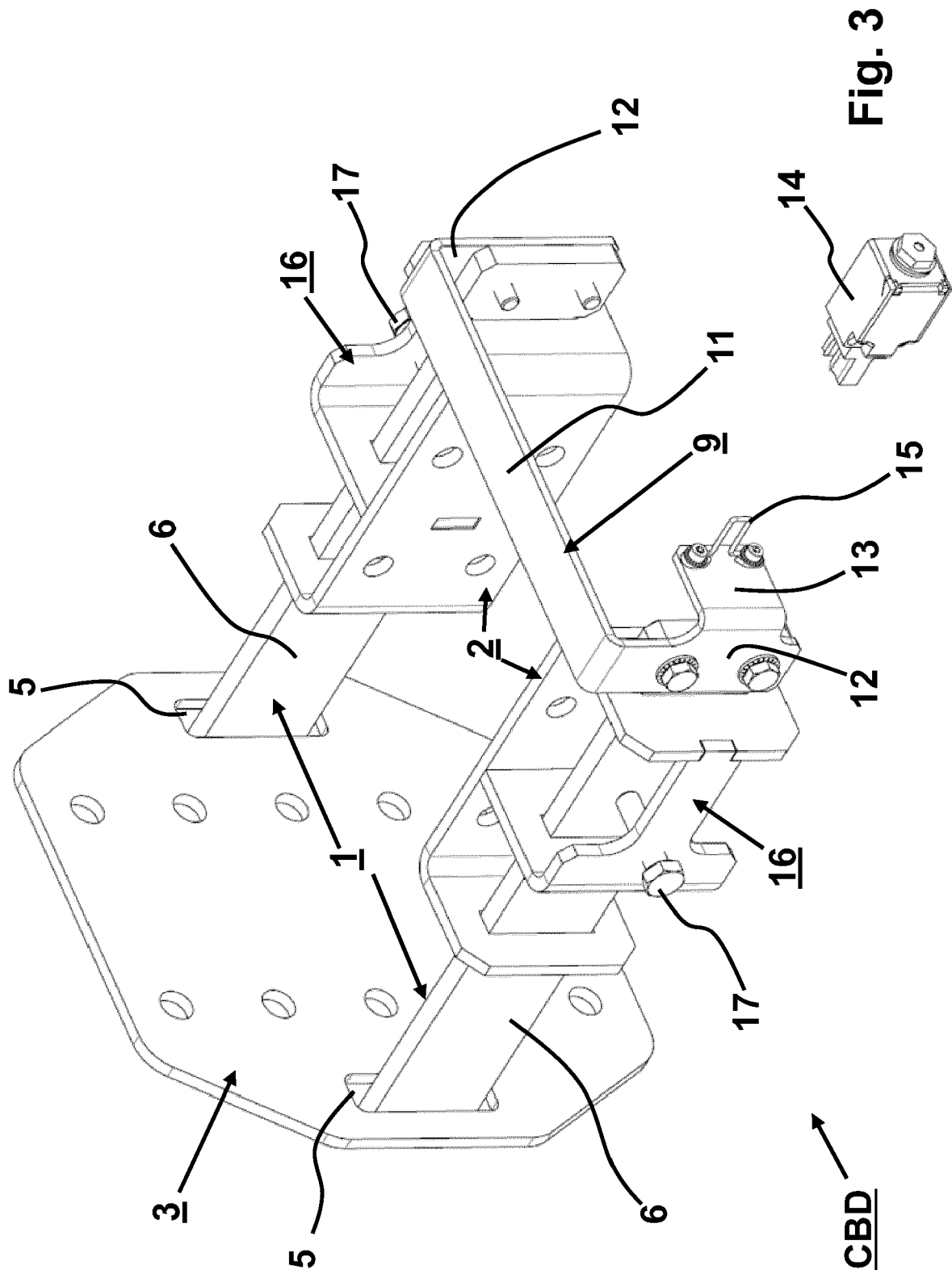
