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(54) Cleaning device for roller shutters and method for cleaning roller shutters by means of such a device

(57) The present invention relates to a cleaning device (1) designed for cleaning roller shutters. The device comprises at least one elongated brush (10) member which is connected to fixing means (2) by which said at least one brush member (10) can be fixed to a building between a wall of said building and a path of movement of a roller shutter mounted on the building, at least substantially parallel to said path of movement. The at least one brush member (10) in use engaging the inner side of the roller shutter facing the building, wherein said at least one brush member (10) is connected for rotation about its longitudinal axis (21) to the fixing means and in that the cleaning device comprises driving means for rotatably driving said at least one brush member (10) about its longitudinal axis. The invention further relates to a method for cleaning a roller shutter.

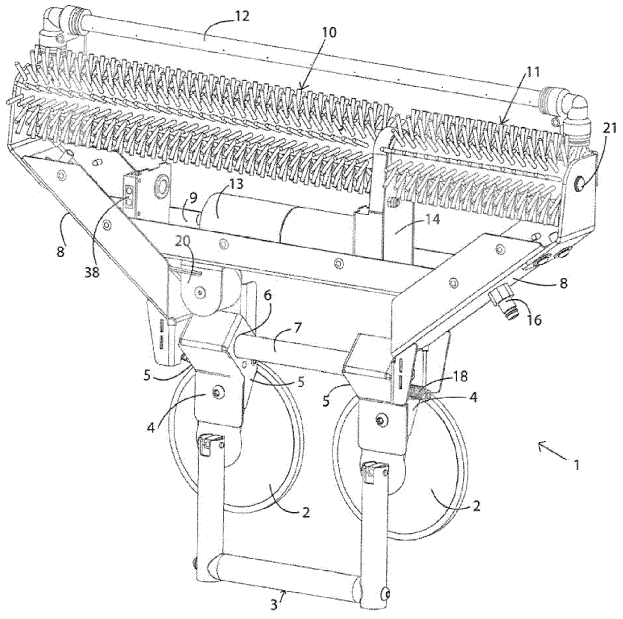

Fig.1

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Description

[0001] Cleaning device for roller shutters and method for cleaning roller shutters by means of such a device

DESCRIPTION

[0002] The present invention, according to a first aspect thereof, relates to a cleaning device designed for cleaning roller shutters, comprising at least one elongated brush member which is connected to fixing means by which said at least one brush member can be fixed to a building between a wall of said building and a path of movement of a roller shutter mounted on the building, at least substantially parallel to said path of movement, said at least one brush member in use engaging the inner side of the roller shutter facing the building. The term "wall" of a building as used herein must be given a broad interpretation; it also comprises a window, such as the window that is covered by the roller shutter in use.

[0003] It is known to use a brush that is fixed to the wall of a building or to a casing of the roller shutter by means of a strip, with hairs extending in the path of movement of a roller shutter. When the roller shutter in question is moved up or down, the hairs of the brush engage the inner side of the roller shutter, which is thus brushed. A drawback of the known brush is that it does not clean the roller shutter well and that a great deal of dust removed from the roller shutter by the brush remains stuck to the brush. Dirty brushes do not clean well.

[0004] Accordingly it is an object of the present invention, according to a first aspect thereof, to provide a cleaning device as described in the introduction by means of which it is possible to clean the inner side of a roller shutter more adequately, and which exhibits less tendency to retain dirt than the known brush, or at least to prevent or reduce the risk that dirt removed from the roller shutter and retained by the brush member will subsequently be transferred from the brush member to the roller shutter again. According to the present invention, this object is achieved in that said at least one brush member is connected for rotation about its longitudinal axis to the fixing means and in that the cleaning device comprises driving means for rotatably driving said at least one brush member about its longitudinal axis. If said at least one brush member is mounted to a building in use and is preferably driven in a direction opposed to the direction of movement of the roller shutter, i.e. that the respective contact surfaces of the roller shutter and said at least one brush member move in opposite directions, or if said contact surfaces move at least at different speeds, said at least one brush member is better capable of cleaning the roller shutter than the known static brush. Because said at least one brush member rotates in use, dirt will be removed from said at least one brush member more rapidly than is the case with the known brush. The object of the present invention is thus achieved. Several improvements can be realised in the device according to the present invention, so that a roller shutter can be cleaned even more adequately and the transfer of dirt back to the roller shutter can be prevented even further. Such improvements are explained herein and will be become apparent upon reading the present document. The phrase "fixing to the building" as well as all other features from the claims must be given a broad interpretation, and this phrase includes, for example, fixing the brush member to a roller shutter casing (that is fixed to the building).

