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(54) **SYSTEM TO FIX A MOTOR BODY TO A ROLL-UP SHUTTER**

(57) A system (10) to fix a motor body (4) to a roll-up shutter (1), for allowing at least one blade (3) of the roll-up shutter (1) to be moved. The roll-up shutter (1) comprises a frame (2), which is associated with at least one blade (3), which is mobile relative to the frame (2). The system (10) comprises a support (12), which is adapted

to be associated with the frame (2) of the roll-up shutter (1). The support (12) has at least one slit (14), in which at least one pin (16) slides, which can be constrained in any position of the slit (14); the pin (16) being adapted to be associated with a the motor body (4), thus locking it to the frame (2).

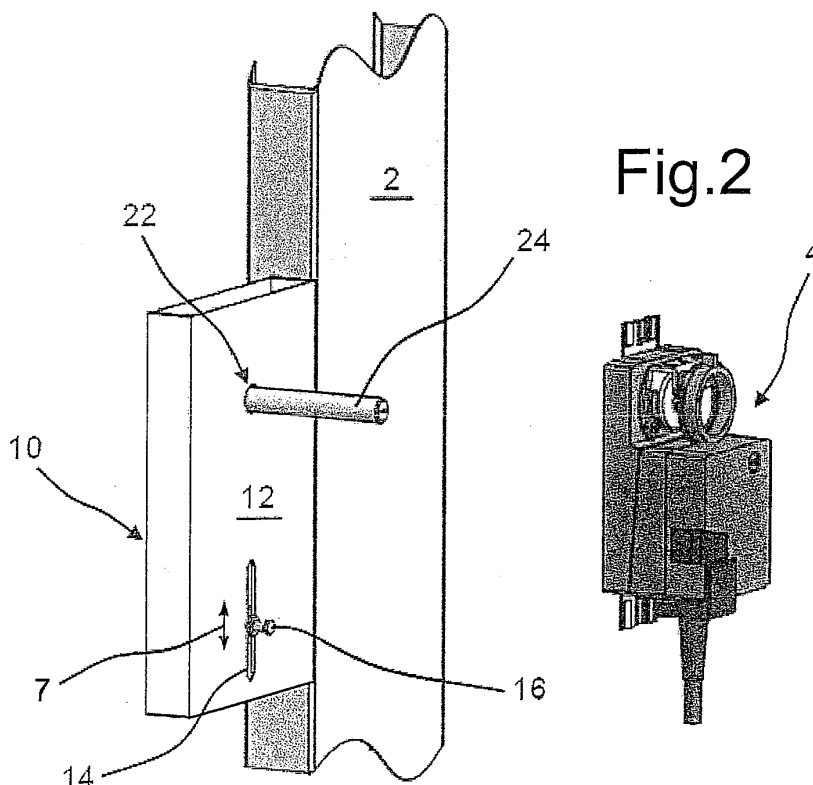


Fig.2

Description

Technical field

[0001] The present invention relates to a system to fix a motor body to a roll-up shutter, for example one used in air treatment devices or systems, said motor being designed to permit the movement of at least one blade of the roll-up shutter.

Technological background

[0002] In this technical field the use of elements is known, which are available in the form of plates, normally made of metal, and are fixed to the frames of roll-up shutters of air treatment machines or systems (e.g. industrial/commercial air conditioning systems) and on which a motor is mounted, such as an electric servomotor. The motor, by acting upon the control pin of the roll-up shutter, determines the opening and the closing of the blades, thus regulating the air flow through the blades themselves.

[0003] Motors must have a stop device located at their end, usually opposite to the control pin, so as to prevent the motor from rotating together with the pin of the roll-up shutter when it is working.

[0004] This kind of systems is affected by some drawbacks.

[0005] Since, as the size of the roll-up shutter varies, the size of the motor changes as well, there is the need to fix an "anti-rotation" pin at different distances from the control pin of the roll-up shutter, depending on the length of the motor.

[0006] Currently, for example, together with the motors manufacturers also provide a small plate, usually made of metal, with the anti-rotation pin already fixed thereon, normally by means of welding; this small plate is then fixed by drilling a hole in the bearing structure of the roll-up shutter and by using screws, usually self-tapping screws.

