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(54) Flotation means for the correct wedging of a safety device for life

(57) The invention consists of flotation means for correct wedging of a safety device for lifts specially designed to be situated between the guide and the lift cabin optimising space requirements, consisting mainly of the use of a set of horizontal grooves which enable lateral displacement of the body of the safety device which is laterally displaceable and able to absorb all the forces deriving from wedging at the time of stopping, as well as being provided with a seating means specially designed to ensure the correct support of the wedge at all times.

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Description

OBJECT OF THE INVENTION

[0001] The invention consists of flotation means for the correct wedging of a safety device for lifts specially designed to be situated between the guide and the cabin making best use of space requirements.

[0002] The flotation means consist mainly of the use of a set of horizontal grooves which enable the correct positioning of the friction wedge laterally displacing the main body of the safety device.

[0003] The safety device which uses these flotation means comprises a body which is able to absorb completely the forces deriving from the wedging at the moment of detention.

[0004] This wedging also has seating means specially designed to ensure that the wedge is correctly supported at all times.

BACKGROUND TO THE INVENTION

[0005] Safety devices for lifts act in the event of emergency when the lift cabin exceeds the upward or downward pre-established speed.

[0006] When this pre-established speed is exceeded which occurs for example in a free fall which might be caused by a broken suspension cable or over-acceleration upwards, an emergency braking mechanism acts to stop the lift cabin.

[0007] During the free fall or over-acceleration the safety device which is interlocked to the lift cabin, tends to follow with its speed. At this same moment when the free fall occurs or the upward over-acceleration occurs, a traction element joined to a friction wedge is blocked.

[0008] This effect produces a displacement of the wedge in the opposite direction to the movement of the safety device. In addition, the friction wedge is displaced laterally against the lift guide due to an oblique seating with one or various blocks also of the friction type, situated on the opposite side of the guide which are displaced as they are interlocked to the body of the safety device which compresses some coiled springs.

[0009] In this way the lift cabin is halted by the safety device located between the cabin and the guides.

[0010] In order to ensure perfect wedging, it is essential that the wedge seating is adequate at all times which is achieved by enabling the floatability of the body of the safety device.

[0011] One of the systems which permits this floatability is a patent with publication number FR 2702464, where the floatability is achieved by means of a rod guided by two prolongations which terminate in ends which are free from the body of the safety device.

[0012] Between one of the free ends of the safety device and two lateral walls where the rivet is attached, there are some elastic means which permit the floatability of the safety device body since the rivet acts as a support upon which the body of the safety device slides.

[0013] These prolongations or free ends present in the body of the safety device in order to permit floatability seriously increase the space taken up by the whole safety device equipment, and therefore it has to be placed beneath the cabin, thus restricting space in the lower part of the cabin allocated to steering apparatus, pulleys and other elements associated with the activation of the lift cabin.

[0014] Conversely, the invention which is described herein resolves the aforementioned disadvantages associated with floatability of the body of the safety device, without increasing the dimension and the weight thereof due to the need to include the rivet and the supports joined to said rivet, and in this way it is possible to place it at the cabin level thus freeing up space beneath the cabin.

DESCRIPTION OF THE INVENTION

[0015] The present invention refers to flotation means for the correct wedging of a safety device for lifts specially designed to situate the safety device between the guide and the cabin, making the most of space requirements.

[0016] The safety device presents a traction element which is blocked when over-acceleration occurs, both in an upward direction and a downward direction of the lift cabin.

[0017] This blockage of the traction element which is joined to a friction wedge, together with the movement of the safety device fixed to the lift cabin which tends to follow with its speed, wedges the friction wedge against the lift guide and produces a lateral displacement of the body of the safety device due to the oblique seating present in the device.

[0018] This lateral displacement produces a compression in one or various elastic elements situated on the opposite side of the guide and a displacement of one or various friction blocks interlocked to the body of the safety device situated on that side against the guide, producing as a result contact of the friction blocks with the guide and therefore the lift cabin is halted.

[0019] In order to achieve perfect wedging it is essential that the base of the wedge is adequate at all times which is achieved by permitting displacement of the wedge within the body of the lift safety device.

[0020] The floatability of the body of the safety device is achieved initially with the presence of horizontal grooves situated in the fastenings of a support plate interlocked to the resistant structure of the cabin to which the body of the safety device is anchored by means of bolts which are designed to absorb the forces of the vertical braking.

