

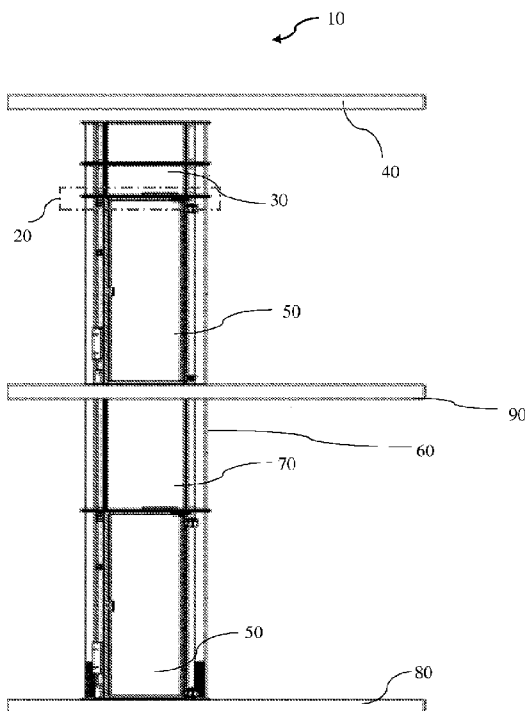


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(54) Title: OVERLOAD VALVE ASSEMBLY FOR A PNEUMATIC VACUUM ELEVATOR

FIG. 1



(57) Abstract: An overload valve assembly for a pneumatic vacuum elevator is disclosed. The overload valve assembly for a pneumatic vacuum elevator is characterised by a fastening means, a pad with a centre hole, an arresting plate with a centre hole, a disc plate with a centre hole, a bottom bush, a spring and a top bush bounded with a nut. Here, the pad, the arresting plate, the disc plate, the bottom bush, the spring and the top bush bounded with the nut is fitted over the fastening means. The overload valve unit is configured to function based on spring actuation mechanism and ensure the maximum permissible limit of pay load in the elevator cabin assembly.



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OVERLOAD VALVE ASSEMBLY FOR A PNEUMATIC VACUUM
ELEVATOR

This International Application claims priority from a Complete patent application
5 filed in India having Patent Application No. 202041023093, filed on June 02, 2020,
and titled "OVERLOAD VALVE ASSEMBLY FOR A PNEUMATIC VACUUM
ELEVATOR".

FIELD OF INVENTION

10 Embodiments of a present disclosure relates to a pneumatic vacuum elevator, and
more particularly to an overload valve assembly for a pneumatic vacuum elevator.

BACKGROUND

In conventional approach, mechanical elevators use countervailing weights in order
to facilitate moving up and down of a passenger cabin. Such, typical elevators
15 require a great deal of space, maintenance, equipment and machinery. The
pneumatic vacuum elevator uses air pressure to cause motion of the passenger cabin
within a thoroughfare or tubular cylinder. The mechanism uses the air within the
tubular cylinder as a working fluid. Brakes, motors, valves, electronic controls and
other equipment work in tandem to ensure a safe and pleasant riding experience for
20 each occupant therein.

For ideal operation of pneumatic vacuum elevator, the load inside an elevator cabin
(CAR) assembly must not exceed the permissible load limit, so that the elevator
cabin (CAR) assembly may traverse safely inside the cylinder assembly of the
elevator without any malfunction. In current approach, load cells are being used to
25 determine the real time weight of the elevator cabin (CAR) assembly. In such
mechanism, elevator provides alerts if pre-determined weight is crossed. Here,
detection may be incorrect due to malfunction of load cells. An effective
mechanism would be to use an automatic and reliable overload detection system,
whereby the system may give alert after judging maximum permissible limit of pay

load in real time and halt the operation of pneumatic vacuum elevator to prevent any mishap.

Hence, there is a need for an overload valve assembly for a pneumatic vacuum elevator to address the aforementioned issues.

5 BRIEF DESCRIPTION

In accordance with one embodiment of the disclosure, an overload valve assembly for a pneumatic vacuum elevator is disclosed. The overload valve assembly for a pneumatic vacuum elevator comprises an overload valve unit. The overload valve unit is housed in a head cylinder. The overload valve unit is connected to top of an elevator cabin (CAR) assembly. The overload valve unit is configured to function based on spring actuation mechanism and ensure the maximum permissible limit of pay load in the cabin assembly.

The overload valve assembly is characterised by a fastening means. The fastening means is mechanically oriented in an inverted position and affixed over outer top surface of the elevator cabin (CAR) assembly. The overload valve assembly is also characterised by a pad with a centre hole. The pad is inserted into the fastening means. The pad is adapted to rest over lower end of the fastening means.

The overload valve assembly is also characterised by an arresting plate with a centre hole. The arresting plate is inserted into the fastening means. The arresting plate is adapted to rest above the pad. The arresting plate and the pad are tightly held over lower end of the fastening means by a C-shaped clip. The overload valve assembly is also characterised by a disc plate with a centre hole. The disc plate is inserted into the fastening means and mechanically coupled to lower side of the head cylinder. The disc plate comprises extrusion around circumference of the disc plate at lower side, extrusion around the centre hole, and a plurality of holes for out flow of air.

The overload valve assembly is also characterised by a bottom bush. The bottom bush is inserted into the fastening means and housed inside the extrusion at the

centre hole of the disc plate. The bottom bush is adapted to act as an insulator by insulating the fastening means from the disc plate. The overload valve assembly is also characterised by a spring of pre-determined spring force. The spring is inserted into the fastening means and rests above the disc plate. The overload valve assembly
5 is also characterised by a top bush bounded with a nut. The top bush enables fastening of the spring with the disc plate from top end of the fastening means.

In accordance with one embodiment of the disclosure, a pneumatic vacuum elevator, ensuring a maximum permissible limit of pay load in elevator cabin (CAR) assembly, is disclosed. The pneumatic vacuum elevator includes an elevator
10 cylinder which is adapted to house pneumatic vacuum elevator components. The pneumatic vacuum elevator components include a head cylinder mechanically affixed just below the ceiling of the top floor for housing an elevator cabin structural sealing unit, at least one motor and an overload valve assembly, where the overload valve assembly is configured to function based on spring actuation mechanism and
15 ensure a maximum permissible limit of pay load in elevator cabin (CAR) assembly.

The pneumatic vacuum elevator components also include an elevator cabin (CAR) assembly. The elevator cabin (CAR) assembly is positioned below the head cylinder and adapted for upward and downward movement through one or more floor levels. The pneumatic vacuum elevator components also include an
20 intermediate cylinder assembly mechanically affixed in between each of the one or more floor levels. The intermediate cylinder assembly is adapted to provide requisite space for easy movement of the elevator cabin (CAR) assembly between each of the one or more floor levels.