[0007] As a consequence, fixing a motor body to this kind of roll-up shutters is not very practical and the devices currently available in stores are not very versatile, since they are hardly able to adjust to the different types of motors associated with the respective roll-up shutters. In other words, for each roll-up shutter, depending on its shape and on the size of the motor, one needs to fix on the body of said roll-up shutter a dedicated anti-rotation system designed to avoid undesired movements of the motor.

Summary of the invention

[0008] An object of the present invention is to provide a system to fix a motor body to a roll-up shutter, which is able to solve this and other drawbacks of the prior art and which, at the same time, can be produced in a simple and economic fashion.

[0009] In particular, one of the technical problems solved by the present invention is that of manufacturing a system that can be installed on roll-up shutters of different sizes, thus adjusting to the sizes of the roll-up shutter and of the motor installed thereon.

[0010] According to the present invention, this and other objects are reached by means of a system having the features set forth in appended independent claim.

[0011] The appended claims are an integral part of the technical teaching provided in the following detailed description concerning the present invention. In particular, the appended claims define some preferred embodiments of the present invention that describe optional technical features.

Brief description of the drawings

[0012] Further features and advantages of the present invention will be best understood upon perusal of the following detailed description, which is provided by way of example and is not limiting, with reference, in particular, to the accompanying drawings, wherein:

- figure 1 is a view showing a roll-up shutter associated with a system according to the present invention;
- figures 2 and 2a are a perspective view and a sectional view, respectively, of a system according to a first embodiment;
- figures 3 and 3a are a perspective view and a sectional view, respectively, of a system according to a second embodiment;
- figure 4 is an exploded view of a system according to the present invention.

Detailed description of the invention

[0013] With reference, in particular, to figure 1 number 1 indicates, as a whole, a roll-up shutter having, in a known fashion, a frame 2, which is associated with at least one blade 3 (usually a plurality of blades) that is mobile relative to frame 2. Furthermore, roll-up shutter 1 is associated with a system 10 to fix a motor body 4 (shown in the following figures) to a roll-up shutter 1 so as to allow at least one blade 3 of roll-up shutter 1 according to the present invention to be moved.

[0014] With reference to the example shown, frame 2 has, on the front side, a substantially rectangular shape. Blades 3 are able to rotate around an axis of theirs in order to at least partially open/close a passage of fluid, usually air or vapor, through roll-up shutter 1.

[0015] These roll-up shutters are particularly useful for calibration operations to be carried out in air treatment machines or systems, such as commercial/industrial conditioning systems. However, the use of the invention is not limited to these examples.

Figure 2 shows a first embodiment of system 10 according to the present invention. System 10 is asso-

ciated with frame 2 of roll-up shutter 1. In particular, said system 10 can be associated with frame 2 by means of fixing means, such as for example: screws, bolts, welding, gluing; if necessary, system 10 can be manufactured as a single piece together with frame 2.

Figures 2 and 3 show a motor body 4, which is designed to be fixed, in a removable manner, to roll-up shutter 1 through system 10 according to the present invention.

[0016] Motor body 4 is designed to deliver a mechanical force that is able to move said at least one blade 3.

[0017] Motor body 4 can belong to different known types, such as for example: electric motor, servomotor, hydraulic motor, magnetic motor, etc..

[0018] System 10 comprises a support 12, for being associated, preferably in a removable manner, with frame 2 of roll-up shutter 1; support 12 has at least one slit 14, in which at least one pin 16 slides, which can be constrained in any position of slit 14, pin 16 being adapted to be associated with motor body 4, thus locking it to frame 2.

[0019] The arrow indicated with number 7 in the figures shows the directions along which pin 16 can move in slit 14.

[0020] In the examples shown, the slit has a substantially oblong and straight shape; though, slit 14 can also have a curved shape. Furthermore, slit 14 can have a shape similar to that of a broken line or of a closed line.

[0021] Preferably, pin 16 can be fixed, in a removable manner, in any position inside said slit 14 by means of fixing means.