[0021] These grooves permit the relative position between the friction wedge and the guide to be defined during installation and the correct seating of the friction wedge during braking.

[0022] The main body of the safety device consists of

a "C" whose cavity passes through the guide on which the wedging is to be applied.

[0023] On one side of this main body in "C" form there are friction blocks linked through the elastic means and on the other side the friction wedge is located joined to a traction element such as a cable, a rod or similar.

[0024] The friction wedge moves along an obliquely supported seating and is guided by a grooving which is also oblique according to the seating which has sliding pins.

[0025] The oblique grooving has two widths so that it is possible to vary the type of seating of the pins interlocked to the wedge depending on the position in which those follower pins are fixed, in the first section narrow, or in the second wide. The narrow section does not allow any play of the pin in the direction transversal to the oblique grooving whereas the wide section does.

[0026] Therefore, the means of seating of the friction wedge is modified as the movement in the direction perpendicular to the longitudinal direction of the oblique grooving is not restricted. That is, the friction wedge is not restricted by the oblique grooving ensuring that the support contact with its seating is correct and is not conditioned by the restraints which would be imposed by the pins.

[0027] The force of the braking with which the wedge acts is regulated by a bolt which sets the distance in the horizontal between the friction wedge and the lift guide.

[0028] To summarise, the invention refers to flotation means for the correct wedging of a safety device where the safety device has a main body in the form of a "C" the cavity of which passes through the lift guide, with a friction wedge on one side of the guide, and on the other side one or various friction blocks linked by elastic means to the main safety device body designed to absorb the forces of reaction by the support of the friction wedge with the guide for retention by wedging, where the flotation means are characterised in that they consist of horizontal grooves present in a support plate interlocked to the resistant structure of the cabin to which the main body of the safety device is attached by means of bolts which are designed to absorb the forces of the vertical braking.

DESCRIPTION OF THE DRAWINGS

[0029] The present descriptive report is completed with a set of drawings which illustrate a preferred example but which is in no way restrictive of the invention.

[0030] Figure 1 shows a perspective view of the back of the first example of an embodiment of the invention of the flotation means for a safety device situated on its back wall. The same view shows the axis indicating the direction along which the guide extends.

[0031] Figure 2 shows a perspective view of the upper front part of the same embodiment of the invention for flotation means for a safety device situated on its back wall where only part of the lift guide is seen in order to note the wedge and the friction blocks.

[0032] Figure 3 shows a view of the elevation of the same example of an embodiment of the invention of the safety device flotation means where the safety device wedging is shown.

PREFERRED EMBODIMENT OF THE INVENTION

[0033] In the light of the aforementioned description the present invention refers to flotation means for the correct wedging of a safety device for lifts where the safety device which makes use of said flotation means comprises a body (1) with a traction element (2) joined to a friction wedge (3).

First example of a preferred embodiment

[0034] In this first example of a preferred embodiment the friction wedge is joined to the traction element (2) through attachment to the upper body (1) of the safety device.

[0035] When over-acceleration of the lift cabin takes place in a downward direction the traction element (2) is blocked, so that the body of the safety device (1) continues to move, causing the friction wedge (3) wedged in the upper part of the safety device, to move relatively in respect thereof, sliding on a seating comprising a linear needle bearing (9) arranged obliquely in order to implement the wedging on the guide (4) of the lift cabin.

[0036] At that moment, one or various friction blocks (5) situated in the body of the safety device (1) on the opposite side of the lift guide (4) are displaced towards said guide (4), thus stopping the lift cabin by retention.

[0037] The friction blocks (5) are linked to elastic means (6) which work under compression which in this preferred example of the embodiment are Belleville washers, so that the safety device body (1) is crushed during the wedging.

[0038] During the upward and downward movement of the lift cabin as it functions normally the guide (4) fits to some extent with the wedge (3) and the friction blocks (5) so that the safety device body (1) does not interfere with said guide (4).

[0039] Flotation of the safety device body is implemented by means of horizontal grooves (7.1) on the support plate(7) interlocked to the resistant structure of the lift cabin where the safety device body (1) is attached by means of bolts (8) designed to absorb the forces of the vertical braking.

[0040] The support plate (7) is situated between the wall (1.1) of the safety device body (1) opposed to the guide (4) which hereinafter shall be termed back wall, and the bolts (8) fixed on that wall (1.1) to the safety device body (1.