[0005] In a preferred embodiment of the present invention, the cleaning device comprises a fluid connection for a fluid supply line. This makes it possible to have the brush device operate while water, or possibly another cleaning fluid, is being supplied. The cleaning device may to that end be provided with spray nozzles connected to the fluid connection, which spray nozzles in use spray fluid against the roller shutter to be cleaned or possibly on the brush. Alternatively, outlet openings being in communication with the fluid supply line may be provided in said at least one brush member. The fluid connection is preferably a quick-action coupling, as for example known from garden hoses.

[0006] The fluid connection is preferably provided at a short end of the brush member. Water can thus flow directly into the brush member, and a water hose connected to the fluid connection can extend into the space between the path of movement of the roller shutter and the building in a relatively simple manner. Preferably, both short ends are provided with a fluid connection, so that a water hose can be connected to the cleaning device at a desired end.

[0007] It is preferable in that regard if the fluid connection is provided on an at least substantially hollow spindle provided with outlet openings of the brush member.

[0008] In a preferred embodiment of the present invention, the driving means can be activated by a water flow supplied by the fluid supply line. Thus, said at least one brush member will start to rotate on its own accord when the water flow is started.

[0009] It is preferable in that case if the driving means comprise blades in the hollow spindle of the brush member.

[0010] In an alternative preferred embodiment of the present invention, the driving means comprise an electric motor. Alternatively, mechanical driving means may be provided, for example a wheel which engages a roller shutter moving in the path of movement, which wheel is thus driven by the roller shutter. The brush member can in that case be driven in the opposite direction or be rotatably driven at another speed via a transmission.

[0011] In a preferred embodiment of the present invention, the fixing means are designed for detachably fixing the cleaning device to a building, preferably using quick-connection means. It is thus possible to fix the cleaning device to a building only for incidental cleaning. Thus, cleaning can be carried out, using limited means, via successive cleaning actions at different positions on one and the same roller shutter, but also with different roller shut-

ters. Moreover it is thus possible to prevent situations in which a cleaning device remains exposed to view in the interim between two cleaning operations, for example in front of a window of the building.

[0012] It is preferable if the fixing means comprise at least one suction cup, which is fixed to a window associated with the roller shutter in use. Suction cups that engage the glass of a window are well-known, for example to glaziers, and can be readily used as fixing means with a cleaning device according to the present invention. They are capable of providing a solid fixation, without causing damage to the windows.

[0013] If the cleaning device comprises at least three fixing means oriented in a triangle relative to each other, a very stable fixation possibility is provided, which prevents tilting of the device.

[0014] It is furthermore preferable if the cleaning device is provided with adjusting means by which the position of the brush relative to the fixing means can be adjusted. Thus, the position of a cleaning device can be adapted to the spacing between a building and a roller shutter. In addition to that, or alternatively, adjusting means may be provided by which the position of the brush relative to a roller shutter to be cleaned can be adjusted between an inoperative position, in which said at least one brush member does not intersect the path of movement of the roller shutter, and an operative position, in which said at least one brush member does intersect the path of movement of the roller shutter to be cleaned.

[0015] It is preferable if the adjusting means comprise a tilting device, preferably provided between the fixing device and the brush. Said at least one brush member can thus be adjusted relative to the fixing means by being tilted.

[0016] In order to be able to exert some pressure with said at least one brush member against a roller shutter to be cleaned, it is preferable if biasing means are provided between the fixing means and the brush member. The biasing means, for example a spring, may be biased for driving said at least one brush member in the direction of a roller shutter to be cleaned.