[0022] In other words, pin 16 can take on a released condition, in which it is free to move along slit 14, thus assuming a plurality of positions inside slit 14 itself, and a constrained condition, in which it is fixed in any of said plurality of positions inside slit 14.

[0023] In this way, one can adjust the distance between the axis of a rotary shaft 24, upon which motor body 4 acts, and pin 16, thus allowing system 10 to be adjusted to uncountable motor bodies, which can have different sizes and shapes depending on the their configuration and on the technical needs of each single case. Furthermore, said system 10 is simple and quick to be configured for the user, since, unlike the prior art, the user does not need any longer to intervene to mount the small plate designed to house and hold the motor body to be fixed. As a matter of fact, in accordance with the prior art, the small plate is fixed to the frame of the roll-up shutter by means of screws, usually self-tapping screws: clearly, a drawback arises when the motor body must be mounted or replaced with a different one, since users need to drill new holes in the frame of the roll-up shutter and/or in the support in order to then apply the screws.

[0024] Pin 16 can be fixed/constrained along slit 14 by means of fixing means comprising, for example: a screw, a bolt, etc.; or by means of a quick release system, such

as for example: a bayonet system, a snap system, a lock bolt system, etc..

[0025] In system 10 shown in figures 2a and 3a, pin 16 is fixed by means of a bolt comprising a threaded screw 18a, which is designed to engage a respective nut 18b. as shown head 19 of threaded screw 18a and nut 18b are located on opposite sides of support 12.

[0026] In the embodiment shown, it is screw 18a itself that acts as pin 16, since these elements 18a, 16 coincide. In this case, head 19 of the screw is also the head of pin 16.

[0027] In accordance with a variant, head 19 of threaded screw 18a has a shape that allows it to be manually screwed/unscrewed by a user, without the need to use specific tools, such as for example a screwdriver. For example, head 19 of the screw can be shaped as a properly sized knob, so as to make it easier for users to grab it when they are screwing and unscrewing the screw. Preferably, head 19 of the screw can have a milled surface, so as to increase friction, which is useful to improve the hold of the user during these operations.

[0028] In accordance with a further variant, pin 16 is associated with a slider 20, for allowing said pin 16 to move through said positions in said slit 14. In this way, after system 10 has been assembled, slider 20 becomes integral to pin 16 in their movements, so as to make the sliding of pin 16 along slit 14 more solid and reliable, thus avoiding undesired disengagements of pin 16 from slit 14.

[0029] Optionally, slider 20 and pin 16 are located on opposite sides of support 12. For example, with particular reference to figures 2 and 2a, if pin 16 projects outwards from support 12, so as to be grabbed by the user, slider 20 is located in the inner part of said support 12.

[0030] Conveniently, slider 20 is associated with said pin 16 in a removable manner. For example, it is possible for slider 20 to have a thread that is suited to engage the complementary thread of threaded screw 18a.

[0031] Preferably, slider 20 is available in the form of a washer.

[0032] According to a further variant, support 12 has a guide (not shown), along which said slider 20 can slide. The guide is usually arranged close to the edges defining slit 14.

[0033] Optionally, the guide is manufactured by means of projections or recesses, which are suited to engage respective recesses or projections of slider 20, so as to guide the movement of pin 16 in a more effective manner.

[0034] In accordance with a further variant, said support 12 comprises, furthermore, an opening 22, which is designed to house a drive member 24, for transmitting a mechanical force able to move said at least one blade 3.

[0035] In the embodiment shown, opening 22 has a substantially circular shape, since drive member 24 is a rotary shaft. Rotary shaft 24, projecting outwards relative to support 12, is destined to mechanically engage motor body 4 in order to allow said mechanical force to be transferred.

[0036] As a person skilled in the art can clearly understand, the concept of drive member is not limited to a rotary shaft; on the contrary, there are many possible variants known to a skilled person - the rotary shaft is only one convenient example.