[0041] In this example of a preferred embodiment, the plate (7) support comprises four bolts (8) located in the respective horizontal grooves (7.1) arranged in twos on top of each other so that with this arrangement the bolts (8) are able to support the forces of the torsion generated

during braking.

[0042] An oblique grooving (1.2) is interlocked to the safety device body (1) with at least one narrow section (1.2.1) and a wide section (1.2.2), through which run two follower pins (3.1) interlocked to the friction wedge (3).

[0043] When as a maximum one of the follower pins (3.1) interlocked to the friction wedge (3) continues in the narrow section (1.2.1) of the oblique grooving, (1.2) the rest of the follower pins (3.1) found in the wide sections (1.2.2) can be displaced in a direction perpendicular to the longitudinal direction of the oblique grooving (1.2) so that the seating of the friction wedge (3) varies, in this case on the linear needle bearing (9).

[0044] The force of the braking associated with the degree of vertical advance of the friction wedge (3) is regulated by means of a lower bolt (3.2) and a safety nut (3.3) which blocks the connection in order to control the permitted advance of the friction wedge (3) when the traction element (2) is blocked.

Second example of a preferred embodiment

[0045] In this second example of a preferred embodiment the friction wedge is jointed to the traction element (2) through an attachment in the lower part of the safety device body (1)

[0046] The friction wedge (3) wedged towards the lower part of the safety device is placed in the body of the safety device (1) in an arrangement symmetrical to the arrangement of the friction wedge (3) in the first example of the preferred embodiment with respect to a horizontal plane, that is, with an oblique plane so that when the lift cabin over-accelerates in an upward direction the traction element (2) is blocked so that the body of the safety device (1) continues to move obliging the friction wedge (3) to displace relatively with respect to the element sliding on the seating comprising a linear needle bearing (9) in an oblique arrangement in order to wedge against the lift cabin guide (4).

Third example of a Preferred embodiment

[0047] In this third example of a preferred embodiment the friction wedge is joined to the traction element (2) through two attachments situated respectively in the lower and upper parts of the safety device body (1).

[0048] The friction wedge (3) wedged towards the upper and lower part of the safety device presents two inclined planes antagonistic to two bases comprising two linear needle bearings (9) also arranged obliquely in order to wedge the lift cabin guide (4) when the lift cabin over-accelerates either in an upwards or downwards direction.

[0049] The essential nature of this invention is not altered by materials, form, size and arrangement of the component elements described in a manner which is not restrictive in any way and is sufficient for an expert to proceed to its reproduction.

Claims

1. Flotation means for the correct wedging of a safety device in which the safety device has a main body (1) consisting of a "C" whose cavity passes through the lift guide (4), with a friction wedge (3) on one side of the guide (4), and on the opposite side one or various blocks (5) also of the friction type, linked by elastic means (6) to the main body (1) of the safety device assigned to absorb the reaction forces by support of the friction wedge (3) on the guide (4) for retention through wedging in which the flotation means are **characterised in that** they comprise horizontal grooves (7.1) present in a support plate (7) interlocked to the resistant structure of the cabin to which the main body (1) of safety device is anchored by means of bolts (8) designed to absorb the vertical braking forces.

2. Flotation means for the correct wedging of a lift safety device according to claim 1 **characterised in that** the friction wedge (3) moves along an oblique support seating so that it is possible to vary the means of seating of the friction wedge (3) as it releases the displacement in a direction perpendicular to the longitudinal direction of an oblique grooving (1.2) present in the main body of the safety device (1).

3. Flotation means for the correct wedging of a lift safety device according to claim 1 **characterised in that** the friction wedge (3) is guided by at least two follower pins (3.1) which follow the oblique grooving (1.2) and are interlocked to the friction wedge (3).

4. Flotation means for the correct wedging of a safety device for lifts according to claim 3, **characterised in that** the oblique groove (1.2) has a first narrow section (1.2.1) and a second wide section (1.2.2) so that the variation in the mode of seating of the friction wedge (3) occurs when as a maximum one of the follower pins (3.1) interlocked to the friction wedge (3) continues in the narrow section (1.2.1) of the oblique grooving (1.2).

5. Flotation means for the correct wedging of a safety device for lifts according to claim 1 **characterised in that** the safety device friction wedge (3) presents a traction element (2) which is blocked when the lift cabin over-accelerates so that body (1) of the safety device (1) continues to move obliging the friction wedge (3) to displace relatively in respect of said body in order to wedge against the guide (4) of the lift cabin.