[0017] An easy-to-use cleaning device is provided if said at least one brush member has a length that ranges between 30 cm and 120 cm.

[0018] In a preferred embodiment of the present invention, two or more brush members are provided. The axes of rotation of said two or more brush members are preferably, but not necessarily, aligned with each other. The hair or other brush elements of two adjacent brush members may be oriented slightly toward each other, for example so as to provide an uninterrupted brush surface. An additional brush member may be provided as an extension of said at least one brush member.

[0019] According to a second aspect, the present invention relates to a method for cleaning an inner side facing a building of a roller shutter. Roller shutters are easy to clean on the outer side thereof, but the inner side is often difficult to reach. This is especially the case if a roller shutter is present in front of a window that cannot be opened.

[0020] A known method for cleaning the inner side of a roller shutter makes use of the known cleaning device that was previously discussed herein, which method comprises placing a brush member in the path of movement of the roller shutter. Upon movement of the roller shutter, the known brush engages the inner side of the roller shutter so as to rub dirt off the roller shutter. Drawbacks of such a method have already been discussed before therein within the context of the first aspect of the present invention.

[0021] According to a second aspect, the object of the present invention is thus to provide a method for cleaning an inner side facing a building of a roller shutter by means of which the known drawbacks are obviated or at least alleviated. The present invention to that end provides a method comprising the steps of

a) fixing at least one brush member that is rotatable about its longitudinal axis to a building between the building and a path of movement of the roller shutter, substantially parallel to said path of movement of the roller shutter; and

b) rotatably driving said at least one brush member about its longitudinal axis upon movement of the roller shutter past said at least one brush member.

[0022] In order to be able to clean the roller shutter adequately, said at least one brush member is preferably, but not necessarily, driven in a direction opposite the direction of movement of the roller shutter in step b). Furthermore, a cleaning agent, preferably in the form of a fluid, is preferably used for cleaning the roller shutter. The method according to the present invention is preferably used in combination with a cleaning device according to the first aspect of the present invention.

[0023] The present invention will be explained below with reference to a preferred embodiment of the present invention shown in the drawing, in which:

Figure 1 is a perspective view of a cleaning device according to the present invention;

Figure 2a is a side view of a cleaning device according to figure 1 that is fixed to a building, in which the cleaning device is shown in an inoperative condition thereof;

Figure 2b shows the cleaning device of figure 2a in an operative condition thereof; and

Figure 3 is a perspective view of a detail of an alternative embodiment of a cleaning device according to the present invention.

[0024] With reference now to figure 1, there is shown a perspective view of a preferred embodiment of the cleaning device 1 according to the present invention. The device comprises two suction cups 2, which can be jointly activated by means of one operating element in the form

of a handle 3. The operation of such suction cups is generally known from the glazing industry. The suction cups 2 are each connected, via two connecting elements 4, to four folded plate members 5, which are each provided with a hole 6 through which a tube 7 extends, which tube is welded to the plate members 5. A pivot pin (not shown in figure 1) extends within the tube 7. Two arms 8 are pivot-mounted about the pivot pin. The arms 8 are interconnected by means of a horizontal folded plate 9 and a rotary shaft 21, about which a large brush roller 10 and a small brush roller 11 are rotatable. An electric motor 13 is connected to a chain casing 14, in which a chain drive (not shown) for the rotary shaft 21 is present. Disposed in one of the arms 8 is a hose coupling for quick-connecting a water hose (not shown) to the cleaning device. The hose coupling 16 is connected to a pipe provided with nozzles 12 via pipes not shown. Furthermore, an electrical connection (not shown in figure 1) is provided for driving the electric motor 17. Springs 18 bias the parallelogram-shaped pivotable part formed by the arms 8, the blades 9 and the rotary shaft 21 in the direction of the viewer. An electromagnet 20 opposes said bias and maintains the cleaning device 1 in the condition shown in figure 1.