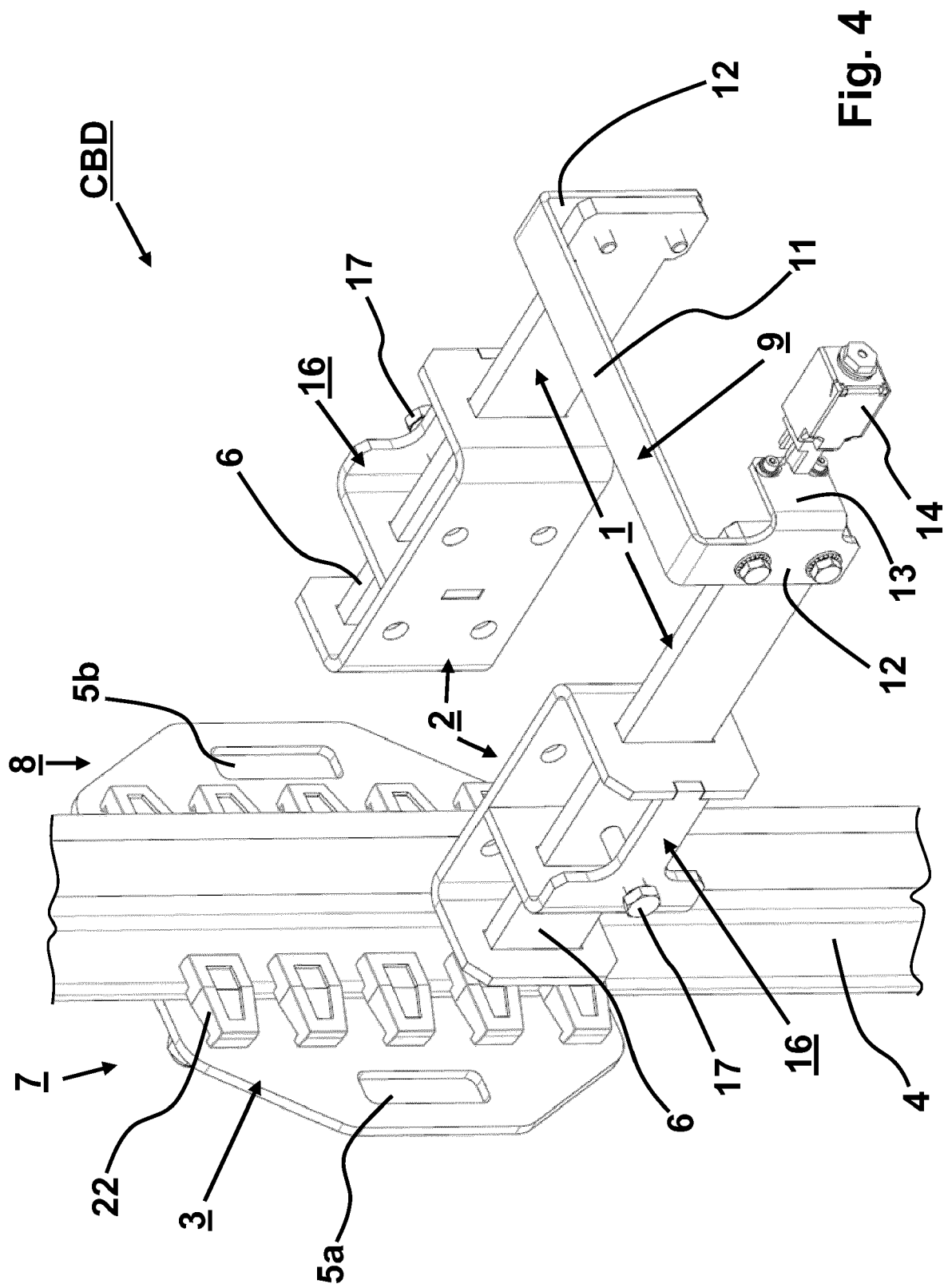


