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(54) Title: CLEANING SYSTEM FOR NONPOROUS SURFACES

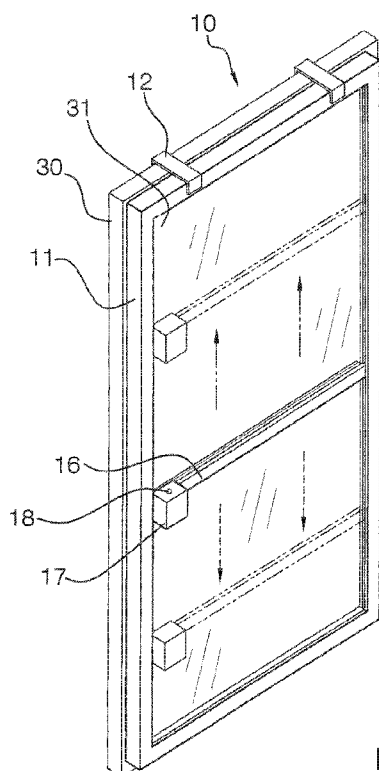


FIG. 5

(57) Abstract: A glass cleaning squeegee system has a frame that outlines glass surface or windowpane to be cleaned; the frame with at least one vertical guide track; a cross bar having on each end a gear that is situated in the guide track, the cross bar being oriented horizontally; a squeegee attached to the horizontal cross bar on a side of the cross bar facing the glass surface; a motor driving at least one gear to move the squeegee on the cross bar vertically; a powering means connected to the motor; and a means of attaching the frame at least temporarily to the glass surface or windowpane.



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CLEANING SYSTEM FOR NONPOROUS SURFACES

TECHNICAL FIELD

[0001] The present invention relates to the field of squeegee devices, more specifically, an automated system that squeegees windows and other glass panes.

BACKGROUND OF THE INVENTION

[0002] There have been attempts over the years to design window cleaning apparatus, including ones utilizing squeegees. For example, U.S. Patent No. 1,903,439 discloses a window cleaning system that uses a squeegee that is attached to the window frame. U.S. Patent No. 3,276,042 discloses a sanitary shower stall with an integral squeegee. U.S. Patent No. 5,333,664 discloses a shower door shade that uses a number of squeegees to remove grime from the shower door, as it is rolled and unrolled. The squeegees are designed to wipe off a shade that drapes over the shower door so the operator must deal not only with several squeegees, but also the shower door shade.

[0003] U.S. Patent No. 6,470,511 discloses a shower stall that is provided with an integral squeegee assembly.

[0004] U.S. Patent No. 7,127,988 discloses a squeegee operable for manually printing with a screen having a screen mesh and a printing device and having a guide system that defines a guide plane for the squeegee.

[0005] U.S. Patent No. 4,945,601 discloses a window wiping system that moves vertically up and down the surface of the window.

[0006] U.S. Design Patent No. 457,479 illustrates an ornamental design for an elongated wiper blade, which fails to depict a frame having a guide track from which a squeegee is moved via a motor.

SUMMARY OF THE INVENTION

[0007] The shower squeegee system includes a frame, at least one track, a motor-driven gear, and a squeegee. The frame includes at least one bracket that enables the frame to hang from a top surface of a shower glass enclosure. The motor-driven gear traverses said track to

drive the squeegee vertically along an interior surface of the corresponding glass pane of the shower glass enclosure. The motor driven gear and corresponding motor are contained within an enclosure, and are powered by at least one battery.

[0008] In one embodiment there is provided a glass cleaning squeegee system. It has a frame that outlines glass surface or windowpane to be cleaned, and the frame has at least one vertical guide track. The system also has a cross bar having on at least one end a gear that is situated in the guide track, the cross bar being oriented horizontally. The system has a squeegee attached to the horizontal cross bar on a side of the cross bar facing the glass surface. The system also has a motor driving at least one gear to move the squeegee on the cross bar vertically and a powering means connected to the motor. The system also has a means of attaching the frame at least temporarily to the glass surface or windowpane.

[0009] Optionally, the glass cleaning squeegee system with the motor and the gear has a motor driven gear. Preferably the glass cleaning squeegee system has a squeegee with an overall length equal to or less than the overall width of the frame. The means of attaching the frame can be at least one bracket clip positioned onto a top of a shower glass enclosure where the glass pane is located. The glass cleaning squeegee system may have an on/off button to operate the motor. The system optionally has a central processing unit connected to the powering means and to an on/off button that controls operation of the motor. The central processing unit can be connected to the powering means and a motion sensor, which automates operation by turning the motor on or off when the motion of a person has been detected for a predetermined amount of time, and after said person has left detection for a predetermined amount of time. The central processing unit can be connected to the powering means and to a rain sensor that automates operation by turning the motor on or off when water is detected upon the glass pane.

[00010] In another embodiment, the glass cleaning squeegee system frame has only two guide tracks that are fastened to a surface.

[0011] Optionally, the cross bar is a housing containing a motor. The housing can contain a sound source. The sound source may be an MP3 player, an iPOD® or a BLUETOOTH® receiver. The housing has at least one speaker.

[0012] In another embodiment, the housing has at least one light. The light may be LED lights. The light may be controlled by a button on the control panel, or activated by a motion or water sensor and turned off by a timer.

[0013] In another embodiment, the system can have at least one servo near a gear, the servo being capable of changing the direction of movement of the glass cleaning squeegee system and/or moving the squeegee toward or away from the glass surface.

[00014] In another embodiment, the powering means is at least one battery. Optionally, the system also has a container for glass cleaning solution. Alternatively, the system can have a heater and/or a camera.

[0015] These together with additional objects, features and advantages of the window cleaning squeegee system will be readily apparent to those of ordinary skill in the art upon reading the following detailed description of presently preferred, but nonetheless illustrative, embodiments of the window cleaning squeegee system when taken in conjunction with the accompanying drawings.

[0016] In this respect, before explaining the current embodiments of the window cleaning squeegee system in detail, it is to be understood that the window cleaning squeegee system is not limited in its applications to the details of construction and arrangements of the components set forth in the following description or illustration. Those skilled in the art will appreciate that the concept of this disclosure may be readily utilized as a basis for the design of other structures, methods, and systems for carrying out the several purposes of the window cleaning squeegee system. Nor is the system limited to use with glass or windows; also included are solar panels, marble, steel, and nonporous surfaces, literally anything on which a squeegee can be successfully used.