To further clarify the advantages and features of the present disclosure, a more
25 particular description of the disclosure will follow by reference to specific embodiments thereof, which are illustrated in the appended figures. It is to be appreciated that these figures depict only typical embodiments of the disclosure and are therefore not to be considered limiting in scope. The disclosure will be described and explained with additional specificity and detail with the appended figures.

BRIEF DESCRIPTION OF THE DRAWINGS

The disclosure will be described and explained with additional specificity and detail with the accompanying figures in which:

5 FIG. 1 is a schematic representation of a pneumatic vacuum elevator in accordance with an embodiment of the present disclosure;

FIG. 2 is a schematic representation of an overload valve assembly in conjunction with a pneumatic vacuum elevator in accordance with an embodiment of the present disclosure;

10 FIG. 3 (a) is a schematic representation of top view of the overload valve assembly (110) in accordance with an embodiment of the present disclosure;

FIG. 3 (b) is a schematic representation of isometric view of the overload valve assembly (110) in accordance with an embodiment of the present disclosure;

FIG. 3 (c) is a schematic representation of front view of the overload valve assembly (110) in accordance with an embodiment of the present disclosure;

15 FIG. 4 is an exploded view representation of the overload valve assembly in accordance with an embodiment of the present disclosure;

FIG. 5 is a sectional view representation of the overload valve assembly during cabin permissible load condition in accordance with an embodiment of the present disclosure; and

20 FIG. 6 is a sectional view representation of the overload valve assembly during cabin overload condition in accordance with an embodiment of the present disclosure.

Further, those skilled in the art will appreciate that elements in the figures are illustrated for simplicity and may not have necessarily been drawn to scale.

25 Furthermore, in terms of the construction of the device, one or more components of

the device may have been represented in the figures by conventional symbols, and the figures may show only those specific details that are pertinent to understanding the embodiments of the present disclosure so as not to obscure the figures with details that will be readily apparent to those skilled in the art having the benefit of
5 the description herein.

DETAILED DESCRIPTION

For the purpose of promoting an understanding of the principles of the disclosure, reference will now be made to the embodiment illustrated in the figures and specific language will be used to describe them. It will nevertheless be understood that no
10 limitation of the scope of the disclosure is thereby intended. Such alterations and further modifications in the illustrated online platform, and such further applications of the principles of the disclosure as would normally occur to those skilled in the art are to be construed as being within the scope of the present disclosure.

15 The terms "comprises", "comprising", or any other variations thereof, are intended to cover a non-exclusive inclusion, such that a process or method that comprises a list of steps does not include only those steps but may include other steps not expressly listed or inherent to such a process or method. Similarly, one or more devices or subsystems or elements or structures or components preceded by
20 "comprises... a" does not, without more constraints, preclude the existence of other devices, subsystems, elements, structures, components, additional devices, additional subsystems, additional elements, additional structures or additional components. Appearances of the phrase "in an embodiment", "in another embodiment" and similar language throughout this specification may, but not
25 necessarily do, all refer to the same embodiment.

Unless otherwise defined, all technical and scientific terms used herein have the same meaning as commonly understood by those skilled in the art to which this disclosure belongs. The system, methods, and examples provided herein are only illustrative and not intended to be limiting.

In the following specification and the claims, reference will be made to a number of terms, which shall be defined to have the following meanings. The singular forms “a”, “an”, and “the” include plural references unless the context clearly dictates otherwise.

- 5 Embodiments of the present disclosure relate to an overload valve assembly for a pneumatic vacuum elevator is disclosed. The overload valve assembly for a pneumatic vacuum elevator comprises an overload valve unit. The overload valve unit is housed in a head cylinder. The overload valve unit is connected to top of an elevator cabin (CAR) assembly. The overload valve unit is configured to function
10 based on spring actuation mechanism and ensure the maximum permissible limit of pay load in the cabin assembly.

The overload valve assembly is characterised by a fastening means. The fastening means is mechanically oriented in an inverted position and affixed over outer top surface of the elevator cabin (CAR) assembly. The overload valve assembly is also
15 characterised by a pad with a centre hole. The pad is inserted into the fastening means. The pad is adapted to rest over lower end of the fastening means.

The overload valve assembly is also characterised by an arresting plate with a centre hole. The arresting plate is inserted into the fastening means. The arresting plate is adapted to rest above the pad. The arresting plate and the pad are tightly held over
20 lower end of the fastening means by a C-shaped clip. The overload valve assembly is also characterised by a disc plate with a centre hole. The disc plate is inserted into the fastening means and mechanically coupled to lower side of the head cylinder. The disc plate comprises extrusion around circumference of the disc plate at lower side, extrusion around the centre hole, and a plurality of holes for out flow of air.

25 The overload valve assembly is also characterised by a bottom bush. The bottom bush is inserted into the fastening means and housed inside the extrusion at the centre hole of the disc plate. The bottom bush is adapted to act as an insulator by insulating the fastening means from the disc plate. The overload valve assembly is also characterised by a spring of pre-determined spring force. The spring is inserted

into the fastening means and rests above the disc plate. The overload valve assembly is also characterised by a top bush bounded with a nut. The top bush enables fastening of the spring with the disc plate from top end of the fastening means.

FIG. 1 is a schematic representation of a pneumatic vacuum elevator (10) in accordance with an embodiment of the present disclosure. As used herein, the machine “pneumatic elevators” utilize air pressure to lift the elevator cabin (50). In such embodiment, a vacuum seal built into the ceiling enables lifting of the elevator cabin through the elevator cabin housing. The pneumatic vacuum elevator (10) comprises an elevator cylinder (60). The elevator cylinder (60) is adapted to house the pneumatic vacuum elevator (10) components.

The pneumatic vacuum elevator (10) components comprises a head cylinder (30). The head cylinder (30) is mechanically affixed just below ceiling (40) of the top floor (90). The head cylinder (30) is adapted for housing the elevator cabin structural sealing unit (20), at least one motor and an overload valve assembly. Each of the at least one motor delivers necessary power for total functioning of the elevator during operation.

The pneumatic vacuum elevator (10) components also comprises a cylindrical elevator cabin (CAR) (50) assembly. The cylindrical elevator cabin (CAR) (50) assembly is positioned below the head cylinder (30). The cylindrical elevator cabin (CAR) (50) assembly is adapted to provide an elevator housing for upward and downward movement through one or more floor levels (80 and 90).

The pneumatic vacuum elevator (10) components also comprises an intermediate cylinder assembly (70). The intermediate cylinder assembly (70) is mechanically affixed in between each of the one or more floor levels (80 and 90). The intermediate cylinder assembly (70) is adapted to provide requisite space for easy movement of the cylindrical elevator cabin (CAR) (50) assembly between each of the one or more floor levels (80 and 90).