[0037] Moreover, as one can see in the non-limiting example of figure 4, the space portion comprised within support 12 or comprised between support 12 and frame 2 of roll-up shutter 1 can house one or more members 26 (basically mechanical ones), adapted to allow said mechanical force to be transferred from motor body 4 to said at least one blade 3. In the example members 26 comprise a gear wheel; however, they can also comprise, for example: lever mechanisms, a rocker arm, a chain system, a further shaft, etc..

[0038] As one can see in the embodiment shown, support 12 is made up of two parts 12a and 12b, to be coupled to one another; part 12a having slit 14.

[0039] In particular, in figure 4 rotary shaft 24 has a cross section with a square shape.

[0040] In detail, in figure 4 support 12 (in particular part 12a) has at least one projection/recess 30, 31, to engage a respective recess/projection 31, 30 of frame 2.

[0041] Conveniently, system 10 comprises a striker element 32, which also has at least one projection/recess 30, 31, to engage a respective recess/projection 31, 30 of frame 2.

[0042] This striker element 32 is adapted to be fixed to support 12 by means of fixing means, such as for example a bolt 18d. In this way, support 12 and striker element 32 are fixed to frame 2 by means of a "pincers" coupling.

[0043] By so doing, system 10 can be associated with frame 2 in a particularly quick manner and without the need to use tools to drill holes. Furthermore, system 10 can be fixed to frame 2 in a removable manner.

[0044] Preferably, said projections/recesses 30, 31 have a conical shape in their cross-section.

[0045] Moreover, in the example of figure 4 pin 14 can be fixed in the 14 by means of a screw 18c.

[0046] The elements (12, 14, 16, 18, 19, 20, the guide, and further detail elements) belonging to system 10 can be made of a metal material (e.g. steel, aluminium, etc.), a plastic material, a polymer material, a rubber material, etc.. Furthermore, these elements can be conveniently made of different materials based on the technical needs. Clearly, the choice of materials is not limited to the ones mentioned above.

[0047] In accordance with the embodiment shown in figure 2, support 12 substantially has the shape of a hollow parallelepiped without the upper and lower base; in other words, the support is made up of four plates arranged along a rectangular perimeter so as to form a substantially box-shaped structure. Slit 14 and opening 22 are obtained on one of these plates.

[0048] However, it is possible for support 12 to also comprise the upper and lower base.

[0049] In figure 2 system 10 is conveniently associated

with frame 2 in its outer part.

[0050] In accordance with the embodiment shown in figure 3, support 12 substantially has the shape of a two-dimensional plate.

[0051] In figure 3 system 10 is conveniently housed, at least partially, in the inner part of the structure making up frame 2. Namely, the structure of the elements making up frame 2 has, in its cross section, a concavity wherein system 10 is housed.

[0052] The shapes of support 12 and, more in general, of system 10 are described herein by mere way of non-limiting example of the object of the invention.

[0053] Below we will briefly explain the operation of system 10 with reference to the operations to be carried out to assemble and install system 10 on a roll-up shutter 1. With reference to figure 2 or 3, the installation operation comprises the following steps:

- fixing support 12 of system 10 to frame 2 of the roll-up shutter;
- fitting motor body 4 to roll-up shutter 1.

[0054] Now rotary shaft 24 engages motor body 4, so that they constrain one another in order to allow said mechanical force to be transferred for the purpose of moving said at least one blade 3.

[0055] In this condition, as pin 16 has not been fixed in the correct position yet, if motor body 4 were turned on, motor body 4 would start to rotate around the axis of rotary shaft 24 to which it is constrained. As a matter of fact, without the constraining action performed by pin 16, motor body 4 can substantially pivot around rotary shaft 24 and, therefore, the torque delivered by motor body 4 would not be compensated by a constraining torque; hence, motor body 4 would not be able to transfer the mechanical torque to rotary shaft 24.

[0056] This would lead to a malfunctioning of the roll-up shutter as a whole.

[0057] Subsequently, the user moves pin 16 and causes it to slide along slit 14 until it reaches a position in which it can be associated with said motor body 4 and lock/constrain it to frame 2.

[0058] After that, pin 16 is constrained in the chosen position in slit 14, for example by tightening the bolt.