[0017] It is therefore important that the claims be regarded as including such equivalent construction insofar as they do not depart from the spirit and scope of the window cleaning squeegee system.

[0018] It is also to be understood that the phraseology and terminology employed herein are for purposes of description and should not be regarded as limiting.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and together with the description serve to explain the principles of the invention:

[0020] FIG. 1 illustrates a front, isometric view of the window cleaning squeegee system by itself;

[0021] FIG. 2 illustrates a rear view of the window cleaning squeegee system by itself and detailing the track and squeegee, and wherein the motor is depicted in hidden lines;

[0022] FIG. 3 illustrates a cross-sectional view of the window cleaning squeegee system along line 3-3 in FIG. 2, and detailing the motor housing, guide track, and gear that drives the squeegee thereon;

[0023] FIG. 3A illustrates a cross-sectional view of the window cleaning squeegee system along line 3A-3A in FIG. 1, and detailing the inter-relation of the frame, the squeegee, the guide track, and the gear;

[0024] FIG. 4 illustrates a side view of the squeegee being driven up or down with respect to the glass;

[0025] FIG. 5 illustrates a front, isometric view of the window cleaning squeegee system installed upon a pane of glass of a shower enclosure, and depicting the squeegee moving up and down via the arrows thereon;

[0026] FIG. 6A illustrates a block diagram of the various components of the window cleaning squeegee system that involve different sensors and a central processing unit; and

[0027] FIG. 6B illustrates a block diagram of the window cleaning squeegee system that involves a battery, on/off button, and motor.

[0028] FIG. 7 illustrates a squeegee system with a squeegee bar that has central motor and control buttons.

[0029] FIG. 8 illustrates side views of the FIG 7 embodiment. FIG. 8A shows a side end view of the servo, gear, a squeegee pressed against a window and downward pointing arrow. FIG. 8B shows the same end view as FIG 8A but with an upward point arrow and the squeegee away from the window.

[0030] FIG. 9 shows the front face of an exemplary squeegee bar with four speakers.

[0031] FIG. 10 is a schematic showing a typical array of glass-covered solar panels on which the window cleaning system can be placed, either permanently or movably.

[0032] The following detailed description is merely exemplary in nature and is not intended to limit the described embodiments of the application and uses of the described embodiments.

[0033] As used herein, the word "exemplary" or "illustrative" means "serving as an example, instance, or illustration." Any implementation described herein as "exemplary" or "illustrative" is not necessarily to be construed as preferred or advantageous over other implementations. All of the implementations described below are exemplary implementations provided to enable persons skilled in the art to practice the disclosure and are not intended to limit the scope of the appended claims. Furthermore, there is no intention to be bound by any expressed or implied theory presented in the preceding technical field, background, brief summary or the following detailed description.

DETAILED DESCRIPTION

[0034] Currently there are no satisfactory automatic window cleaning systems on the market. I have developed one that can be operated automatically with a minimum of energy for use in showers, windows, solar panels, ceramic and other nonporous surfaces. This new cleaning system keeps shower doors clear and new-looking and avoids soap and mineral build up that interferes with the bathroom appearance. The shower cleaning system has additional features that can add to a spa effect in the bath. The window washing system for other uses keeps windows bright and solar panels clean and more effective than if dust or sand were to accumulate thereon.

[0035] I have designed the system with two side tracks in which an arm holds the squeegee against the glass on the downward stroke. Preferably the squeegee is positioned away from the glass on the upward stroke. I have designed the squeegee arm to incorporate other elements, such as a glass cleaner container, motor, sound system with speakers, light, camera, motion and rain sensors, and a computer to operate the window washing system and its components.

[0036] Detailed reference will now be made to the preferred embodiment of the present invention, examples of which are illustrated in FIGS. 1-5. An inventive glass cleaning squeegee system 10 (hereinafter invention) has been designed for use with showers. It includes a frame 11, at least one bracket 12, a guide track 13, a gear 14, a motor 15, a squeegee 16, and a housing 17. The frame 11 rests adjacent a glass pane 31 of a shower glass enclosure 30. The frame 11 is positioned adjacent the glass pane 31 via the bracket(s) 12, which clips onto the shower glass enclosure 30. The frame 11 consists of a plurality of pieces that form an outline that mirrors the overall shape of the glass pane 31. The frame 11 and the

bracket(s) 12 are made of a material comprising a wood, plastic, metal, or carbon fiber. The bracket(s) 12 attach along a top piece of the frame 11. The bracket is attached to the frame by any fastening means including but not limited to adhesive, bolts, nails, screws, rivets, welding the two parts together, casting the two parts together, or molding the two parts together. For the shower and other cleaning systems, a bracket need not be used. Alternatives to the bracket include but are not limited to adhesive, bolts, nails, screws and rivets.

[0037] Located upon a left side and a right side of the pieces of the frame 11 are guide tracks 13. The guide tracks 13 enable the invention 10 to squeegee the entire surface of the glass pane 31 by enabling the squeegee 16 to traverse the entire length of the glass pane 31 vertically. Paired guide tracks are required, but not the horizontal pieces of the frame. If the horizontal pieces of the frame 11 are eliminated, the guide tracks 13 must be firmly attached to the glass pane 31 or other nonporous surface. Firm attachments include but are not limited to adhesive, bolts, nails, screws and rivets.

[0038] The gear 14 has gear teeth that correspond with the guide track 13 to enable the gear 14, the motor 15, and the squeegee 16 to traverse up and down the guide track 13, and in essence squeegee the entire surface of the glass pane 31, namely the surface within the frame 11. By moving the frame 11, one cleans another area.

