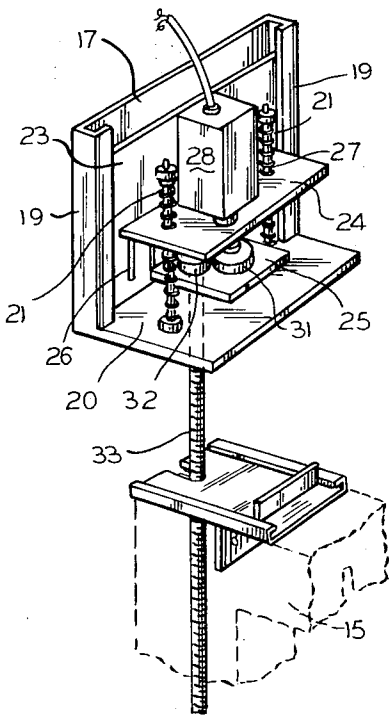
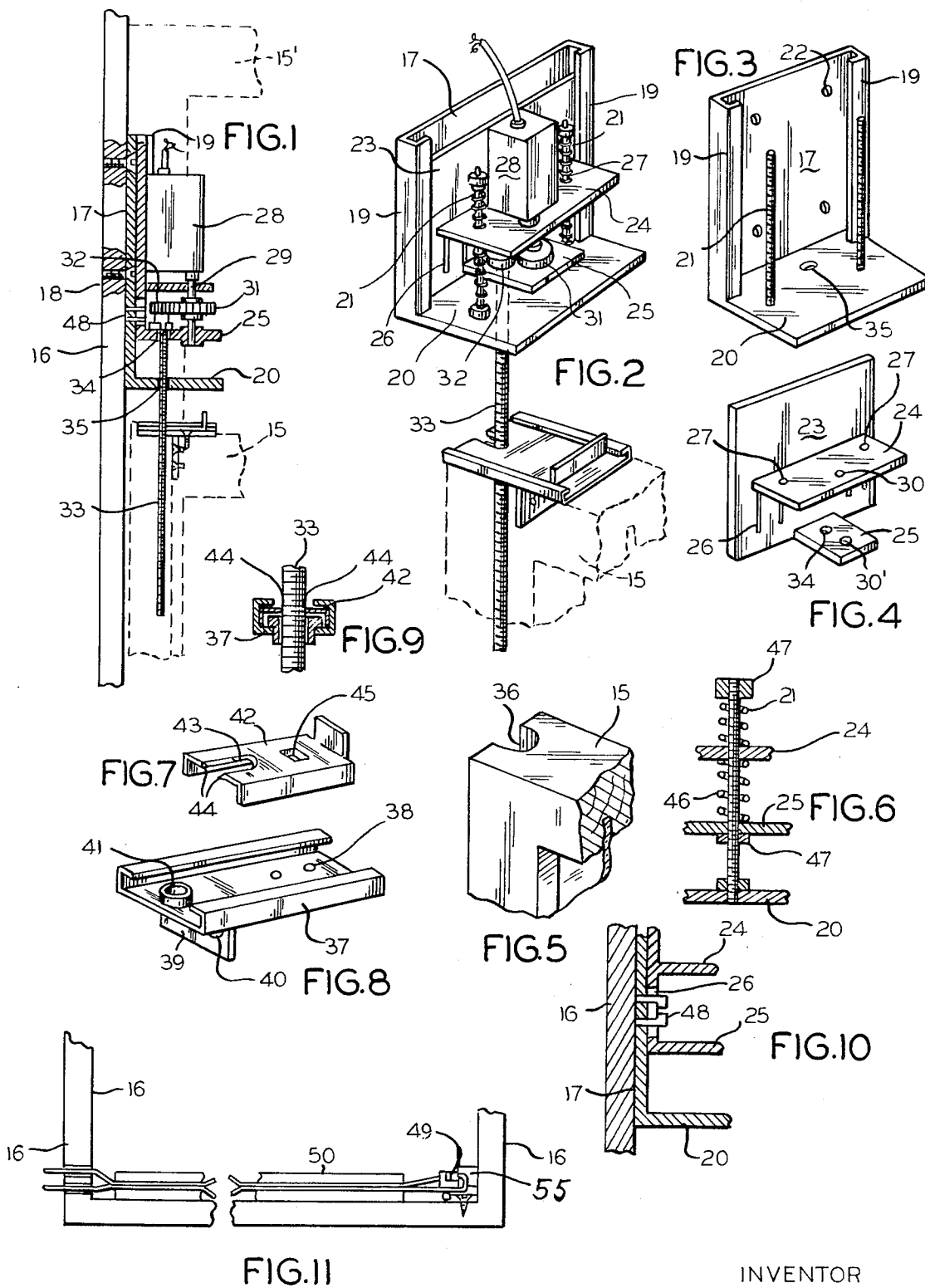