FIG. 2 is a schematic representation of the overload valve assembly (110) in conjunction with a pneumatic vacuum elevator (100) in accordance with an embodiment of the present disclosure. The overload valve assembly (110) is housed in a head cylinder (30) (as shown in FIG. 1) and principally connected to the top of an elevator cabin (CAR) (50) assembly. As stated above, all such pneumatic vacuum elevator (10) (as shown in FIG. 1) components are housed in elevator cylinder (60). In such embodiment, the overload valve assembly (110) is housed just above the bottom surface (130) housing a motor assembly (120). In such embodiment, the overload valve assembly (110) is affixed near top portion (140) of elevator cylinder (60) to detect the weight of the elevator cabin (CAR) (50) assembly effectively.

FIG. 3 (a) is a schematic representation of top view of the overload valve assembly (110) in accordance with an embodiment of the present disclosure. FIG. 3 (b) is a schematic representation of isometric view of the overload valve assembly (110) in accordance with an embodiment of the present disclosure. FIG. 3 (c) is a schematic representation of front view of the overload valve assembly (110) in accordance with an embodiment of the present disclosure. FIGs. 3(a), (b) and (c) basically provides assembled orthographic views of the overload valve assembly (110). The overload valve assembly (110) basically comprises of components such as a fastening means, a pad, an arresting plate, a disc plate fabricated with extrusions, a spring, a number of bush and a nut characterised for tightly holding the components together. In an embodiment, the fastening means used may be a rod, a bolt, an Allen bolt, a stud bolt or a screw.

FIG. 4 is an exploded view representation of arrangement of various components of the overload valve assembly (110) in accordance with an embodiment of the present disclosure. The overload valve assembly (110) for the pneumatic vacuum elevator (10) comprises an overload valve unit (105) (as shown in FIG. 2). The overload valve unit (105) is housed in a head cylinder (30) and connected to top of an elevator cabin (CAR) (50) assembly. The overload valve unit (105) is configured

to function based on spring actuation mechanism and ensure the maximum permissible limit of pay load in the elevator cabin (CAR) (50) assembly.

The overload valve assembly (110) is characterised by a fastening means (150). The fastening means (150) is mechanically oriented in an inverted position. In one
5 specific embodiment, the type of fastening means used may be a hexagonal fastening means (150). The fastening means (150) is affixed over outer top surface of the elevator cabin (CAR) (50) assembly.

The overload valve assembly (110) is also characterised by a pad (160). The pad (160) is configured with a centre hole for the procedure of insertion into the
10 fastening means (150). The pad (160) is adapted to rest over lower end of the fastening means (150). In one embodiment, the pad is fabricated with nylon, plastic, polycarbonate, medium-density fibreboard or any non-conduction material. It is pertinent to note that, the use of non-conducting material enables insulation from unnecessary electrical conductivity. In one specific embodiment, the pad (160) may
15 be fabricated in circular shape.

The overload valve assembly (110) is also characterised by an arresting plate (170). The arresting plate (170) is characterised with a centre hole for the procedure of
insertion into the fastening means (150). The arresting plate (170) is adapted to rest above the pad (160). In one embodiment, the arresting plate (170) is fabricated with
20 steel, aluminium or any other similar conducting material. In one embodiment, the arresting plate (170) may be fabricated in circular shape.

In one specific embodiment, the arresting plate (170) and the pad (160) are tightly held over lower end of the fastening means (150) by a C-shaped clip (180). In such
embodiment, the C-shaped clip (180) basically locks the arresting plate (170) and
25 the pad (160) with the fastening means (150).

The overload valve assembly (110) is also characterised by a disc plate (190). The disc plate (190) is characterised with a centre hole for the procedure of insertion
into the fastening means (150). The disc plate (190) is mechanically coupled to

lower side of the head cylinder (30). In one specific embodiment, the disc plate (190) comprises extrusion around circumference of the disc plate (190) at lower side, extrusion around the centre hole, and a plurality of holes (195). In one embodiment, the plurality of holes (195) may enable outflow of air during overload valve assembly (110) operation. In another embodiment, the disc plate (190) is fabricated with steel, aluminium or any other similar conducting material.

In one specific embodiment, the extrusion around the centre hole is fabricated in upward direction. In such embodiment, the extrusion around the centre hole enable holding of components on the above portion of the overload valve assembly (110). In another specific embodiment, the extrusion at lower side is fabricated in downward direction. In such embodiment, the extrusion at lower side is adapted to house the arresting plate (170) and the pad (160).

Furthermore, in another specific embodiment, the arresting plate (170) and the pad (160) is adapted to move in tandem from a closed position to an open position. At the closed position, the arresting plate (170) covers the plurality of holes (195), thereby preventing the out flow of air and completing a power circuit. The arresting plate (170) is configured to be pushed down to move to the open position, thereby uncovering the plurality of holes (195) and enabling the out flow of air and disconnecting the power circuit.

The overload valve assembly (110) is also characterised by a bottom bush (200). The bottom bush (200) is inserted into the fastening means (150) and housed inside the extrusion at the centre hole of the disc plate (190). The bottom bush (200) is adapted to act as an insulator by insulating the fastening means (150) from the disc plate (190). In such embodiment, the bottom bush (200) may be fabricated in circular shape. In one embodiment, the bottom bush (200) is fabricated with nylon, plastic, polycarbonate, medium-density fibreboard and any non-conduction material.

Moreover, the overload valve assembly (110) is also characterised by a spring (210) of pre-determined spring force. The spring (210) is inserted into the fastening means

(150) and rests above the disc plate (190). As used herein, the term “spring force” is the force exerted by a compressed or stretched spring upon any object that is attached to it.

In one embodiment, the spring (210) is adapted to provide spring actuation movement for the movement of the arresting plate (170) and the pad (160) from the closed position to the open position upon detecting a load in the elevator cabin (CAR) (50) assembly more than the permissible limit of pay load.

The arresting plate (170) and the pad (160) are pulled down via the fastening means when one or more users of permissible weight enters into the CAR, however the arresting plate (170) remains closely affixed onto the bottom of the disc plate (190) while covering the plurality of holes (195). This happens because the pre-determined spring force of the spring is calibrated hold to the permissible weight. In an event, when the weight in the CAR exceeds the permissible weight limit the arresting plate (170) is pulled down further thus actuating the spring (where the spring is compressed and unable to hold the arresting plate (170) tightly affixed to the bottom of disc plate (190)), this allows the arresting plate (170) to move down and pulled away from the bottom of the disc plate (190) thus opening the plurality of holes (195) and disconnecting the power circuit. This works as an impeccable safety mechanism by bringing the operation of the elevator to halt. Further, when load in the CAR is removed or adjusted to be within the permissible weight limit, the spring gets back to its decompressed state, thus pulling up the arresting plate (170) onto the bottom of the disc plate (190) and thereby closing the plurality of holes (195) and completing the power circuit again.