[0039] In FIG. 3A, the cross-sectional view illustrates the interrelation of the gear 14, the guide track 14, the frame 11, and the squeegee 16 on the non-motored side of the invention 10. The frame 11 essentially encompasses the gear 14 and track 13 thereby enabling proper alignment and maintaining a horizontal orientation of the squeegee 16 across the frame 11 and the glass frame 31. The squeegee 16 is of a traditional form, and is made of a rubber or material that is suitable for wiping water off a ceramic or smooth surface. The squeegee 16 has an overall length that is less than or equal to the overall width of the glass pane 31. The squeegee 16 fits within the frame 11, and squeegee bar is capable of vertical movement, either up or down, within the frame 11 (FIG. 4). In other embodiments, the squeegee can be interchanged with other cleaning tools, such as brushes held stationary or spun at the bar moves up and down the window. Other tools can also be interchangeably installed in the same position as the squeegee.

[0040] The invention 10 includes an on/off button 18 to operate the motor 15. However, it shall be noted that a motion sensor 18A and a central processing unit 18B (hereinafter CPU) may be included to provide automatic operation of the invention 10 by turning the invention

10 on or off by itself when a person has been detected for a predetermined amount of time, and after said person has left detection for a predetermined amount of time. However, it shall be noted that a rain sensor 18C may be included to provided automatic operation of the invention 10 by turning the invention 10 on or off by itself when water is detected upon either the housing 17 or the glass pane 31.

[0041] The invention 10 is powered by at least one battery 19, which is connected by wire to the CPU 18B or to the on/off button 18. The battery 19 may be referred to as a powering means, and may involve a plurality of batteries. Referring to FIGS. 6A and 6B, the invention 10 may include the CPU 18B and the on/off button 18, the motion sensor 18A or the rain sensor 18C; or simply the on/off button 18. The battery 19 provides power to the motor 15. In FIG. 6A, the battery 19 is wired to the CPU 18B, which in turn is wired to the motor 15. In FIG. 6B, the battery 19 is connected to the on/off button, which is connected to the motor 15.

[0042] The housing 17 partially contains the gear 14 and the motor 15, and forms a waterproofed enclosure to protect both the gear 14 and the motor 15 from water associated with use of a shower. The housing is made of a material comprising a plastic, metal, wood, or carbon fiber composite.

EXAMPLE 1

[0043] Figs. 7 and 8 show an improved window washing system 10 that has a control panel 52 and motor (not shown) in the center of the squeegee bar 54. Like my earlier invention, this system 10 has a frame 11, guide tracks 13 with indentations for gear teeth. This version has a central motor with attached rods that drives the gears. Fig. 8 displays side views of the end of the squeegee bar with the servo 56, gear 14, guide track 13 with teeth and squeegee 16. Fig. 8A shows the system in action with the squeegee tip 16 pressed against the glass surface 58 and moving downward. Fig. 8B shows the system returning to its default position, without the squeegee 16 touching the glass surface 58 and thus not depositing water back onto the glass 58. Although one servo 56 is shown, more than one servo can be used to change the direction of the squeegee bar 54 movement (up or down) and/or to move the squeegee toward or away from the glass.

[0044] Fig. 7 shows an embodiment with a plurality of control buttons, for example, a pair 60A and 60B in the center of the squeegee bar 54. One button 60A or 60B permits the user to control squeegee movement by turning it on or off. In one embodiment, one touch of a

control button 60A or 60B activates a program that causes the squeegee bar 54 to move from the top to the bottom of the frame and back up to its default position at the top of the frame. Alternatively, one of the buttons 60A or 60B can be replaced with a water sensor that automatically activates the squeegee motor, preferably on a timer that activates the squeegee motor after the shower is completed.

[0045] This window washer design with an enlarged squeegee bar 54 lends itself to other useful shower functions that currently are only available separately. For example, a sound source and light are now installed separately and can interfere with the appearance of the shower area. Optionally we install a sound source or entertainment system, including, but not limited to a music player or radio. One of the control buttons 60A or 60B can be connected to the battery to send power to the sound source. Another control button(s) select the sound and adjust the volume. Optionally a slot (not shown) in the top of the squeegee bar 54 accommodates an entertainment source including but not limited to an MP3 player or iPOD® player or a BLUETOOTH® receiver.

[0046] Fig. 9 is a schematic showing an embodiment with four speakers 62 (preferably waterproof) installed on a surface of the squeegee bar 54. The sound system requires at least one speaker, and the speaker(s) can be installed on any surface of the bar. Alternately, wireless speakers can be installed in other shower locations, when the sound system has the capacity to send wireless signals, including but not limited to BLUETOOTH® technology.

[0047] Oftentimes, it is difficult to see in the shower, which frequently is equipped with only one low-wattage lamp. This is particularly problematic for older people. To solve this problem, I incorporated a light bar (not shown) within the sleek design of the squeegee bar 54. The light bar is preferably installed on the lower surface of the squeegee bar 54 to shed light downward into the shower. The light is controlled by a button on the central control panel. Alternately, the light can be activated immediately via motion or water sensor and turned off by the timer activating the motor.

EXAMPLE 2

[0048] My next improvement is directed toward a home and commercial window washing system that shows a variation of the squeegee bar. This embodiment has a larger squeegee bar, or housing to accommodate window washing fluid container. This embodiment can be retrofitted on buildings, or it can be installed as the windows are being installed, in which

case, electricity can be optionally hardwired to the unit. This embodiment has three speakers, although any number can be used. Alternatively one or more of the speaker positions is occupied with devices including but not limited to a camera and/or light.

[0049] The commercial embodiment with window washing fluid container will be heavy enough to drag the squeegee bar down and may not require much if any energy expenditure on its downward path. This will be highly advantageous for energy saving to use on moving the squeegee bar back to its default position at the top of the frame.

[0050] For commercial use, the front of the window washing system bar can carry the company logo or name, a glowing front for light effects, and/or advertisement for the building or other company, among other decors. For high rises, particularly where electricity is not immediately available on the building skin, the window washing bar can be covered on sun-exposed surfaces with solar panels to help recharge the contained batteries. Alternatively, rechargeable batteries can be recharged when not in use by returning the window washing bar to the top of the frame and connecting an outlet (not shown) on the window washing bar to any power source.

[0051] For outdoor, cold weather conditions, a heating element and a scraper are installed in the system bar to remove ice and snow. The heating element keeps the washing fluid warm and liquid for dispensing.