[0025] Figure 2a is a side view of the cleaning device 1 shown in figure 1, fixed to a window 30, in the inoperative condition thereof. The cleaning device 1 is fixed to the window 30 by means of suction cups 2 operated by means of the handle 3. The reference numerals in figures 2a and 2b indicate the same elements as comparable reference numerals in figure 1. Consequently not all the elements are mentioned again in the discussion of figures 2a and 2b. The pivot pin 19 however, is shown in figures 2a and 2b. Above the window 30, a casing 32 with a roller shutter 33 rolled up therein is provided on a wall 31 of a building (not shown). The device has an on/off switch 35 and a connection for an electric power supply 36. On the rear side, lateral support rubbers 37 are provided, by means of which the device can be securely supported against a window 30.

[0026] Figure 2b shows the condition of the cleaning device 1 after the other end 34 of the roller shutter 33 has passed a sensor 38, for example a motion sensor, and the sensor has turned off the electromagnet 20, causing the springs 18 to pull the parallelogram-shaped pivotable part down until the brush rollers, of which only the brush roller 10 is shown in figure 2b, push against the side of the roller shutter 33 that faces the window. The roller shutter 33 moves down in the direction indicated by the arrow P. The rotary shaft 21 is rotated in the anticlockwise direction indicated by the arrow R. The brush elements 15, in this case in the form of hairs, thus brush the inner side of the roller shutter 33 clean. Water sprays from the pipe provided with nozzles 12 against a part of the roller shutter 33 that is about to pass the brush rollers 10, 11. The roller shutter 33 is thus cleaned by the cleaning device 1. When the roller shutter 33 is rolled up in the casing 32 again, the brush rollers 10, 11 can be returned to the position shown in figure 2a. It is also possible, if desired, to reverse the direction of rotation of the rotary shaft 21 and have the inner side of the roller shutter 33 brushed again. Preferably, the pipe nozzles 12 do not spray any water against the inner side of the roller shutter 33 any more at that point.

[0027] Present at the bottom of the pivotable part of the cleaning device 1 is a plate 22 with a corrugated recess 23 that mates with a pin 24 which helps to keep the pivotable part in one of the extreme positions shown in figures 2a and 2b, respectively.

[0028] Figure 3 is a perspective view of a detail of an addition to the embodiment of the cleaning device 1. Instead of, or in addition to, an electric motor as the drive unit for the rotary shaft 21, the embodiment shown in figure 3 comprises a driving mechanism driven by flowing water. To that end a closed housing provided with a water inlet, a water outlet and a paddle wheel 39 is provided on the rotary shaft 21. The housing is shown in cutaway view in figure 3 for a better understanding of this aspect of the invention. From a water source (not shown), water is carried into the housing, via the water inlet, by the supply pipe 40a. This can for example be done by means of a battery-driven pump. The water is discharged from the housing via the water outlet and the discharge pipe 40b. Disposed inside the housing is a paddle wheel 39 that is set in motion by the water thus flowing therethrough. The flow of the water, and thus the motion of the paddle wheel 39, is indicated by means of arrows W. Arrow R indicates the rotation of the brush roller 10. Such an embodiment makes it possible to operate the cleaning device without a connection to the electric mains.

[0029] The present invention has been shown and discussed in the figures and the above description with reference to only one embodiment of the present invention. It will be understood that several variants, which may or may not be obvious to those skilled in the art, are conceivable within the scope of the present invention, which is defined in the appended claims. Thus, one or more wheels may be provided on one or both brush rollers, which wheels engage the inner side of the roller shutter upon movement of the roller shutter and which are thus set rotating so as to cause the brush rollers to rotate. In such a case no electricity is needed for causing the cleaning device to operate. A hose coupling can be left out if the cleaning device is used for "dry" operation. The brush rollers can be substituted for one brush roller, two brush rollers of the same size or three or more brush rollers. Furthermore, so-called extensions in the form of brush rollers may be provided on the rotary shaft, in line with the brush rollers. Instead of hairs, other brush elements, such as strips of chamois-like cloth or the like may be provided. The suction cups may be substituted for any other fixing device suitable for providing a solid fixation to a glass surface. Incidentally, whilst only an embodiment of a cleaning device to be fixed directly to a window pane is shown herein, it is also possible, of course, to fix the cleaning device to a building or a roller shutter casing

at a different location. Said fixation need not absolutely be a detachable fixation, it may also be a (semi-) permanent fixation, if desired.