6. Flotation means for the correct wedging of a safety device for lifts according to claim 5 **characterised in that** when the traction element (2) is blocked, a seating comprising a linear needle bearing (9) ar-

ranged obliquely slides on the friction wedge (3) in order to carry out the wedging.

7. Flotation means for the correct wedging of a safety device for lifts according to claim 1 **characterised in that** the friction blocks (5) are linked to elastic means (6) which work under compression so that they are crushed by the safety device body (1) during the wedging.

8. Flotation means for the correct wedging of a safety device for lifts according to claim 1 **characterised in that** the support plate (7) comprises four bolts (8) fitted in the respective horizontal grooves (7.1) arranged two by two some on top of others so that with this arrangement the bolts (8) are able to support the torsion forces generated during braking.

9. Flotation means for the correct wedging of a safety device for lifts according to claim 1 **characterised in that** the braking force associated with the degree of vertical advance of the friction wedge (3) is regulated by means of a lower bolt (3.2) and a safety nut (3.3) which blocks the connection in order to control the advance permitted by the friction wedge(3) when the traction element (2) is blocked.

10. Flotation means for the correct wedging of a safety device for lifts according to claim 7 **characterised in that** the elastic elements (6) are Belleville washers.

11. Flotation means for the correct wedging of a safety device for lifts according to claim 4 **characterised in that** the variation of the seating of the friction wedge (3) occurs when one of the follower pins (3.1) interlocked to the friction wedge(3) continues in the narrow section (1.2.1) of the oblique groove (1.2).

12. flotation means for the correct wedging of a safety device for lifts according to claim 1 **characterised in that** the variation in the seating of the friction wedge (3) occurs when none of the follower pins (3.1) interlocked to the friction wedge (3) continues in the narrow section (1.2.1) of the oblique grooving (1.2).

13. Flotation means for the correct wedging of a safety device for lifts according to claim 6 **characterised in that** the friction wedge (3) is wedged towards the upper part of the safety device presenting an inclined antagonistic plane of a seating comprising a linear needle bearing (9) also obliquely arranged in order to wedge on the lift cabin guide (4) when the lift cabin over-accelerates in the downward direction.

14. Flotation means for the correct wedging of a safety device for lifts according to claim 6 **characterised in that** the friction wedge (3) is wedged towards the.lower part of the safety device presenting an inclined antagonistic plane of a seating comprising a linear needle bearing (9) also arranged obliquely in order to wedge on the guide (4) of the lift cabin when there is an over-acceleration of the lift cabin in an upward direction.

15. Flotation means for the correct wedging of a safety device for lifts according to claim 6 **characterised in that** the friction wedge (3) is wedged towards the upper and lower part of the safety device presenting two inclined antagonistic planes of two seatings comprising two linear needle bearings (9) which are also oblique in order to wedge on the guide (4) of the lift cabin when there is an over-acceleration of the lift cabin in both upward and downward directions.