[0052] This commercial window washing system is particularly useful for very high rises, subject to wind gusts and dangers to workers. My automated system discretely cleans windows without invading the privacy of condominium owners or office workers. This system can be manufactured into or retrofitted on units with glass and/or windows, including but not limited to homes, office buildings, solar collecting panels (see FIG. 10), aquariums, underwater applications, and glass walls.

[0053] With respect to the above description, it is to be realized that the optimum dimensional relationship for the various components of the invention 10, to include variations in size, materials, shape, form, function, and the manner of operation, assembly and use, are deemed readily apparent and obvious to one skilled in the art, and all equivalent relationships to those illustrated in the drawings and described in the specification are intended to be encompassed by the invention 10.

[0054] It shall be noted that those skilled in the art will readily recognize numerous adaptations and modifications which can be made to the various embodiments of the present

invention which will result in an improved invention, yet all of which will fall within the spirit and scope of the present invention as defined in the following claims. For example, although a four-sided frame is shown in the drawings, at minimum two sides that are anchored to a window frame, etc. are needed. Another example is the simple light strip, which can be varied with other types of lighting, including low and ultra voltage lighting, such as LED lights, in one or a plurality of colors. Accordingly, the invention is to be limited only by the scope of the following claims and their equivalents.

[0055] While the embodiments of the invention have been disclosed, certain modifications may be made by those skilled in the art to modify the invention without departing from the spirit of the invention.

CLAIMS

1. A glass cleaning squeegee system comprising:
 - a frame that outlines glass surface or windowpane to be cleaned;
 - the frame comprising at least one vertical guide track;
 - a cross bar having on each end a gear that is situated in the guide track, the cross bar being oriented horizontally;
 - a squeegee attached to the horizontal cross bar on a side of the cross bar facing the glass surface;
 - a motor driving at least one gear to move the squeegee on the cross bar vertically;
 - a powering means connected to the motor; and
 - a means of attaching the frame at least temporarily to the glass surface or windowpane.
2. The glass cleaning squeegee system of Claim 1 wherein the motor and the gear comprise a motor driven gear.
3. The glass cleaning squeegee system of Claim 1 wherein the squeegee has an overall length equal to or less than the overall width of the frame.
4. The glass cleaning squeegee system of Claim 1 wherein the means of attaching the frame comprises at least one bracket clip positioned onto a top of a shower glass enclosure where the glass pane is located.
5. The glass cleaning squeegee system as described in Claim 1 further comprising an on/off button to operate the motor.
6. The glass cleaning squeegee system of Claim 1 wherein a central processing unit is connected to the powering means and to an on/off button that controls operation of the motor.
7. The glass cleaning squeegee system of Claim 1 wherein a central processing unit is connected to the powering means and a motion sensor, which automates operation by turning the motor on or off when the motion of a person has been detected for a predetermined amount of time, and after said person has left detection for a predetermined amount of time.
8. The glass cleaning squeegee system of Claim 1 wherein a central processing unit is connected to the powering means, and is connected to a rain sensor that automates operation by turning the motor on or off when water is detected upon the glass pane.

9. The glass cleaning squeegee system of claim 1 wherein the frame consists of two guide tracks that are fastened to a surface.
10. The glass cleaning squeegee system of claim 1 wherein the cross bar comprises a housing containing a motor.
11. The glass cleaning squeegee system of claim 10 wherein the housing further contains a sound source.
12. The glass cleaning squeegee system of claim 11 wherein the sound source comprises an MP3 player, an iPOD® or a BLUETOOTH® receiver.
13. The glass cleaning squeegee system of claim 10 wherein the housing has at least one speaker.
14. The glass cleaning squeegee system of claim 10 wherein the housing has at least one light.
15. The light of claim 15, further comprising LED lights.
16. The light of claim 15, further being controlled by a button on the control panel.
17. The light of claim 15, further being activated by a motion or water sensor and turned off by a timer.
18. The glass cleaning squeegee system of claim 1 wherein the system comprises at least one servo near a gear, the servo being capable of changing the direction of movement of the glass cleaning squeegee system and/or moving the squeegee toward or away from the glass surface.
19. The glass cleaning squeegee system of claim 1 wherein the powering means comprises at least one battery.
20. The glass cleaning squeegee system of claim 1 wherein the system further comprises a container for glass cleaning solution.
21. The glass cleaning squeegee system of claim 1 further comprising a heater.
22. The glass cleaning squeegee system of claim 1 further comprising a camera.