Claims

1. A cleaning device designed for cleaning roller shutters, comprising at least one elongated brush member which is connected to fixing means by which said at least one brush member can be fixed to a building between a wall of said building and a path of movement of a roller shutter mounted on the building, at least substantially parallel to said path of movement, said at least one brush member in use engaging the inner side of the roller shutter facing the building, **characterised in that** said at least one brush member is connected for rotation about its longitudinal axis to the fixing means and **in that** the cleaning device comprises driving means for rotatably driving said at least one brush member about its longitudinal axis.

2. A cleaning device according to claim 1, **characterised in that** the cleaning device comprises a fluid connection for a fluid supply line.

3. A cleaning device according to claim 2, **characterised in that** the fluid connection is provided at a short end of the brush member.

4. A cleaning device according to claim 2 or 3, **characterised in that** the fluid connection is provided on an at least substantially hollow spindle provided with outlet openings of the brush member.

5. A cleaning device according to one or more of the preceding claims, **characterised in that** the driving means can be activated by a water flow supplied by the fluid supply line.

6. A cleaning device according to claim 5, **characterised in that** the driving means comprise blades in the hollow spindle of said at least one brush member.

7. A cleaning device according to one or more of claims 1 - 4, **characterised in that** said driving means comprise an electric motor.

8. A cleaning device according to one or more of the preceding claims, **characterised in that** the fixing means are designed for detachably fixing the cleaning device to a building.

9. A cleaning device according to one or more of the preceding claims, **characterised in that** the fixing means comprise at least one suction cup, which is fixed to a window associated with the roller shutter in use.

10. A cleaning device according to one or more of the preceding claims, **characterised in that** the cleaning device comprises at least three fixing means oriented in a triangle relative to each other.

11. A cleaning device according to one or more of the preceding claims, **characterised in that** the cleaning device is provided with adjusting means by which the position of the brush relative to the fixing means can be adjusted.

12. A cleaning device according to one or more of the preceding claims, **characterised in that** the adjusting means comprise a tilting device.

13. A cleaning device according to one or more of the preceding claims, **characterised in that** biasing means are provided between the fixing means and said at least one brush member.

14. A cleaning device according to one or more of the preceding claims, **characterised in that** said at least one brush member has a length that ranges between 30 cm and 120 cm.

15. A cleaning device according to one or more of the preceding claims, **characterised in that** two or more brush members are provided.

16. A method for cleaning an inner side facing a building of a roller shutter, comprising the steps of:

    a) fixing at least one brush member that is rotatable about its longitudinal axis to a building between the building and a path of movement of the roller shutter, substantially parallel to said path of movement of the roller shutter; and
    b) rotatably driving said at least one brush member about its longitudinal axis upon movement of the roller shutter past said at least one brush member.

17. A method according to claim 16, **characterised in that** said at least one brush member is driven in a direction opposite the direction of movement of the roller shutter in step b).