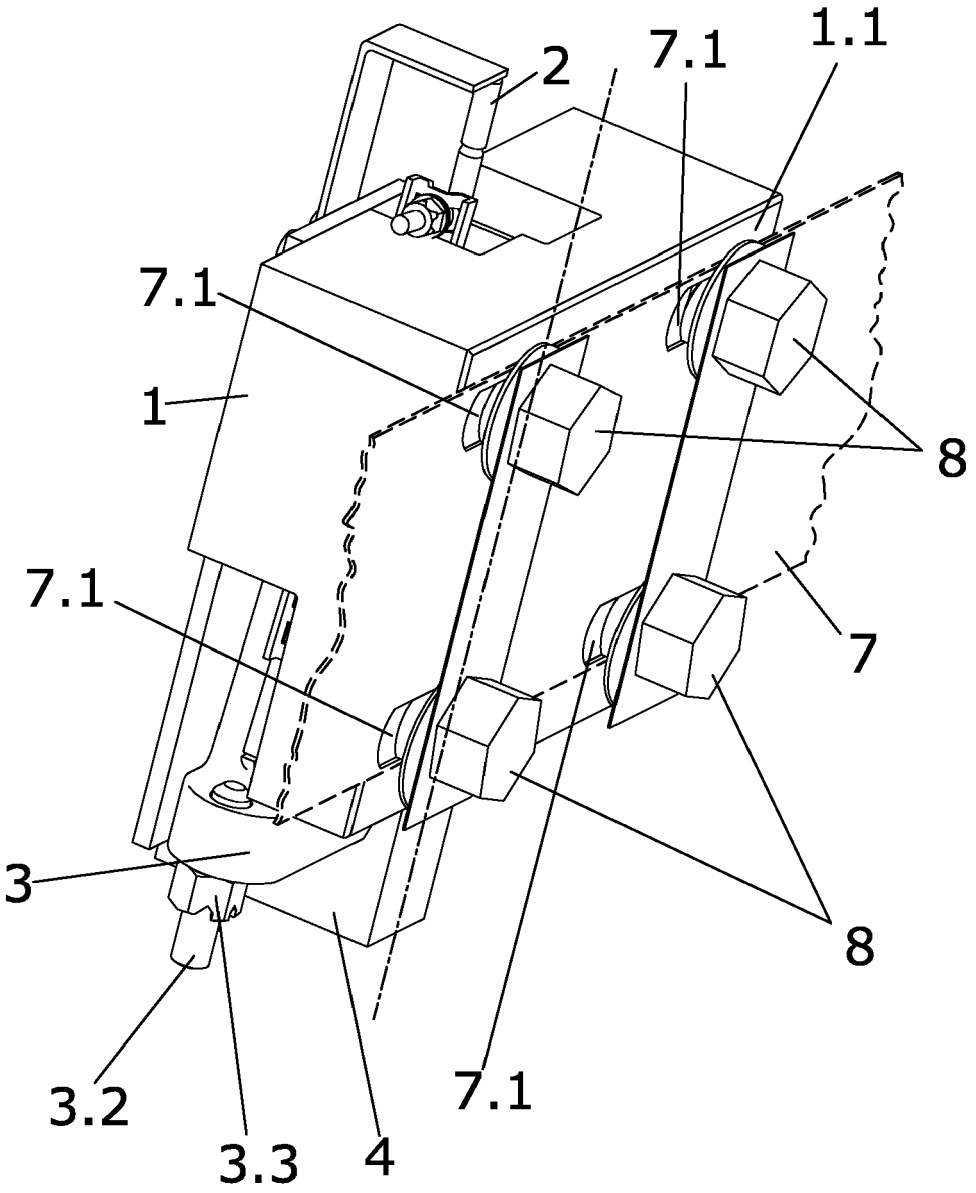

FIG.1

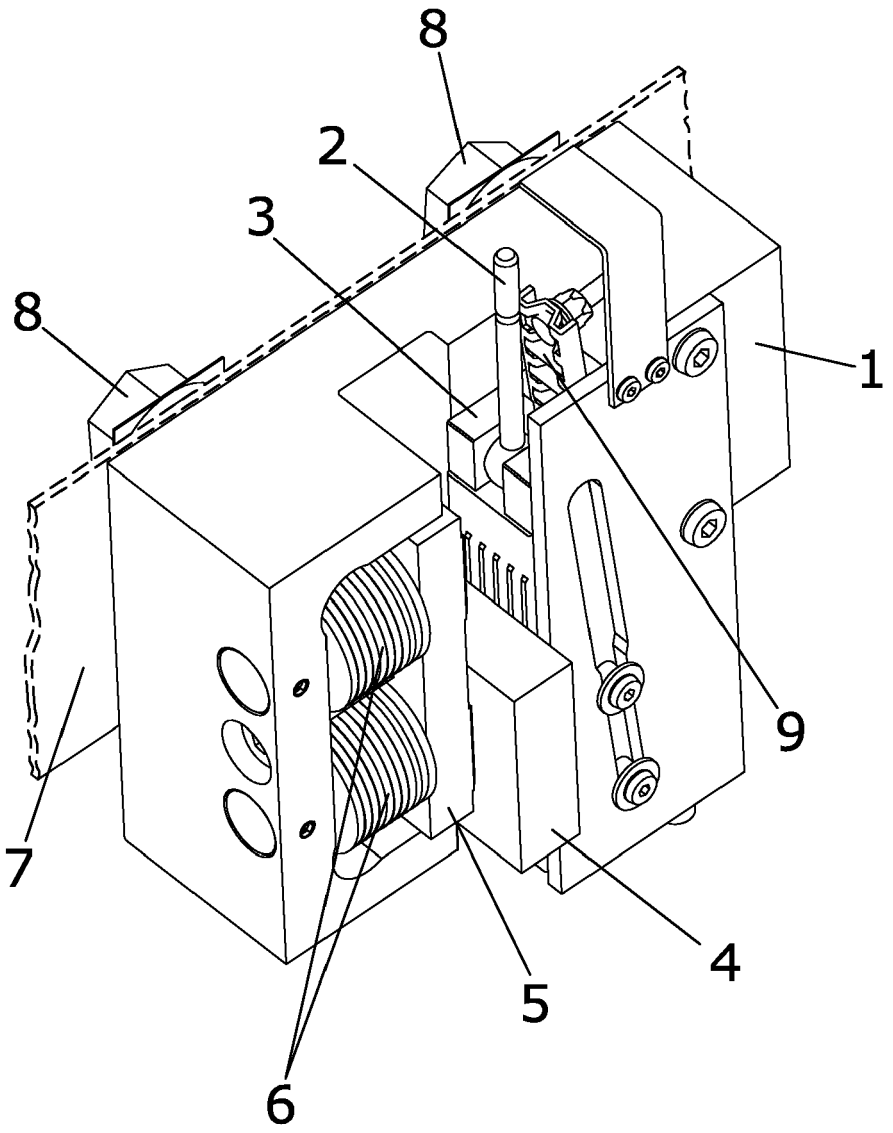

FIG.2