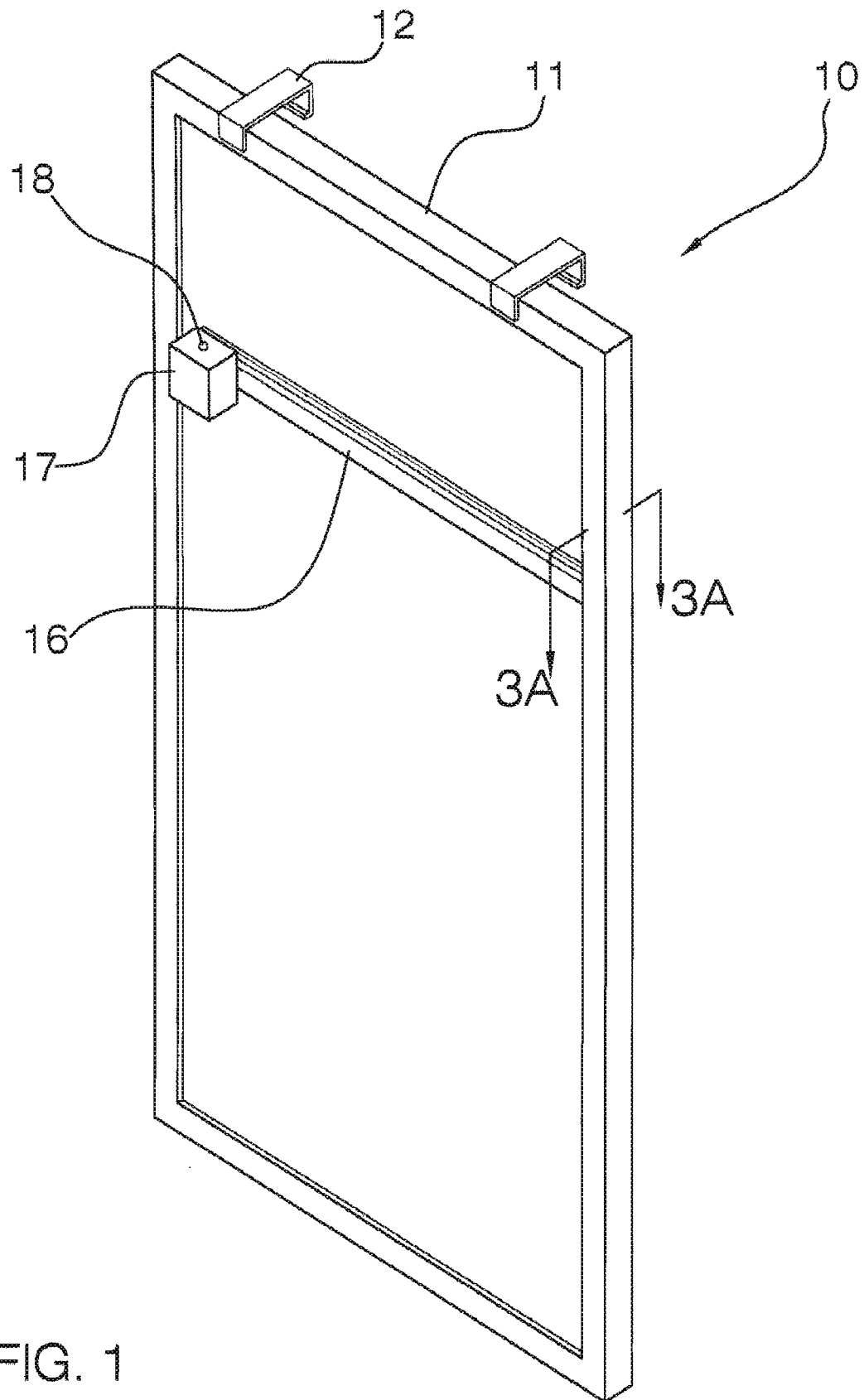


FIG. 1

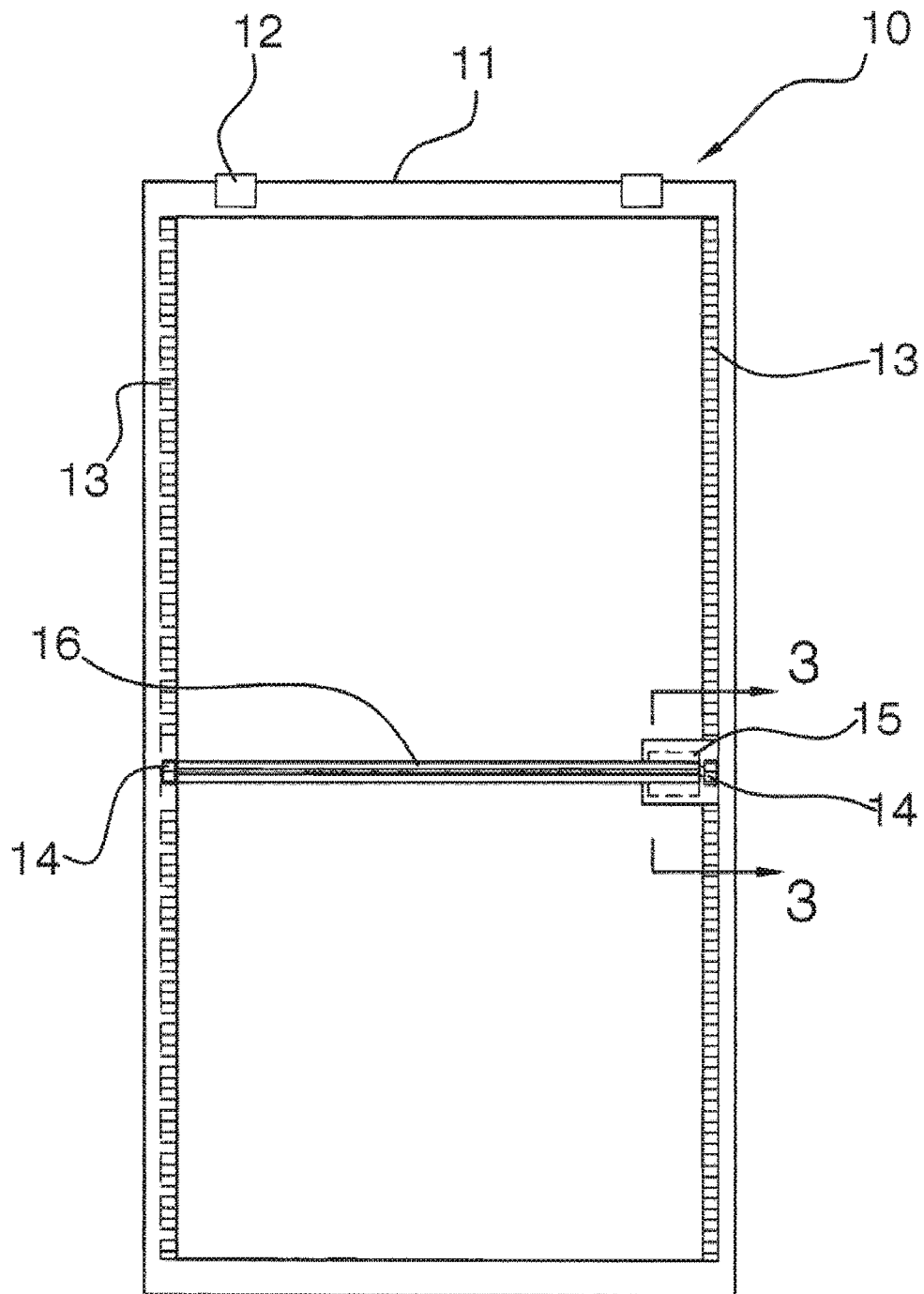


FIG. 2

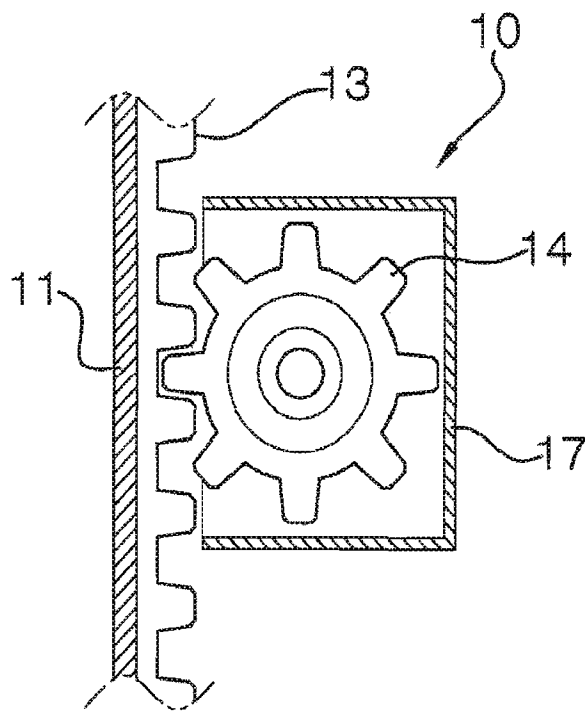