[0059] By so doing, motor body 4 is constrained relative to frame 2; in particular, it is constrained in its rotation and, therefore, it is able to transfer the mechanical force (in this case, a torque) to rotary shaft 24, thus allowing said at least one blade 3 to be moved correctly. Furthermore, motor body 4 is prevented from performing undesired movements that might substantially take place along a direction that is parallel to the axis of rotary shaft 24, i.e. the direction that is perpendicular to the face of support 12 against which motor body 4 rests.

[0060] Conveniently, the outer casing of motor body 4 can have a shape that allows it to house pin 16 in a more comfortable manner, so as to perfect the constraining effect.

[0061] For example, the outer casing of motor body 4 has small projecting plate comprising a recess/slotted hole/cove or the like, which is designed to surround the body of pin 16.

[0062] With reference to the variant shown in figures 2a or 3a, pin 16 has a thickening 16a that is useful to keep motor body 4 close against support 12. Indeed, motor body 4 is held between thickening 16a and head 19 of pin 16. Furthermore, if necessary, thickening 16a acts as a contrast for slider 20 and nut 18b arranged on the other side of support 12.

[0063] Naturally, the principle of the invention being set forth, embodiments and implementation details can be widely changed relative to what described above and shown in the drawings as a mere way of non-limiting example, without in this way going beyond the scope of protection provided by the accompanying claims.

[0064] Some of the advantages of the system according to the present invention lie in:

- the quick positioning of the "anti-rotation" pin that, by sliding inside a proper cavity or slit, can be easily lifted or lowered relative to the axis of the motor;
- the quick locking of the same pin by means of fixing means (e.g. a screw), thus avoiding the drilling of holes for the screws to be used to lock the small plate provided by manufacturers.

Claims

1. System (10) to fix a motor body (4) to a roll-up shutter (1), for allowing at least one blade (3) of the roll-up shutter (1) to be moved, said roll-up shutter (1) comprising a frame (2), which is associated with said at least one blade (3), which is mobile relative to the frame (2); said system (10) comprising a support (12), for being associated with said frame (2) of said roll-up shutter (1);
characterized in that said support (12) has at least one slit (14), in which at least one pin (16) slides, which can be constrained in any position of the slit (14), said pin (16) for being associated with a said motor body (4), thus locking it to said frame (2).
2. System (10) according to claim 1, wherein said slit (14) has a straight shape.
3. System (10) according to claim 1 or 2, wherein said pin (16) can be fixed, in a removable manner, in any position inside said slit (14) by means of fixing means.
4. System (10) according to claim 3, wherein said fixing means comprise a screw.
5. System (10) according to claim 3, wherein said fixing

means comprise a quick release system.

6. System (10) according to any of the previous claims, wherein said pin (16) is associated with a slider (20), for allowing said pin (16) to move through said positions in said slit (14).
7. System (10) according to claim 6, wherein said support (12) has a guide, along which said slider (20) is able to slide.
8. System (10) according to claim 6, wherein said slider (20) is associated with said pin (16) in a removable manner.
9. System (10) according to any of the previous claims, wherein said support (12) comprises an opening (22), for housing a drive member (24), for transmitting a mechanical force able to move said at least one blade (3).
10. System (10) according to any of the previous claims and comprising, furthermore, a striker element (32); said support (12) and said striker element (32) having at least one projection/recess (30, 31), for engaging a respective recess/projection (31, 30) available on the frame (2); said striker element (32) being suited to be fixed to said support (12).
11. Roll-up shutter (1), in particular for air treatment devices or systems, such as air conditioning systems, comprising a system (10) according to any of the previous claims.