The overload valve assembly (110) is also characterised by a top bush (220) bounded with a nut (230). Such structural arrangement enables fastening of the spring (210) with the disc plate (190) from top end of the fastening means (150). In one embodiment, a control panel is positioned above the top end of the hexagonal fastening means (150). In another embodiment, the overload valve assembly (110) may use NyLok nut for tightening. In yet another embodiment, the top bush (200)

may be fabricated in circular shape to act as a non-conduction device. The top bush (220) is fabricated with nylon, plastic, polycarbonate, medium-density fibre board and any non-conduction material.

The overload valve assembly (150) also comprises an electrical circuit (270) (as shown in FIG. 5 & FIG. 6) between an overload relay (250) present in the control panel and a positive terminal (260) housed within the control panel via the fastening means (150) and the disc plate (190). The fastening means (150) and the disc plate enable (190) completion of circuit and working of the overload valve assembly (110). Negative terminal is basically the overload relay (250) present in the control panel.

FIG. 5 is a sectional view representation of the overload valve assembly (110) during cabin permissible load condition in accordance with an embodiment of the present disclosure. In operation, during permissible load condition, the electric motor runs normally to move the elevator cabin (CAR) (50) assembly within the cylinder assembly (30). During such normal movement, the arresting plate (170) is touched into the disc plate (190) along with pad (160), without any spring (210) action. It is noted here that, the air is not allowed to flow outside from inner surface of the cylinder assembly (30). In such embodiment, the above mechanism enables the elevator cabin (CAR) (50) assembly movement within the cylinder assembly (30) without the loss in flow of air pressure.

In addition, the disc plate (190) is fixed with an acrylic sheet (240) along with use of three pan head screw. The acrylic sheet (240) is fixed along with the cylinder assembly (30) using special adhesives. In such embodiment, the acrylic sheet (240) is used for high impact resistance property.

FIG. 6 is a sectional view representation of the overload valve assembly (110) during cabin overload condition in correspondence of cabin moving in accordance with an embodiment of the present disclosure. During overload condition, the overload valve assembly (110) reacts through spring (210) tension due to insufficient air pressure on the top seal of the elevator cabin (CAR) (50) assembly.

In such embodiment, overload condition refers to a situation where the permissible limit exceeds the loading capacity of the elevator cabin (CAR) (50) assembly.

For spring (210) tension, the arresting plate (170) is moved from the disc plate (190) along with pad (160). Due to such movement, continuity of power is disconnected.

5 Further, the air flow is allowed outside from the inner surface of the cylinder assembly (30). The direction of arrows in FIG.6 denotes the direction of flow of air. Such total mechanism stops the elevator cabin (CAR) (50) assembly within the cylinder assembly (30). In one specific embodiment, an overload indicator such as LED is used to indicate the overload condition inside the elevator cabin (CAR) (50)
10 assembly.

Present disclosure of an overload valve assembly provides an automatic over-weight detection system for an elevator cabin (CAR) assembly. The disclosed system by help of a spring actuation device and electric signal ensures the maximum permissible limit of pay load in the elevator cabin (CAR) assembly.

15 While specific language has been used to describe the disclosure, any limitations arising on account of the same are not intended. As would be apparent to a person skilled in the art, various working modifications may be made to the method in order to implement the inventive concept as taught herein.

The figures and the foregoing description give examples of embodiments. Those
20 skilled in the art will appreciate that one or more of the described elements may well be combined into a single functional element. Alternatively, certain elements may be split into multiple functional elements. Elements from one embodiment may be added to another embodiment. For example, order of processes described herein may be changed and are not limited to the manner described herein. Moreover, the
25 actions of any flow diagram need not be implemented in the order shown; nor do all of the acts need to be necessarily performed. Also, those acts that are not dependant on other acts may be performed in parallel with the other acts. The scope of embodiments is by no means limited by these specific examples.

WE CLAIM:

1. An overload valve assembly (110) for a pneumatic vacuum elevator (10), comprising:

5 an overload valve unit (105) housed in a head cylinder (30) and connected to top of an elevator cabin (CAR) (50) assembly, the overload valve unit (105) is configured to function based on spring actuation mechanism and ensure the maximum permissible limit of pay load in the elevator cabin (CAR) (50) assembly;

characterised by:

10 a fastening means (150) mechanically oriented in an inverted position and affixed over outer top surface of the elevator cabin (CAR) (50) assembly;

a pad (160) with a centre hole, inserted into the fastening means (150), wherein the pad (160) being adapted to rest over lower end of the fastening means (150);

15 an arresting plate (170) with a centre hole inserted into the fastening means (150), wherein the arresting plate (170) being adapted to rest above the pad (160), wherein the arresting plate (170) and the pad (160) are tightly held over lower end of the fastening means (150) by a C-shaped clip (180);

20 a disc plate (190) with a centre hole inserted into the fastening means (150) mechanically coupled to lower side of the head cylinder (30), the disc plate (190) comprises extrusion around circumference of the disc plate (190) at lower side, extrusion around the centre hole, and a plurality of holes (195) for out flow of air,

25 wherein the extrusion at lower side is adapted to house the arresting plate (170) and the pad (160);

a bottom bush (200) inserted into the fastening means (150) and housed inside the extrusion at the centre hole of the disc plate (190), wherein the bottom bush (200) being adapted to act as an insulator by insulating the fastening means (150) from the disc plate (190); and

5 a spring (210) of pre-determined spring force, inserted into the fastening means (150) and rests above the disc plate (190);

a top bush (220) bounded with a nut (230) enable fastening of the spring (210) with the disc plate (190) from top end of the fastening means (150), wherein the bottom bush (200) being adapted to act as an insulator.

10 2. The overload valve assembly (110) as claimed in claim 1, wherein the fastening means comprises a rod, a bolt, an Allen bolt, a stud bolt and a screw.

3. The overload valve assembly (110) as claimed in claim 1, wherein the arresting plate (170) and the pad (160) being adapted to move in tandem from a closed position to an open position, at the closed position the arresting plate (170)
15 covers the plurality of holes (195), thereby preventing the out flow of air and completing a power circuit; and the arresting plate (170) being configured to be pushed down to the open position uncovering the plurality of holes (195), thereby enabling the out flow of air and disconnecting the power circuit.

4. The overload valve assembly (110) as claimed in claim 1, wherein the
20 spring (210) being adapted to provide spring actuation movement for the movement of the arresting plate (170) and the pad (160) from the closed position to the open position upon detecting a load in the elevator cabin (CAR) (50) assembly more than the permissible limit of pay load.