FIG. 3

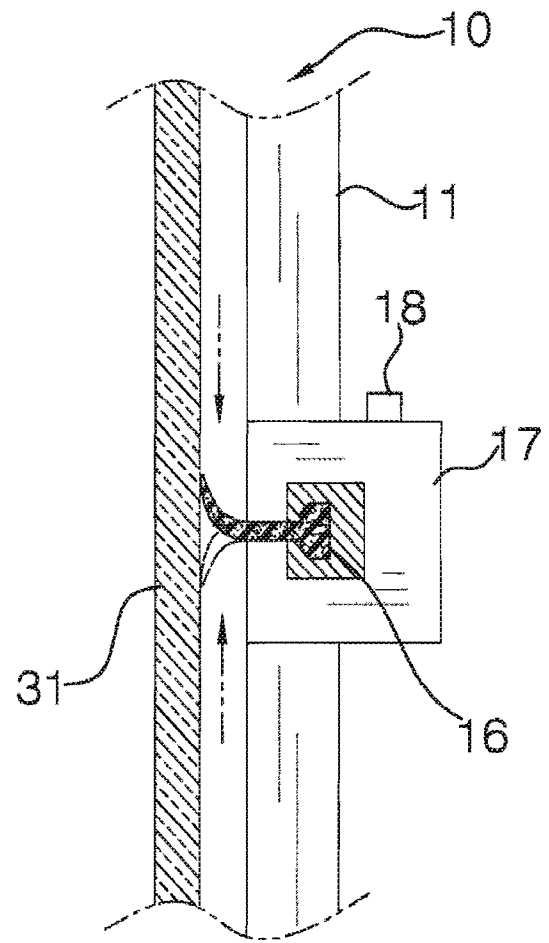


FIG. 4

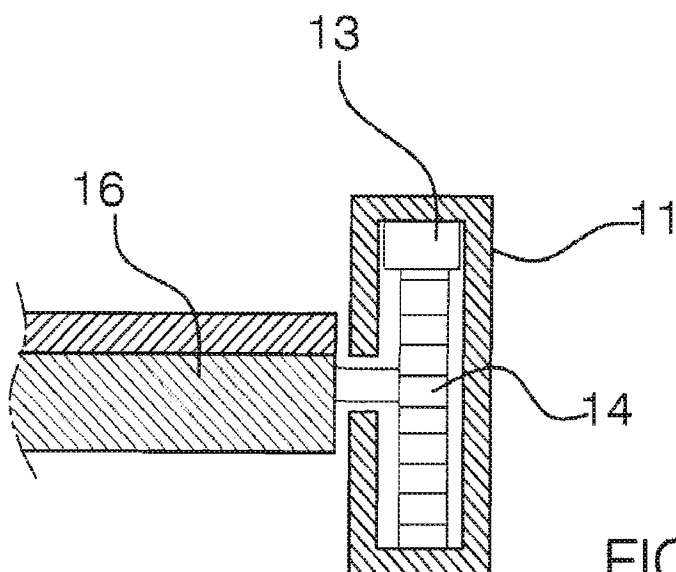


FIG. 3A