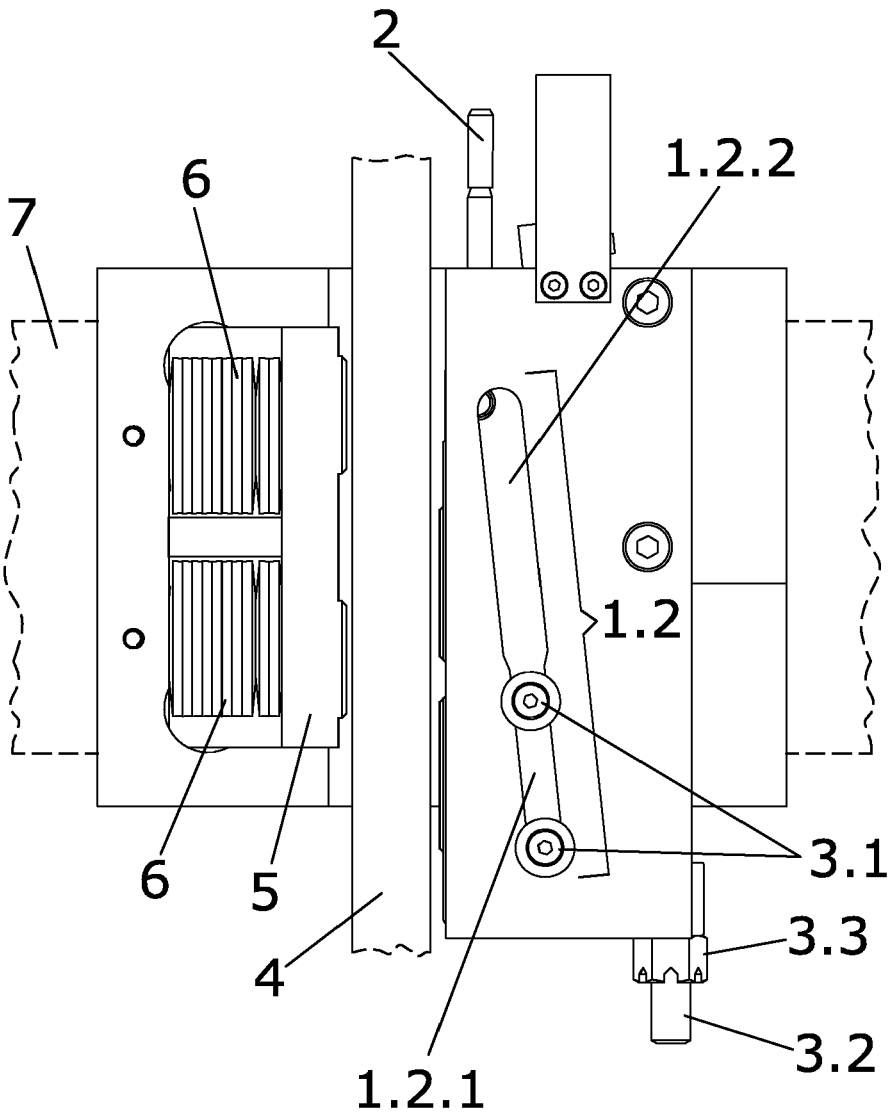

FIG.3

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- FR 2702464 **[0011]**