5. The overload valve assembly (110) as claimed in claim 1, comprising an
25 electrical circuit (270) between an overload relay present (250) in a control panel and a positive terminal (260) housed within the control panel via the fastening

means (150) and the disc plate (190), wherein the control panel is positioned above the top end of the fastening means (150).

6. A pneumatic vacuum elevator (10), comprising:

5 an elevator cylinder (60) adapted to house pneumatic vacuum elevator (10) components, wherein the pneumatic vacuum elevator (10) components comprises:

10 a head cylinder (30) mechanically affixed just below the ceiling (40) of the top floor (90) for housing an elevator cabin structural sealing unit (20), at least one motor and an overload valve assembly (110), wherein the overload valve assembly (110) is configured to function based on spring actuation mechanism and ensure a maximum permissible limit of pay load in the elevator cabin (CAR) (50) assembly;

15 a cylindrical elevator cabin (50) (CAR) assembly positioned below the head cylinder (30) and adapted for upward and downward movement through one or more floor levels (80 and 90); and

20 an intermediate cylinder assembly (70) mechanically affixed in between each of the one or more floor levels (80 and 90) and adapted to provide requisite space for easy movement of the cylindrical elevator cabin (50) (CAR) assembly between each of the one or more floor levels (80 and 90).

7. The pneumatic vacuum elevator (10) as claimed in claim 5, wherein the overload valve unit (105) is housed in the head cylinder (30) and connected to top of the elevator cabin (CAR) (50) assembly.

25 8. The pneumatic vacuum elevator (10) as claimed in claim 5, wherein the overload valve unit (105) comprises:

a fastening means (150) mechanically oriented in an inverted position and affixed over outer top surface of the elevator cabin (CAR) (50) assembly;

5 a pad (160) with a centre hole, inserted into the fastening means (150), wherein the pad (160) being adapted to rest over lower end of the fastening means (150);

10 an arresting plate (170) with a centre hole inserted into the fastening means (150), wherein the arresting plate (170) being adapted to rest above the pad (160), wherein the arresting plate (170) and the pad (160) are tightly held over lower end of the fastening means (150) by a C-shaped clip (180);

15 a disc plate (190) with a centre hole inserted into the fastening means (150) mechanically coupled to lower side of the head cylinder (30), the disc plate (190) comprises extrusion around circumference of the disc plate (190) at lower side, extrusion around the centre hole, and a plurality of holes (195) for out flow of air,

wherein the extrusion at lower side is adapted to house the arresting plate (170) and the pad (160);

20 a bottom bush (200) inserted into the fastening means (150) and housed inside the extrusion at the centre hole of the disc plate (190), wherein the bottom bush (200) being adapted to act as an insulator by insulating the fastening means (150) from the disc plate (190); and

a spring (210) of pre-determined spring force, inserted into the fastening means (150) and rests above the disc plate (190);

25 a top bush (220) bounded with a nut (230) enable fastening of the spring (210) with the disc plate (190) from top end of the fastening means (150).

9. The pneumatic vacuum elevator (10) as claimed in claim 5, wherein the arresting plate (170) and the pad (160) being adapted to move in tandem from a closed position to an open position, at the closed position the arresting plate (170) covers the plurality of holes (195), thereby preventing the out flow of air and completing a power circuit; and the arresting plate (170) being configured to be pushed down to the open position uncovering the plurality of holes (195), thereby enabling the out flow of air and disconnecting the power circuit.