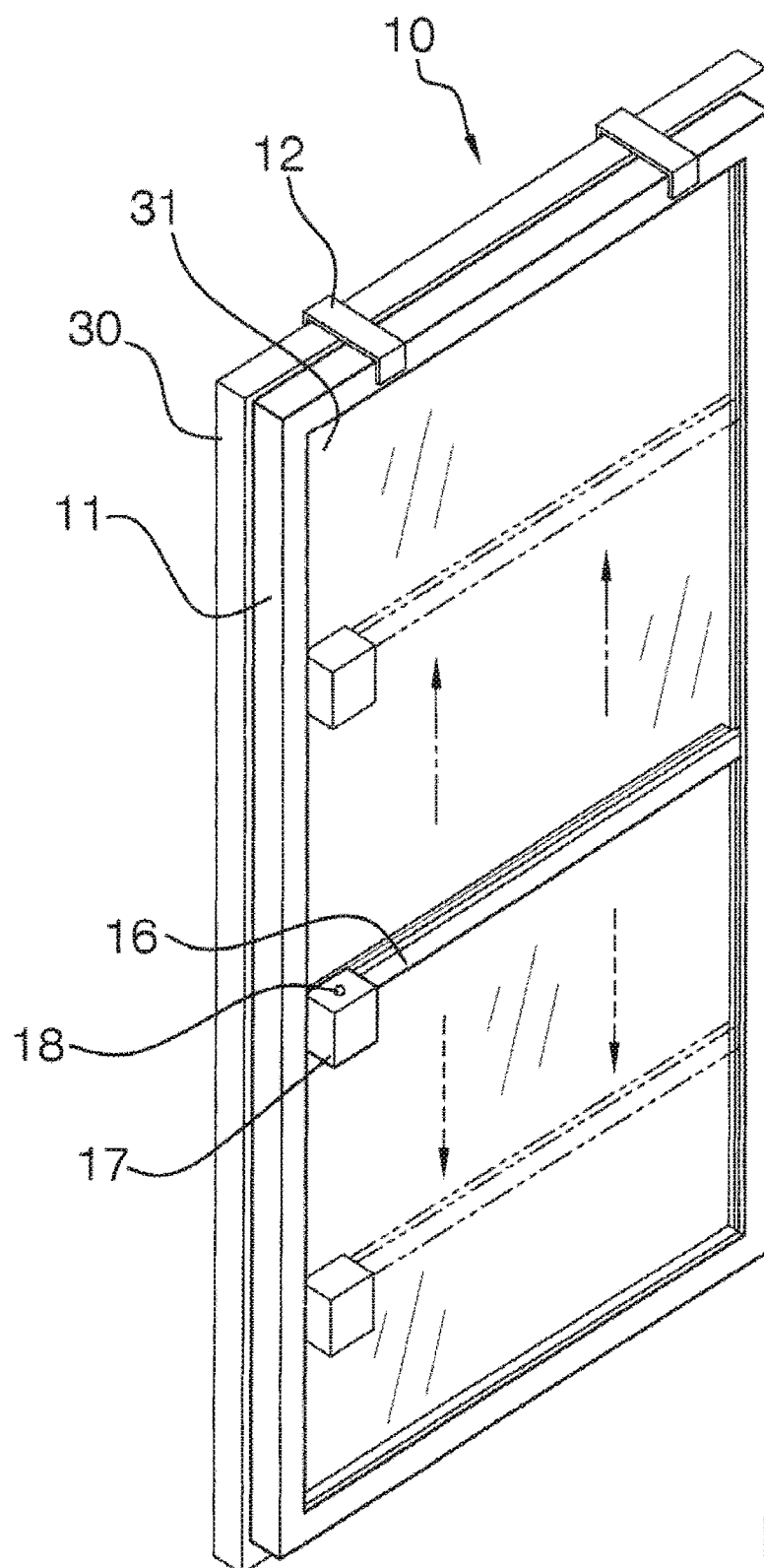


FIG. 5

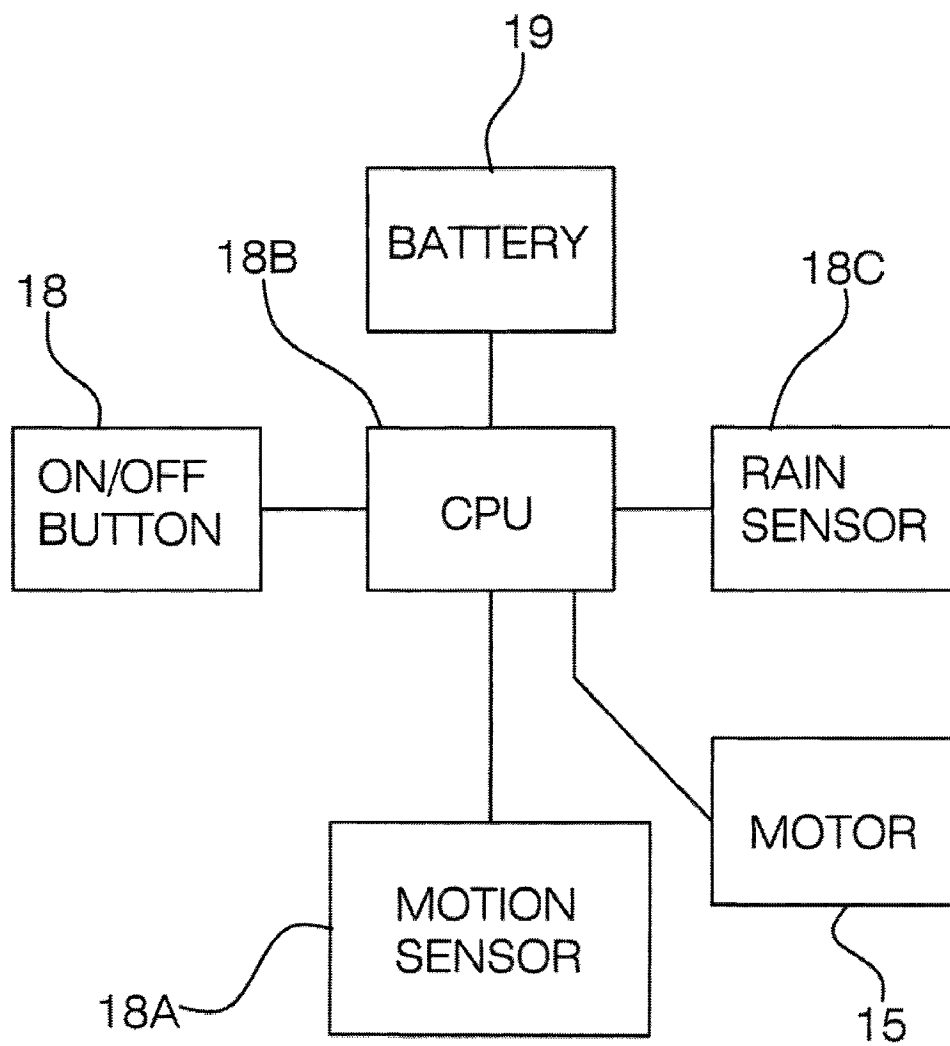


FIG. 6A

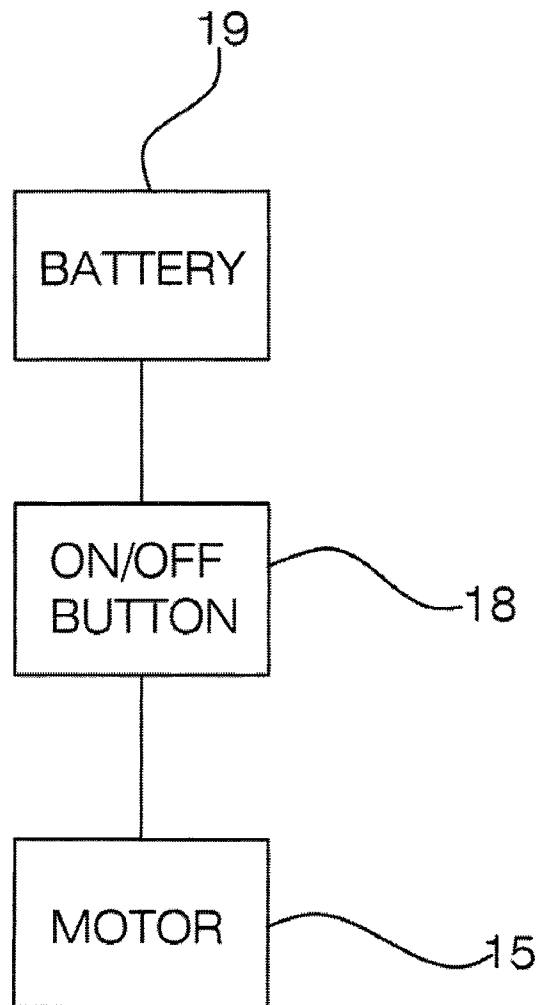