Fig. 2







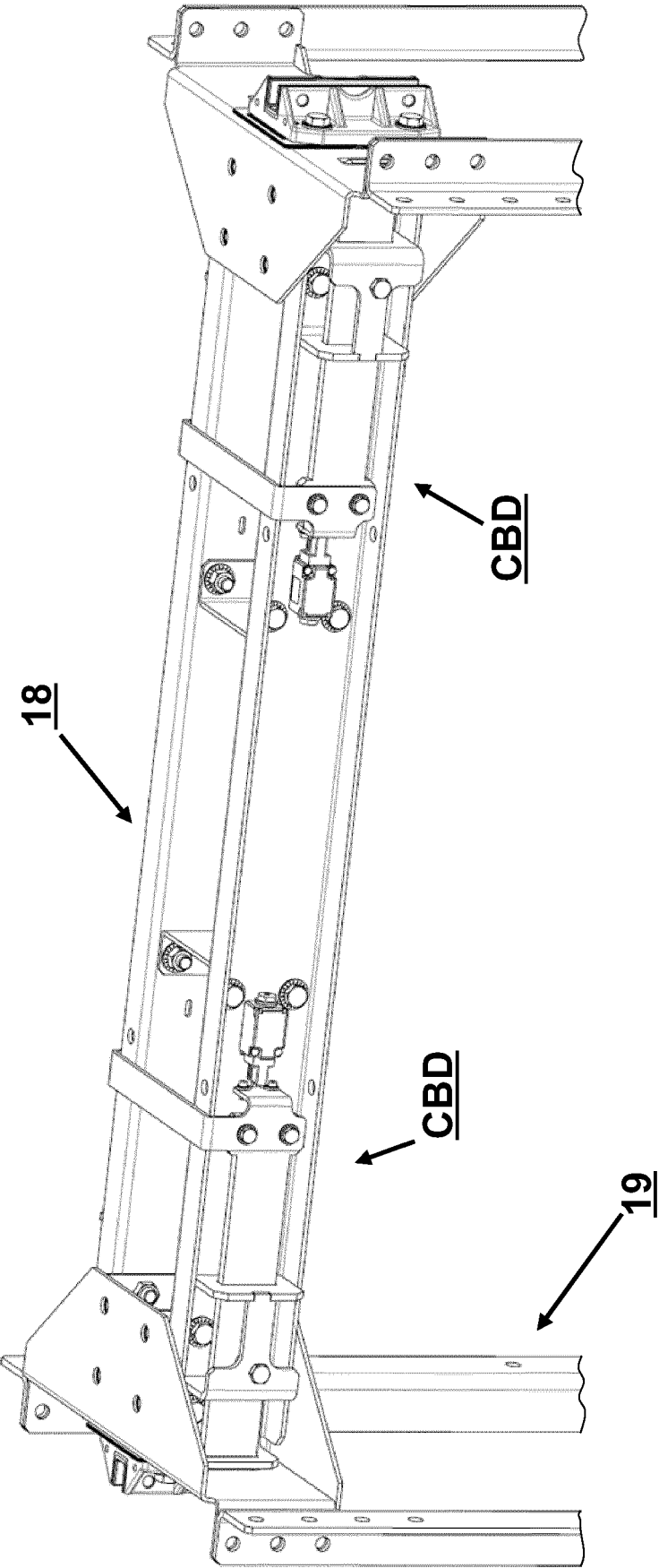


Fig. 5

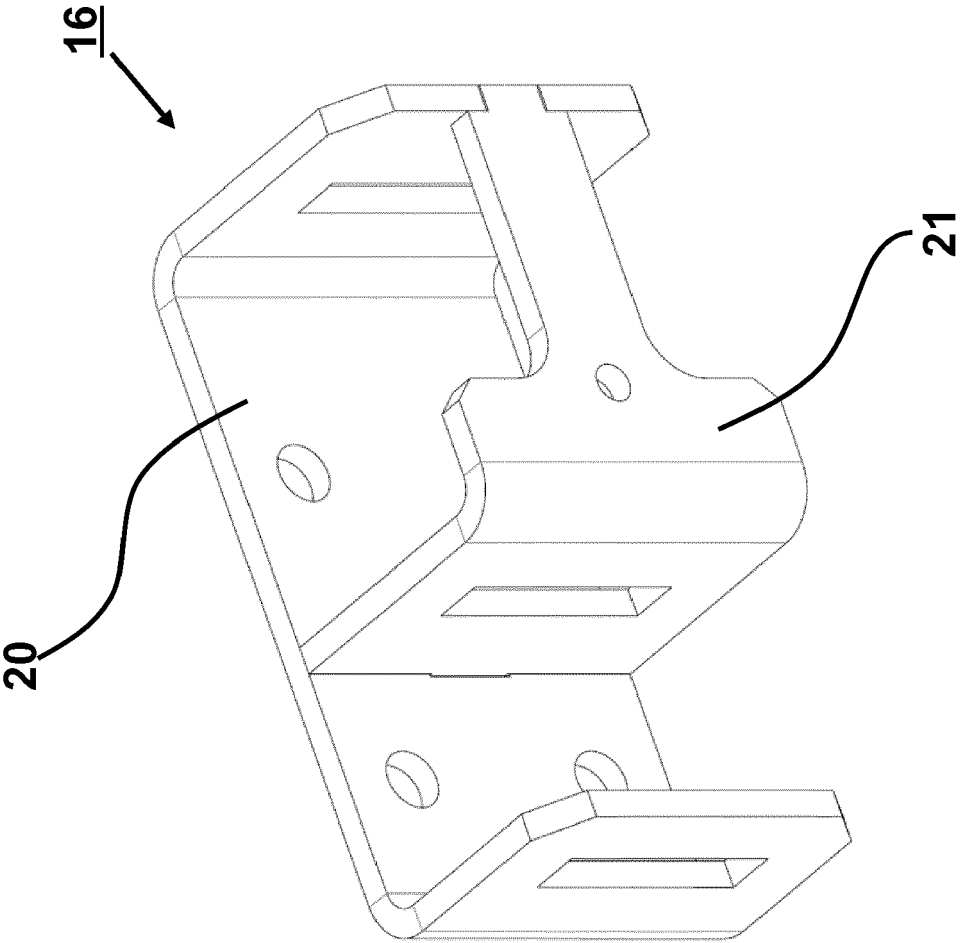


Fig. 6



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