[54]	WINDOW POWER ACTUATING DEVICE	2,684,239 1,571,819	7/1954 2/1926	Gaffrey.....49/21 Toresan.....49/362
[72]	Inventor: Roger L. Boneck, W-140, N-5550 Lilly Road, Menomonee Falls, Wis. 53051	FOREIGN PATENTS OR APPLICATIONS		
		822,658	10/1959	Great Britain.....49/28
[22]	Filed: Oct. 19, 1970	Primary Examiner—Kenneth Downey		
[21]	Appl. No.: 81,929	Attorney—Alter, Weiss & Whitesel		
[52]	U.S. Cl.49/21, 49/28, 49/362	[57] ABSTRACT		
[51]	Int. Cl.E05f 15/20	This invention provides a power actuation device for raising and lowering a window in a building. A safety switch prevents the window from shutting tightly if an object obstructs or limits window travel. Also a moisture sensor shuts the window if it rains.		
[58]	Field of Search49/21-23, 26-28, 49/362			
[56]	References Cited	3 Claims, 11 Drawing Figures		
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WINDOW POWER ACTUATING DEVICE

My invention relates to window actuating devices for homes and buildings and more particularly to a power actuated window control.

Power windows are known; however, they are not generally used in homes and small buildings since they tend to be unduly expensive, complicated, and difficult to install and maintain. The home windows vary greatly in that some tend to stick and others are so loose that they tend to fall, and might even have to be propped up. Moreover, there are certain safety problems since the windows must not be allowed to shut upon a person's fingers, hands, arms, neck, or the like. They should lock tightly against entry by burglars. Furthermore, it is helpful if the windows can be arranged to open by a predetermined amount without requiring the personal supervision of the user while the window is opening or closing. Heretofore, it was not possible to provide windows with all of these desirable features while meeting the cost and simplicity required for practical home installations.

Accordingly an object of my invention is to provide a remote control for power operated windows. More particularly, it is an object to provide power windows for home usage.

Another object of my invention is to provide a device of the character described which is silent in operation and will either raise, or lower the window. Here, an object is to provide either for automatic or manual operation.

Still another object is to provide a device that is equipped with safety switches which will disconnect current to the motor when an emergency resistance is encountered.

A further object is to provide a device which is easy to install, and which requires no special mechanical skill in its operation.

A still further object is to provide a device which cannot be pried in either direction.

Still another object of my invention is to provide a power window device that may be controlled by a moisture actuated switch, that causes the window to close when it rains.

In keeping with an aspect of the invention, power means are provided for operating windows to any predetermined, fixed position. Once started, the device shown, described, and claimed herein, automatically operates to a predetermined open location. From there, it can not be further pried up to allow a burglar to enter. The invention is simple in construction as compared to the prior art, is economical to manufacture, and is easy to operate without requiring a special mechanical skill.

Other and further objects of my invention will become more apparent as the description proceeds, when taken in conjunction with the drawings, in which:

FIG. 1 is a vertical cross-sectional view of the assembled power window operating device, as applied to a casement window;

FIG. 2 is a fragmentary perspective view of the assembled device as shown in FIG. 1;

FIG. 3 is a perspective view of a mounting plate for rigid attachment to a window channel;

FIG. 4 is a perspective view of the motor support for slidable mounting in the channels of the mounting plate shown in FIG. 3;

FIG. 5 is a fragmentary perspective view of a portion of the adjustable sash;

FIG. 6 is a vertical cross-sectional view of stabilizing rods equipped with compression springs;

FIG. 7 is a perspective view of the slidable member for engagement with the channel as shown in FIG. 8;

FIG. 8 is a perspective view of the channel for attaching to the top surface of the adjustable sash;

FIG. 9 is a cross-sectional view of the channel and slide shown in FIGS. 8 and 7 in engagement with the vertical threaded rod;

FIG. 10 is a vertical cross-sectional view of the mounting plate and motor support showing the switch contacts; and

FIG. 11 is an exemplary safety switch for mounting onto a window sill in order to open the circuit to the power actuator if an obstacle is between the bottom of the window and the sill.

Similar reference characters indicate corresponding parts throughout the several views. More particularly, the characters 15 and 15' generally identify the frames of double hung casement windows. The frame 15' is the upper window, and the frame 15 is the lower window, which is raised and lowered by the power device constituting my invention.

The frame shown as 16 is firmly mounted in and attached to the house to support and guide the windows 15 and 15'. A mounting plate 17 is attached to frame 16, as by means of screws 18, (see FIG. 1), for example. The attachment may be at any height selected according to the desired window opening. As shown in FIG. 3, the mounting plate 17 is equipped with a pair of channels 19, and a horizontal plate 20, which supports a pair of vertically disposed threaded rods 21. The apertures 22 in the plate 17 accommodate the screws 18, for mounting it to the frame 16. The perpendicularly extending channels 19 provide a vertical adjustment of the motor mounting and the window opening.