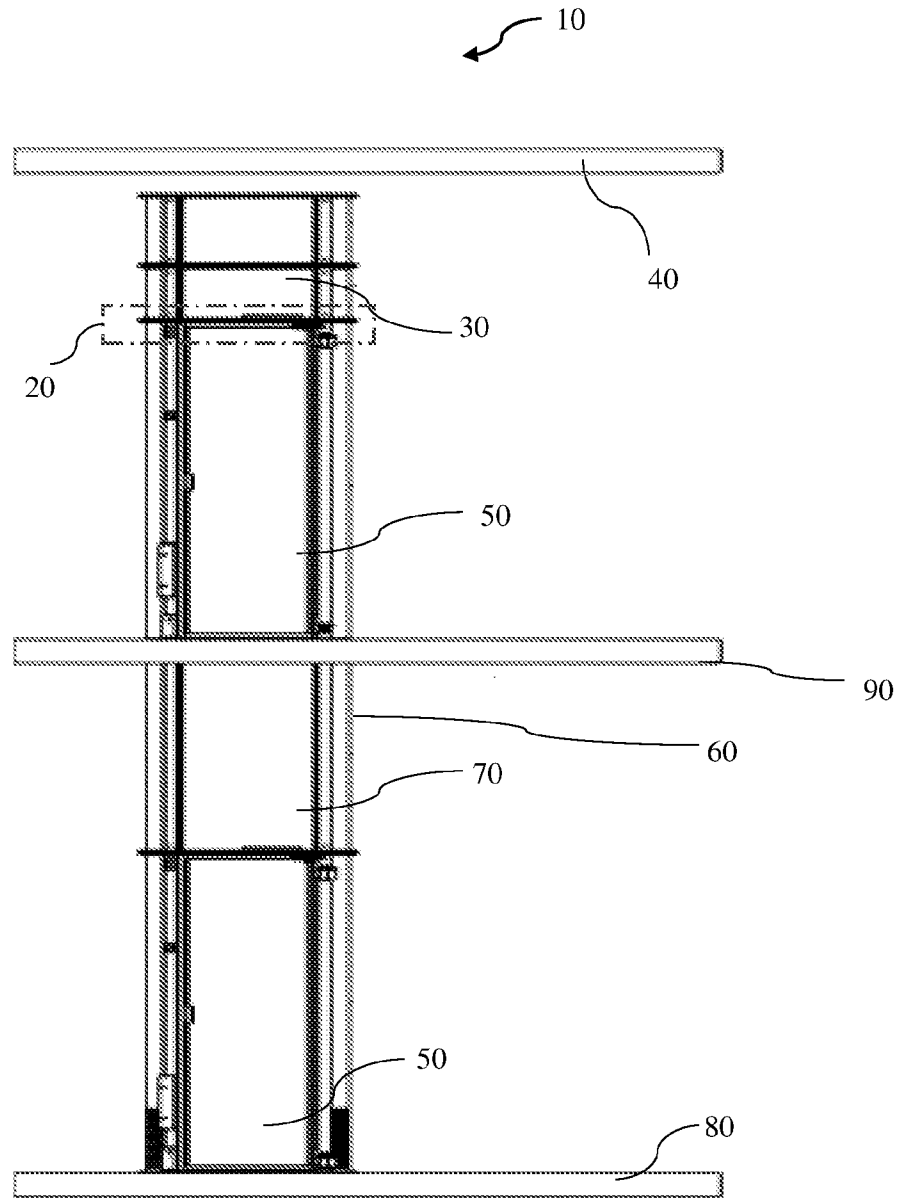


FIG. 1

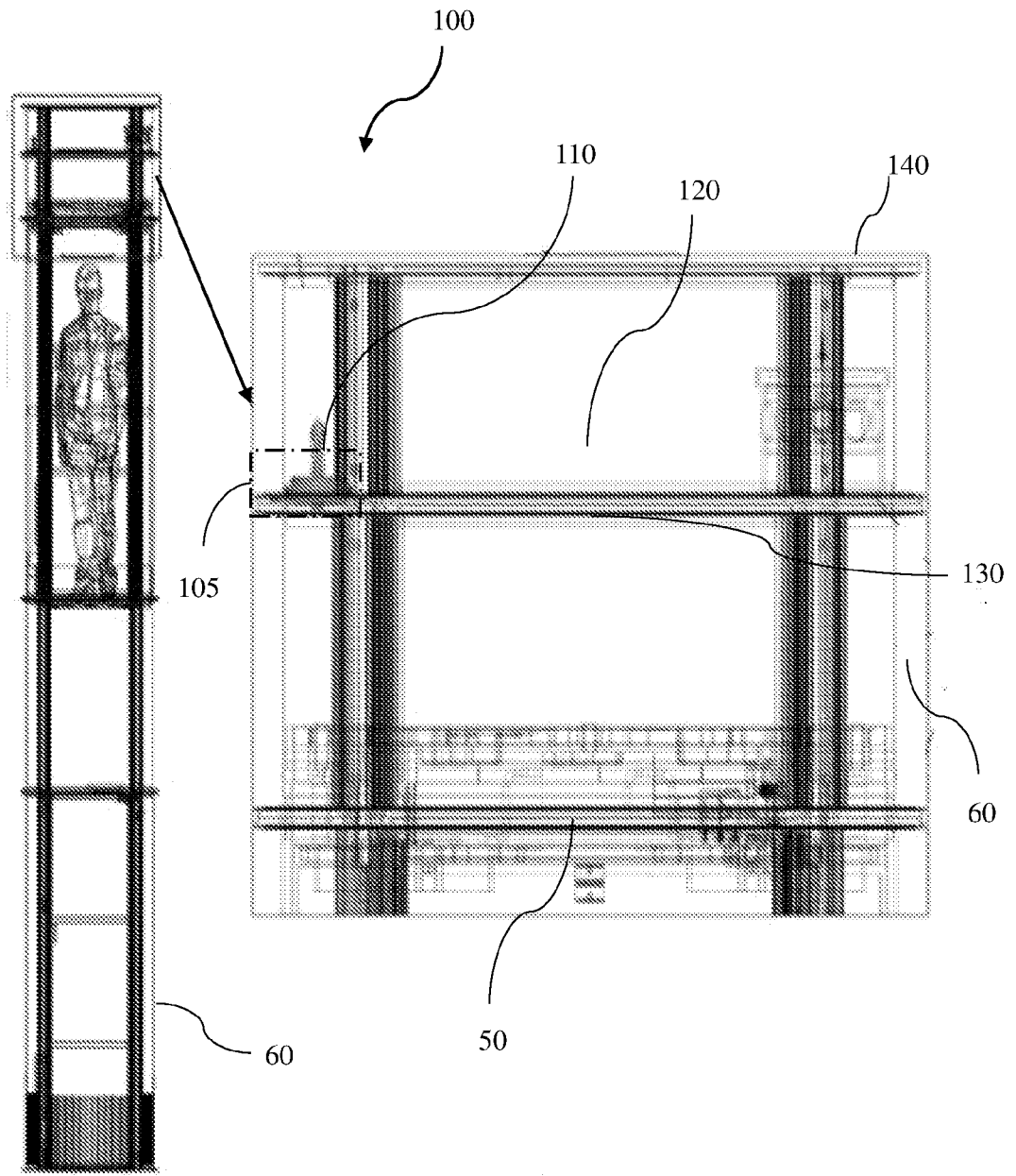


FIG. 2

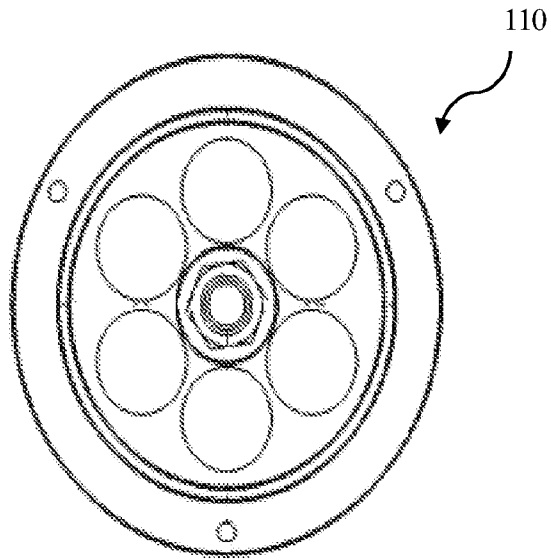


FIG. 3 (a)

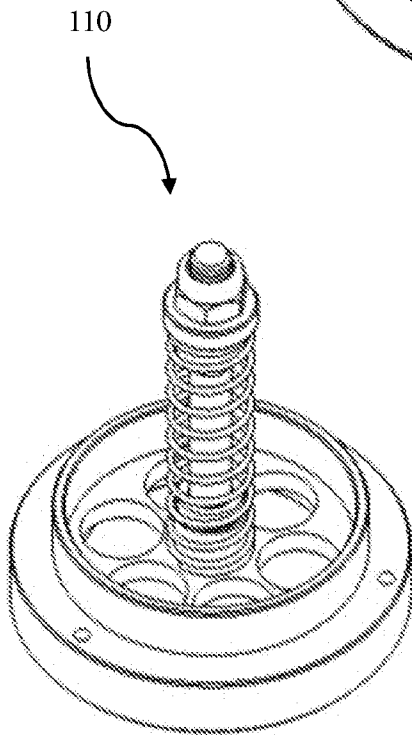


FIG. 3 (b)