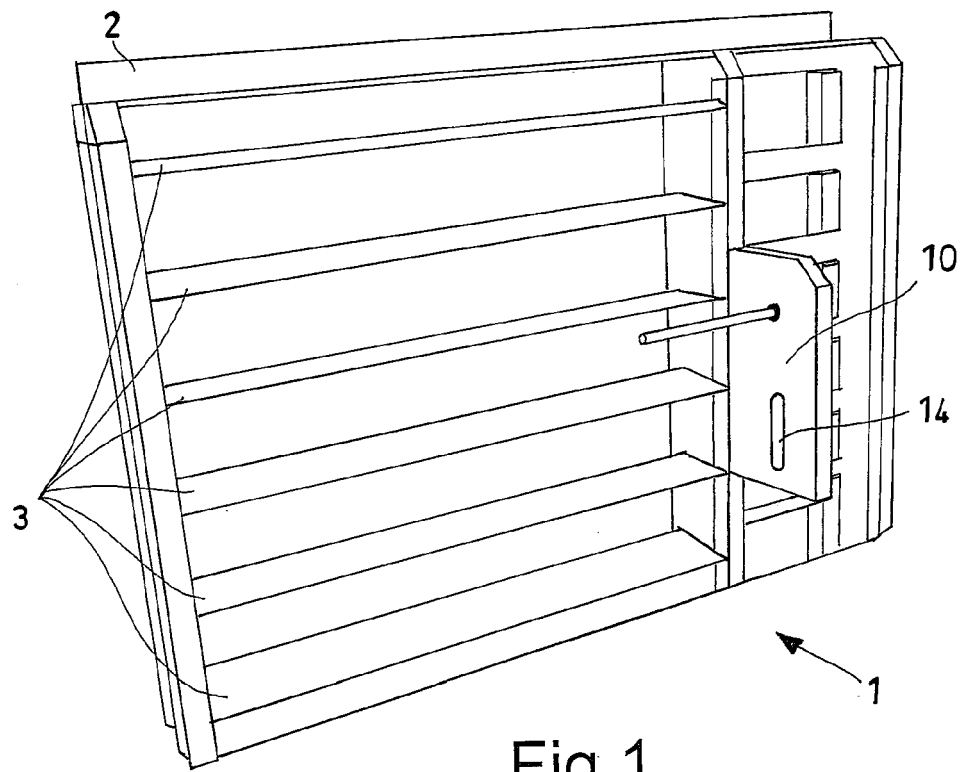


Fig.1

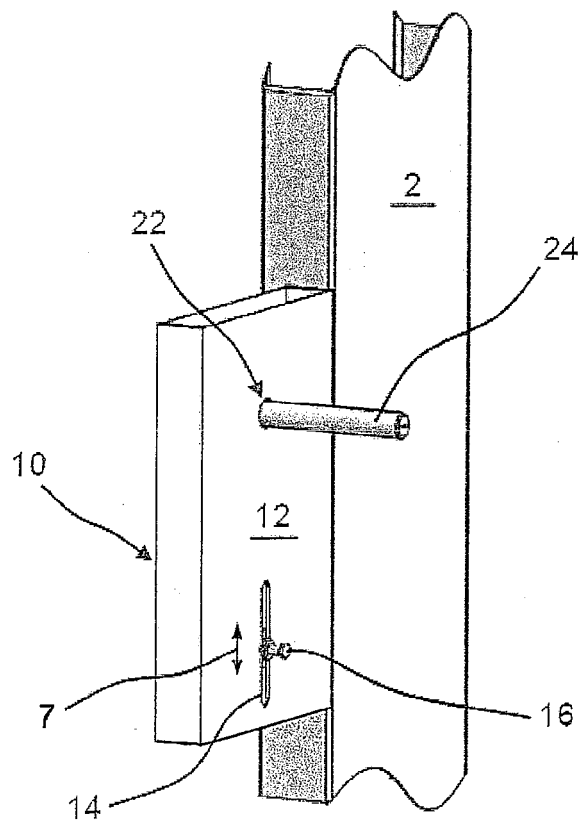
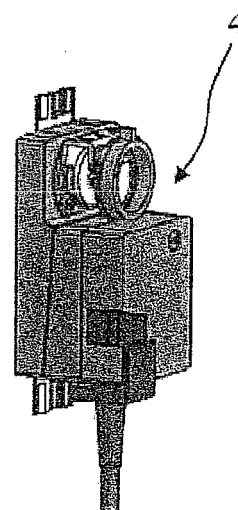