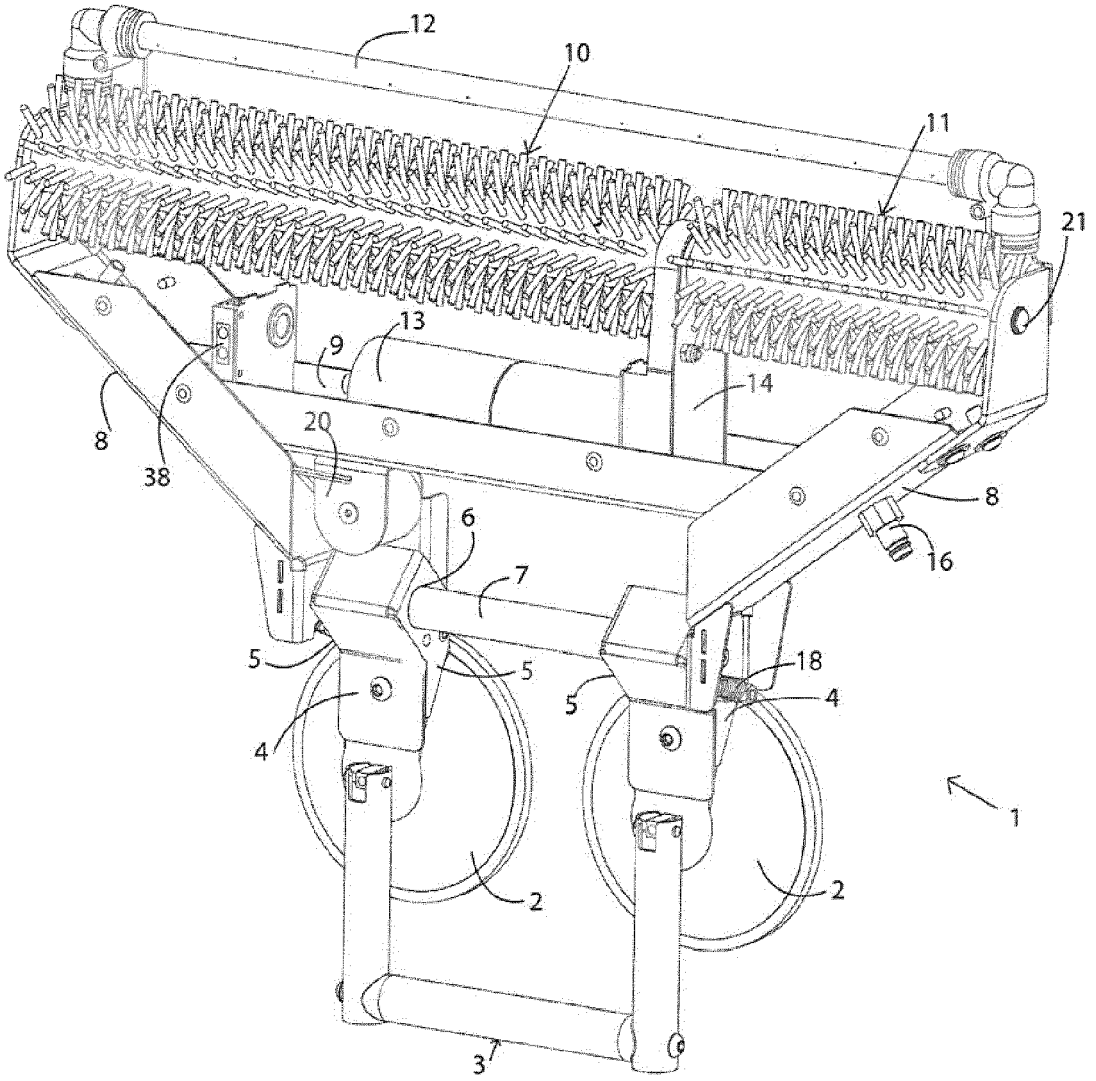

Fig.1

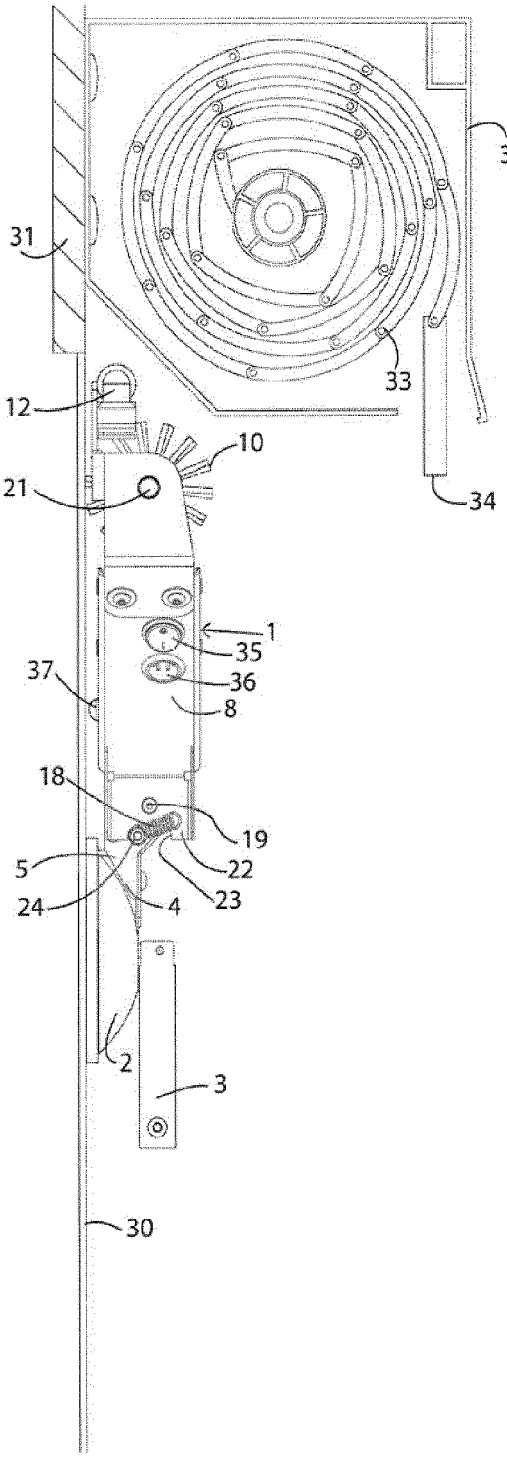
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