FIG. 6B

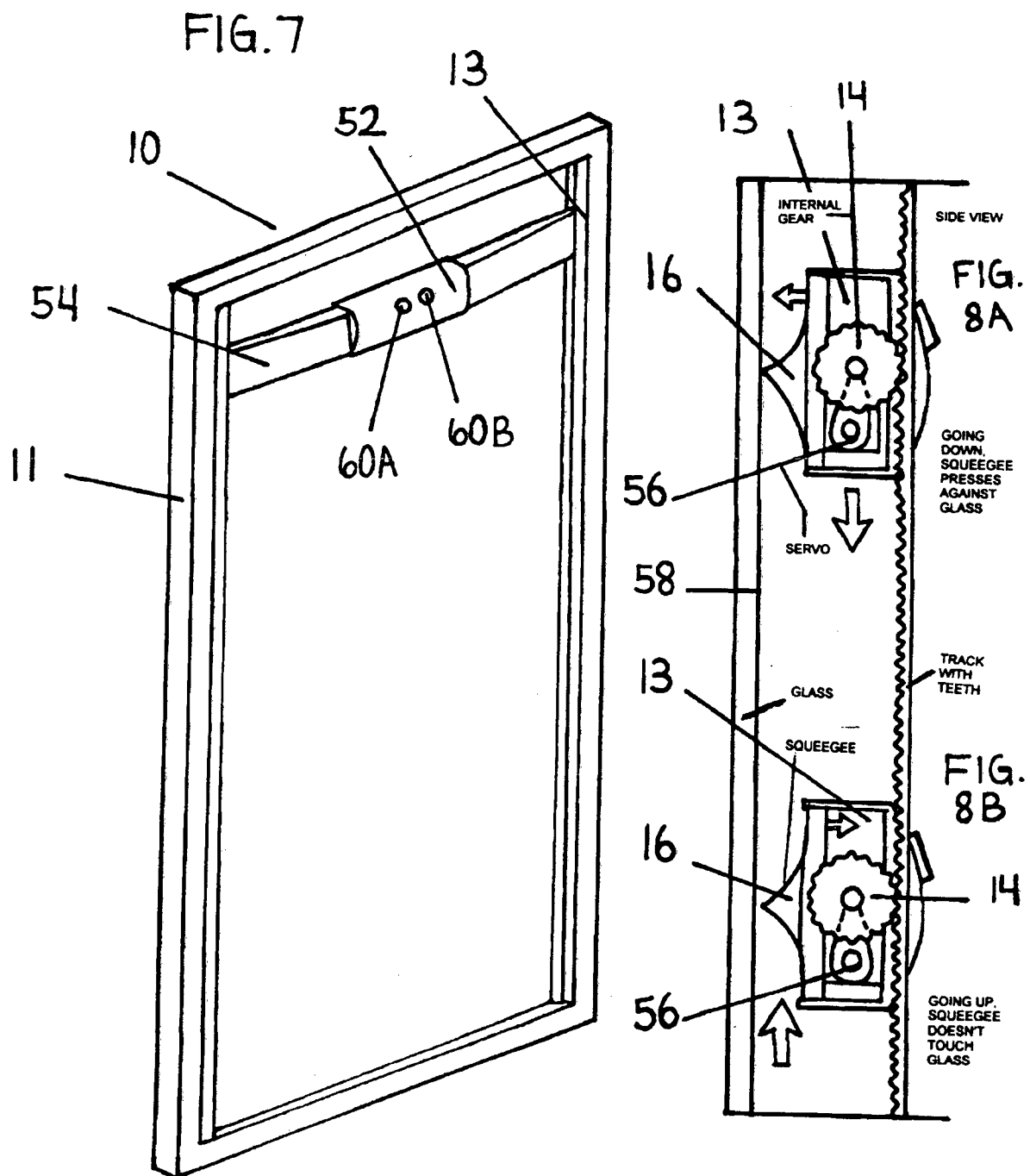


FIG. 9

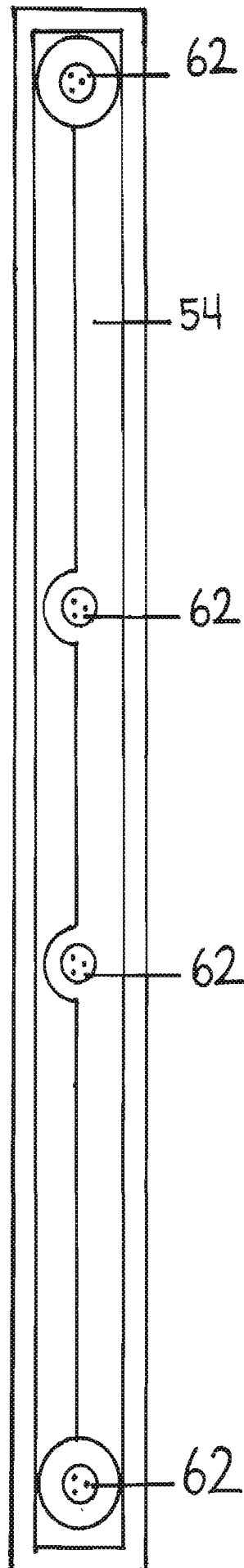


FIG. 10