Fig.2



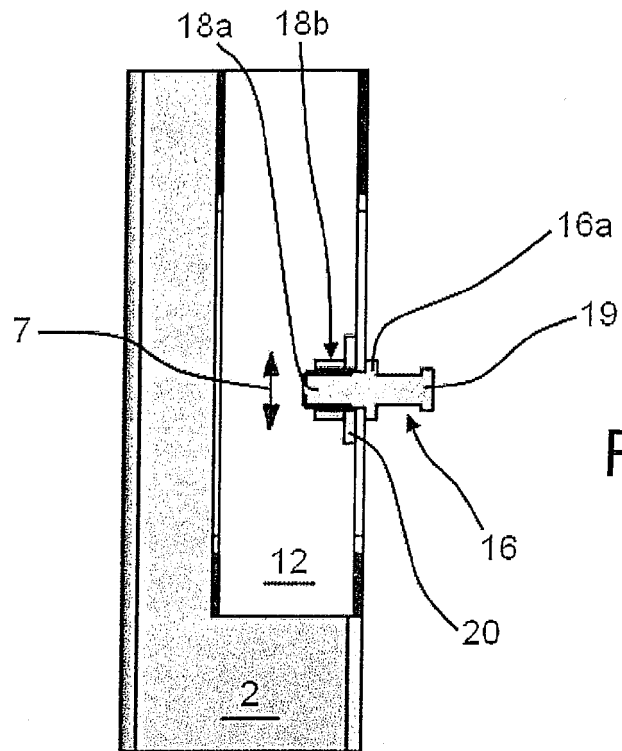


Fig. 2a

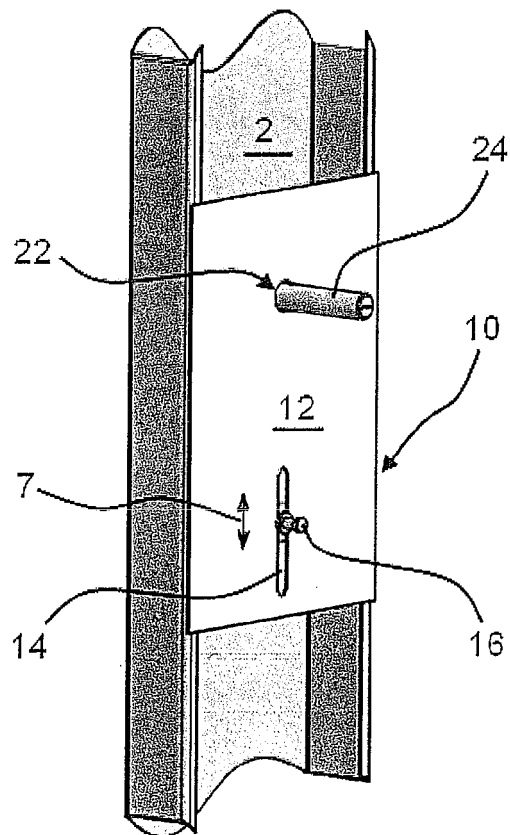
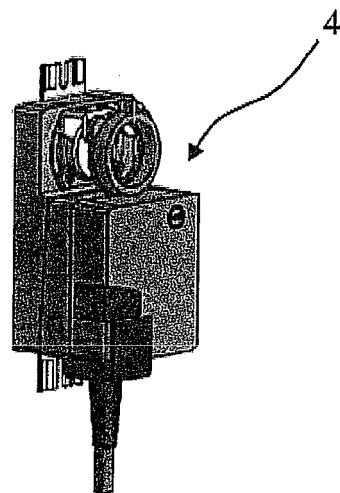