Another plate 23 (see FIG. 4) is equipped with a perpendicularly extending motor mounting plate 24, and a bottom plate 25. The plate 23 is here shown as provided with vertical slots 26 for receiving limit switches. The motor mounting plate 24 has apertures 27 which permit entry of the threaded rods 21 (see FIG. 2). The plate 23 is designed to slidably engage the channels 19 at the sides of the mounting plate 17.

A motor 28 is mounted in any convenient manner onto the top surface of the plate 24. The motor shaft 29 is guided in bearings in the apertures 30 and 30' in the plates 24 and 25, respectively. A drive gear, shown as 31 (see FIG. 1), is attached to the shaft 29 to drive a gear 32 which is attached to the upper end on the threaded shaft 33. This shaft further extends through the aperture 34 in the plate 25 and the aperture 35 in the plate 20 of the mounting plate 17.

A threaded shaft 33 extending downwardly (see FIGS. 1 and 2) into a vertical groove 36 formed in the side of the window frame 15, as shown in FIG. 5.

The upper surface of the window frame 15 supports a channel plate 37 (see FIG. 8) which is attached thereto by means of screws, or the like, threaded through the apertures 38. A downwardly disposed member 39 is attached to the vertical surface of the window frame 15 by means of screws disposed through the apertures shown as 40. The plate 37 is also equipped with a bushing 41, through which the threaded rod 33 passes.

A member 42 (see FIG. 7) slidably engages the channels of the plate 37. The plate 42 is cut out at its forward end 43 to provide passage for the threaded rod 33. The edges 44 on the end slot 43 are formed for engagement with the threads on the rod 33 (see FIG. 9). An indentation 45 in the surface of the member 42 is arranged for retaining the member 42 in position between the screws in the apertures 38 in the plate 37. As the shaft 33 turns, the plate 42 rides on the feed screw threads, thereby raising and lowering the window.

By referring to FIGS. 2 and 6, it will be noted that compression springs 46 encircle the rods 21 and are positioned between the plates 20 and 24. The tension or compression of these springs is adjusted by means of the nuts 47, to keep the plate 24 in a neutrally suspended position and to adjust for the ease with which the windows slides in the frame. Switch contacts 48 are mounted on the plate 17, to extend through the vertical slots 26. If the window 15 is raised to the proper position, the springs are further compressed to open or close switch contacts 48 and remove power from the motor 28. The shaft 33 stops revolving, and retains the window 15 in a fixed position.

In FIG. 11, I show an exemplary emergency safety switch 49, at the end of a tube 50 through which the wires forming a part of the electric circuit pass. Any suitable pressure sensitive switch may be used at this point. Since switches of this type are commonly used to control elevator doors, to open or close swinging doors, and the like, there is no need to here describe them in great detail. The purpose of this safety switch, mounted onto the window sill, is to provide a means of disconnecting, or breaking the circuit, when an object, such as a child's finger is on the window sill. Thus, the window 15 stops moving downwardly until the pressure on the switch is released.

The motor preferably has a reversing type of action controlled by means of a two way switch (not shown), which may be mounted in any convenient location. If desired a conventional moisture actuated switch 55 may also be incorporated in the electric circuit, so that rain will start the motor 28 to revolve the shaft 33 and close the window 15.

The power window actuating device is simple in construction. Many changes may be made without effecting the operativeness of the device. Therefore, the claims are to be construed to cover all equivalents which do not depart from the spirit or the scope of the invention.

I claim:

1. A power window actuating device for double hung windows, said device comprising:

a first vertical plate attached to a window frame, said first vertical plate having vertically extending channels thereon and terminating at a first horizontal plate,

a second vertical plate slidably held in said channels, said second vertical plate having a horizontal shelf thereon for holding said motor,

spring mount means for attaching said shelf to said horizontal plate,

means including a threaded shaft rotatably driven by said motor in either of two opposite directions for raising and lowering said window,

said threaded shaft being axially stationary,

pressure sensitive switches under said window for stopping the movement of said window when an object is in the path of said window while closing,

limit switch means operated responsive to a depression of said spring mount means for stopping said motor, and

said window raising and lowering means including said threaded shaft comprising a second horizontal plate attached to the top of said window,

said second horizontal plate having horizontal guide means,

a thread engaging plate mounted for horizontal movement in said horizontal guide means for threadedly engaging said threaded shaft to raise and lower said window responsive to the rotation of said threaded shaft.

2. The device of claim 1 and means for adjusting the spring mount tension or compression to compensate for the ease with which the window slides in its frame.

3. The device of claim 1 and means for adjusting the vertical position of the motor to thereby adjust the window opening.

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