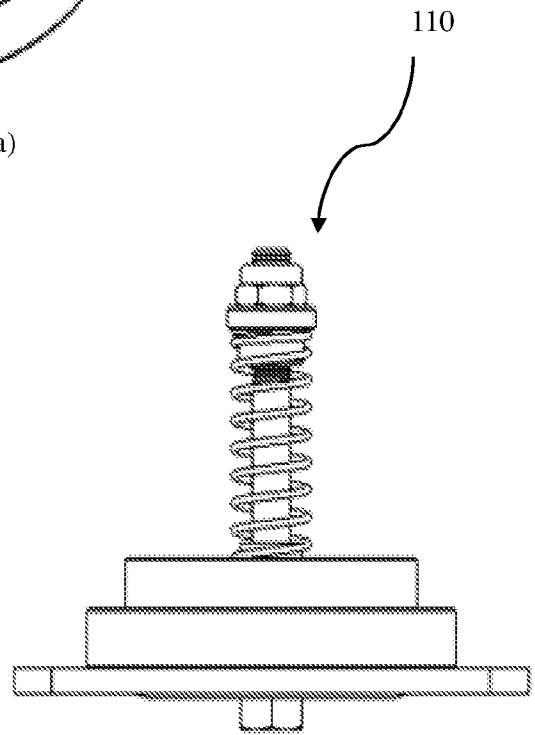


FIG. 3 (c)