Fig. 3



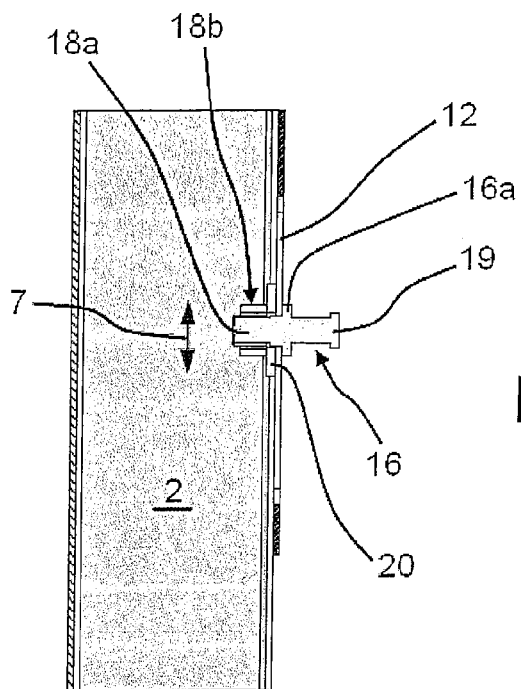


Fig.3a

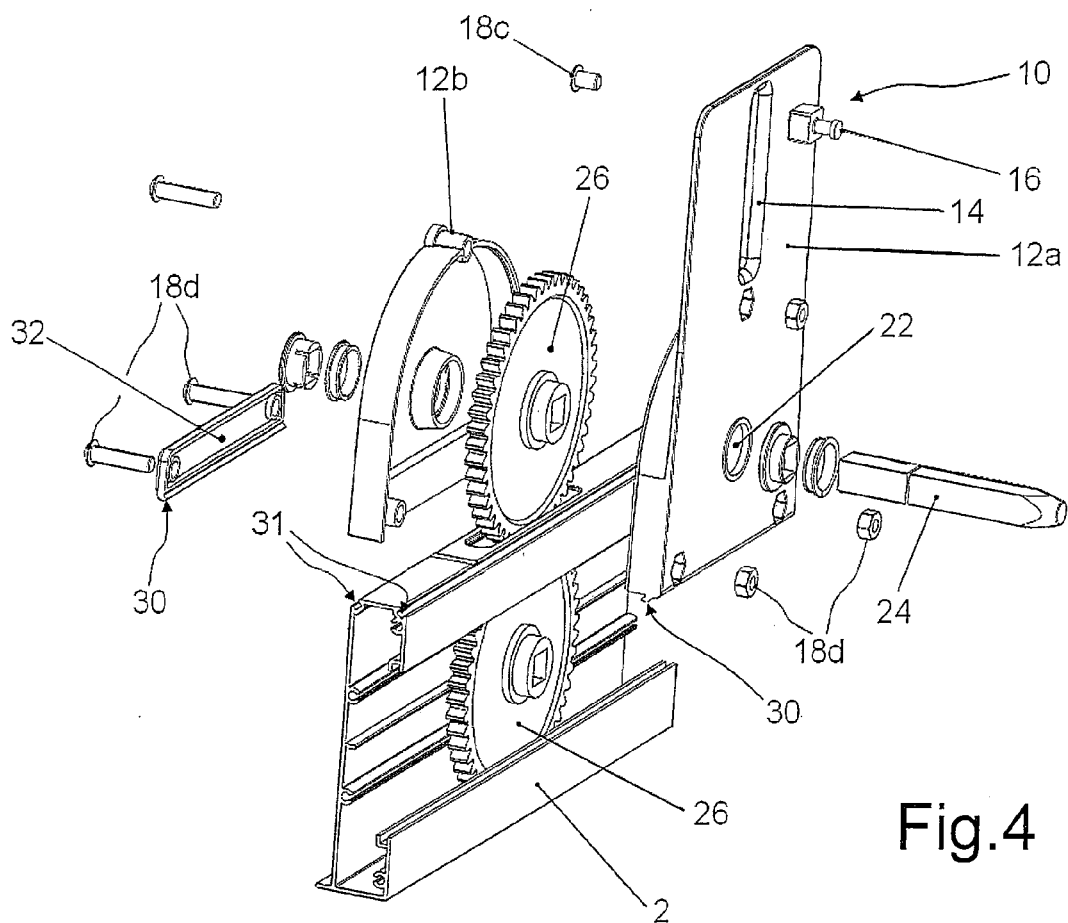


Fig.4



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Application Number
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