Fig. 2a

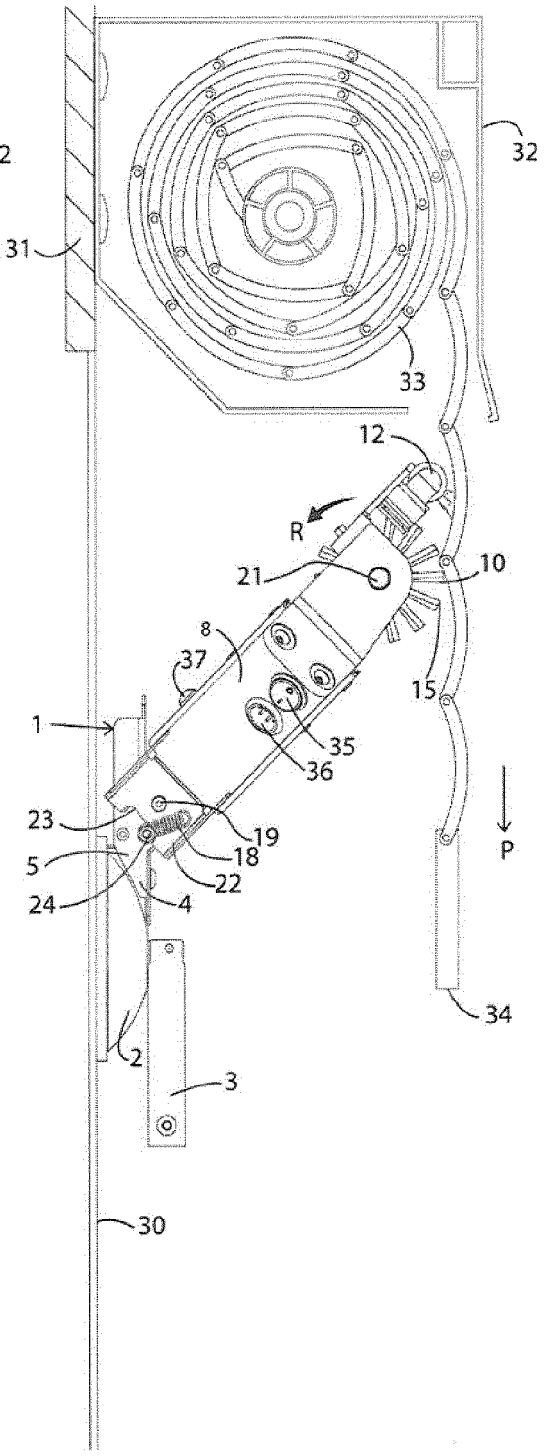
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Fig. 2b