FIG. 3

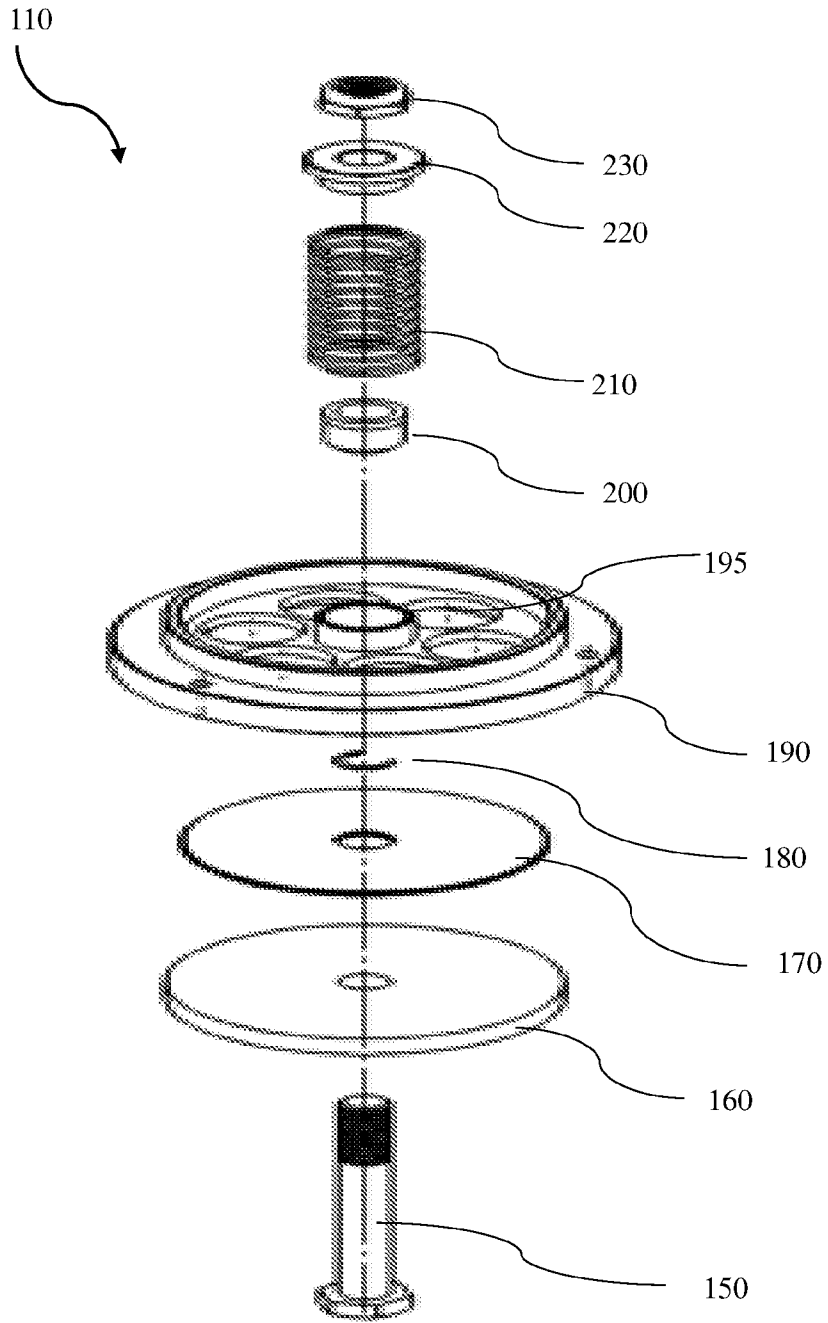


FIG. 4

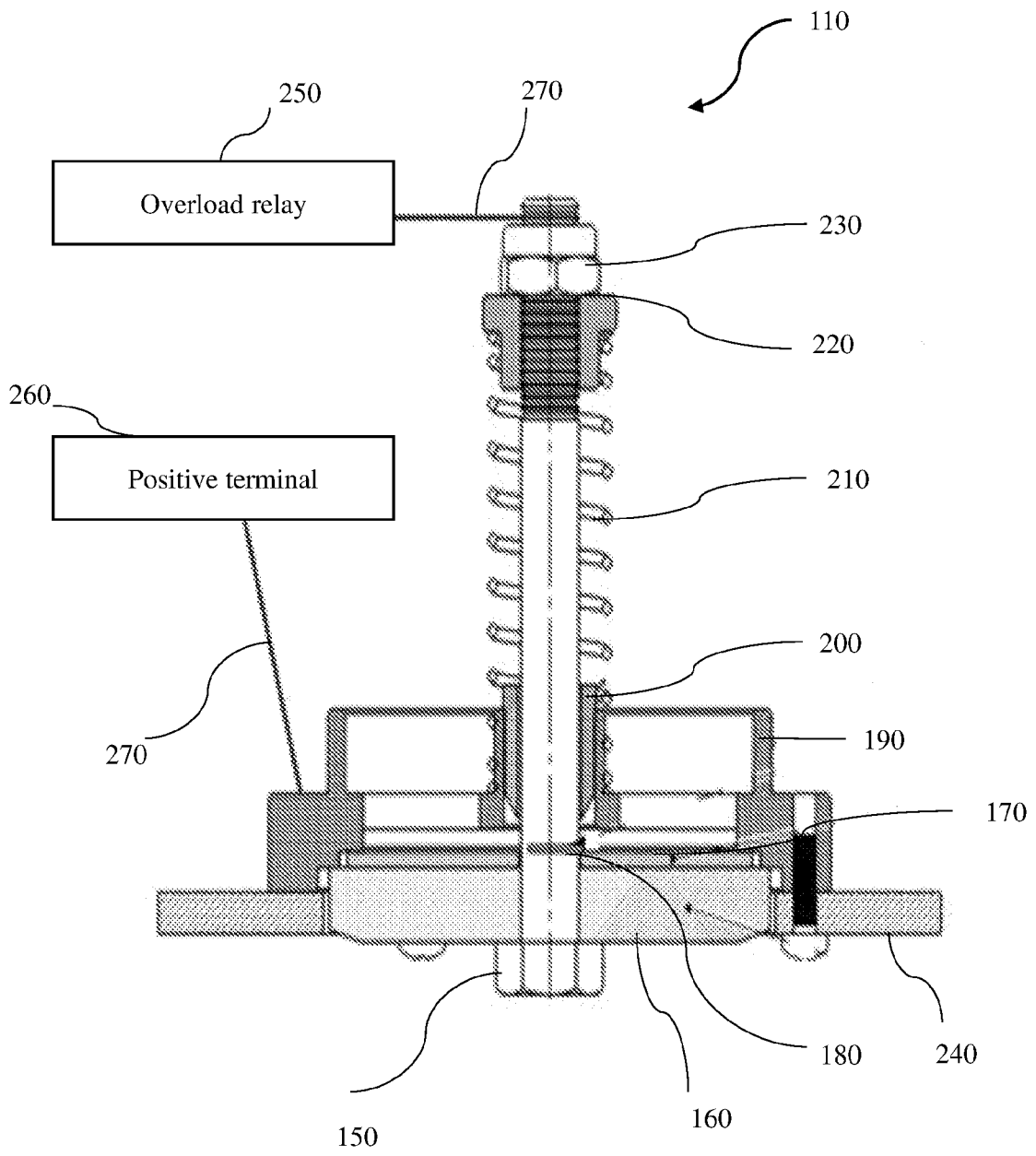


FIG. 5

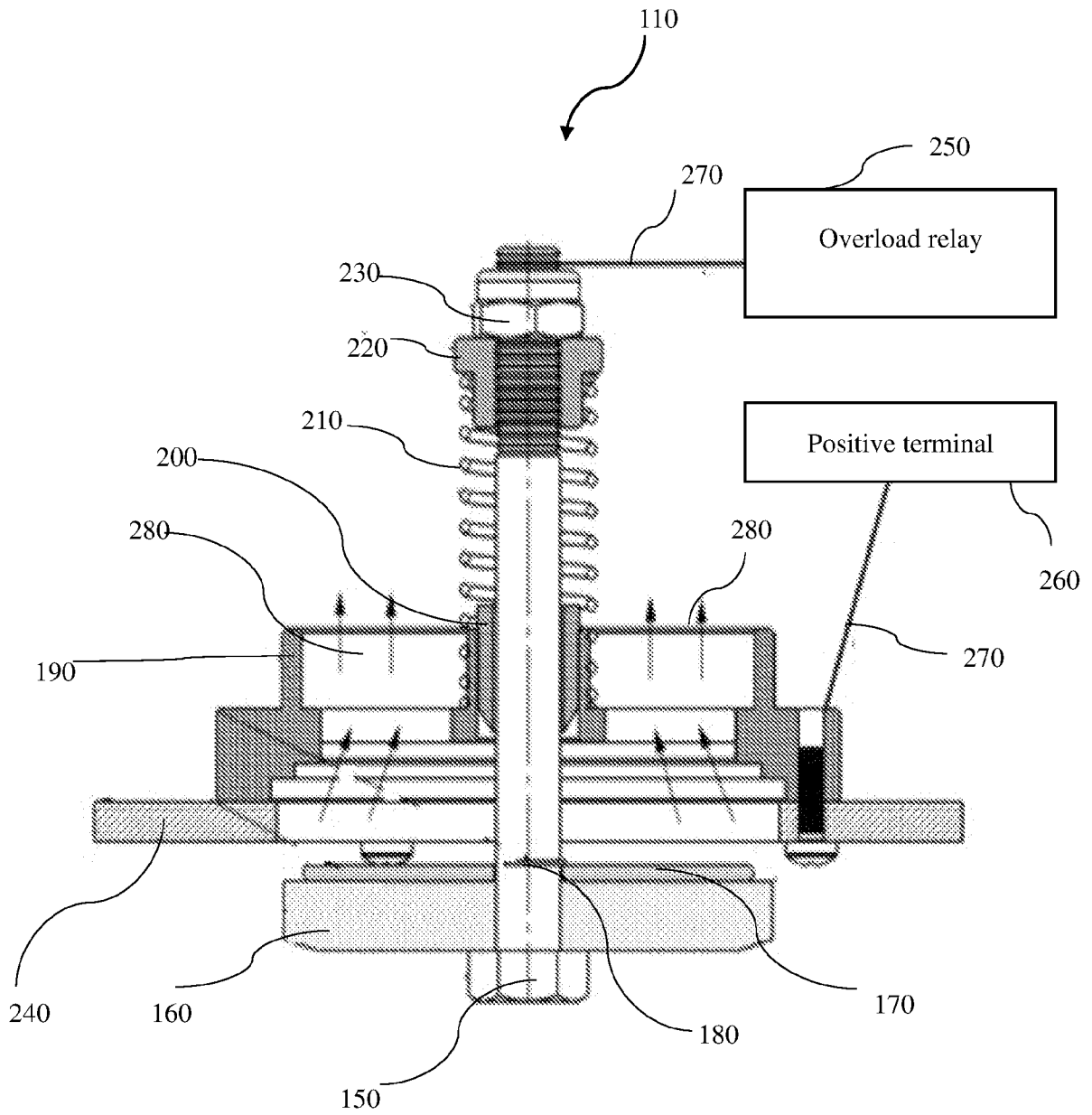


FIG. 6

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB2021/054766

A. CLASSIFICATION OF SUBJECT MATTER
B66B9/04, B66B5/14 Version=2021.01

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)

B66B

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)

PatSeer, IPO Internal Database

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN104724570A (KUNSHAN KOYO ELEVATOR CO LTD) 24 JUNE, 2015 (24.06.2015) (Whole Document)	1-9
A	CN103693529A (SUZHOU TIAN SUO ELEVATOR CO LTD) 02 APRIL, 2014 (02.04.2014) (Whole Document)	1-9
A	CN204434034U (KUNSHAN KOYO ELEVATOR CO LTD) 01 JULY, 2015 (01.07.2015) (Whole Document)	1-9

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents:

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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

27-08-2021

Date of mailing of the international search report

27-08-2021

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/IB2021/054766

Citation	Pub.Date	Family	Pub.Date
CN 104724570 A	24-06-2015	CN 104724570 B	26-04-2017