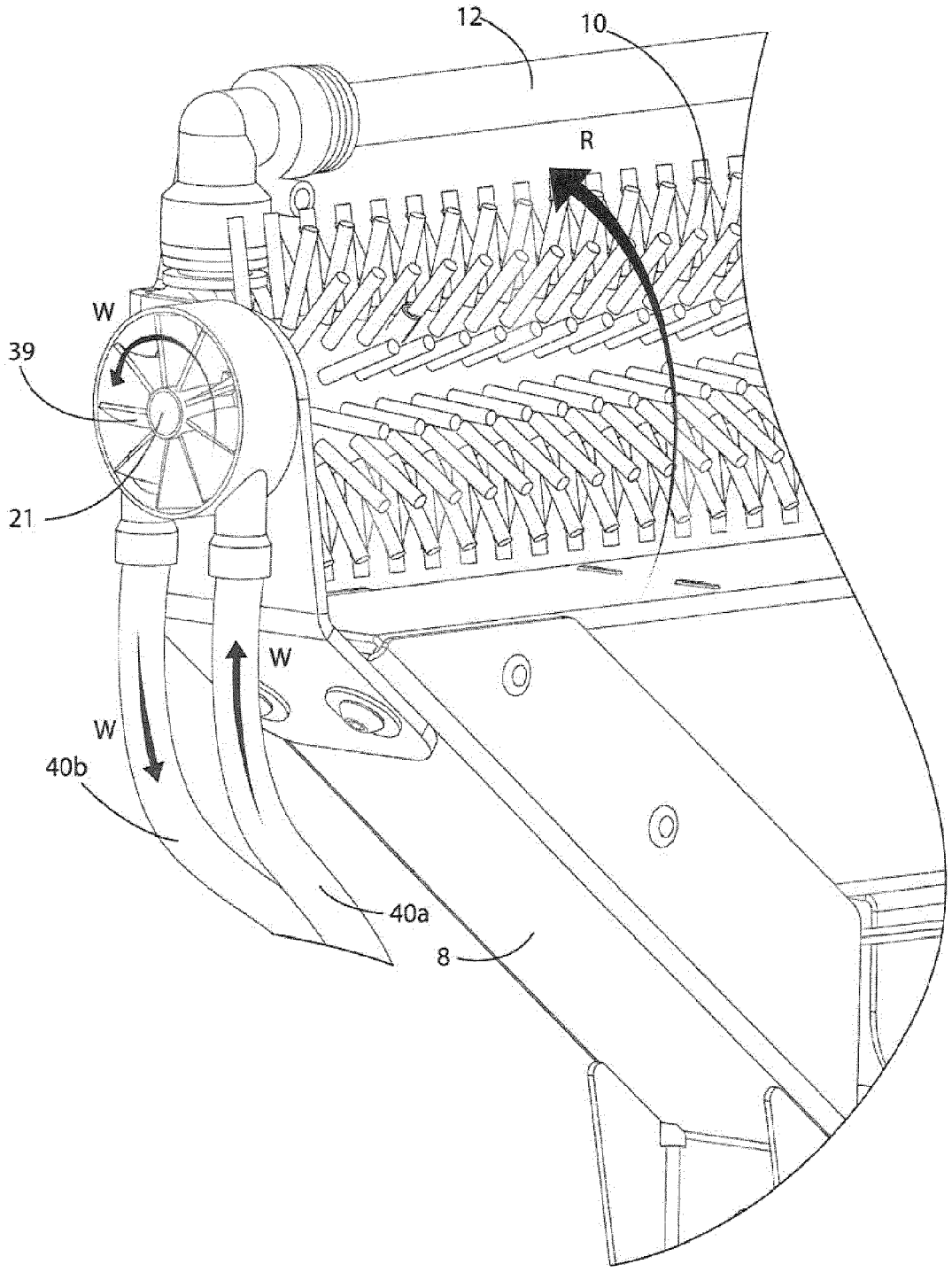

Fig. 3