

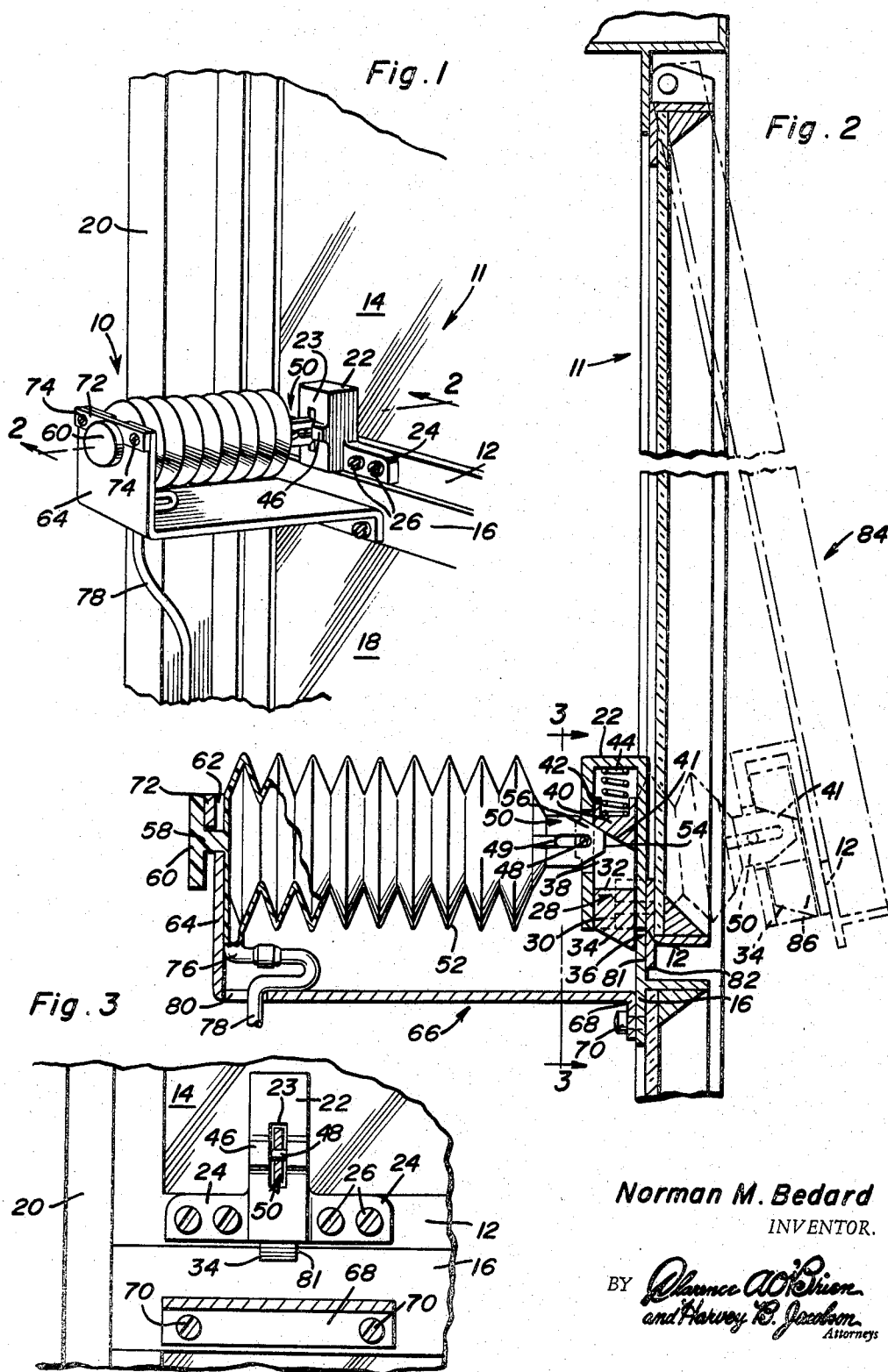
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WINDOW OPERATOR

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WINDOW OPERATOR

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ABSTRACT OF THE DISCLOSURE

A pneumatically actuated window operator including means for latching the window when moved to a closed position. The device includes bellows having a cam mounted thereto. Upon expansion of the bellows, the cam causes retraction of the latch and development of a force against a window vent frame sufficient to open the same. Deflation of the bellows causes return of the vent frame to a closing position. The latch includes a camming surface which bears against a striker plate portion of a window frame causing the latch to assume its original locking position.

This invention relates to latch mechanisms for vent windows and more particularly to a combined automatic latch mechanism and vent operator.

Manually driven mechanical vent window operators and latch mechanisms therefore are well known in the art. Certain constructions include crank means coupled to a linkage for opening a vent or transom type window. An existing window construction includes a latch mechanism in the form of a pivoted hook-like handle mounted on a fixed window frame which engages and retains the vent window frame in a closed position against the fixed window frame. Certain other window constructions are removed from ready access therefore necessitating inconvenience when operation of the window is desired. In view of this prior art, it would be desirable to automatically operate a window without time consuming and troublesome manual operation.

The present invention includes a pneumatically driven window operator which causes opening and closing of a vent window or the like upon simple actuation of a pneumatic control. The pneumatic means include bellows to which a cam member is attached. In turn, this cam is retained in contacting relation with a latch or striker assembly mounted on the vent frame. The striker is kept by a striker plate portion of an abutting window frame. Thus, when opening of the vent is desired, the bellows are inflated thereby causing retraction of the striker by virtue of the urging of the cam against the striker. Further, continuous expansion of the bellows exert an opening force upon the vent frame resulting in a displacement thereof to the extent desired. Closing of the window is completed in much the same fashion except that the striker includes a camming surface which engages the window frame upon closing and causes retraction of the striker until coplanar alignment between the vent and window frames is achieved. The present invention may be employed in operating a vent window automatically from a remote location quickly and with a minimum of inconvenience not heretofore available with prior art devices.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a perspective view of the present window operator.

FIGURE 2 is a sectional view of the present device employed with a vent window structure taken along a plane passing through section line 2—2 of FIGURE 1.

FIGURE 3 is a sectional view taken along a plane passing through section line 3—3 of FIGURE 2.

Referring specifically to the drawings, a preferred embodiment of the present window operator is denoted by the reference numeral 10 illustrated in conjunction with a sash structure 11, the latter including a movable vent or transom window frame 12 and an associated fixed window frame 16. The aforementioned frames include glass panes or the like denoted by 14 and 18 respectively. The sash is included within a suitable casing 20. The window operator 10 includes a housing 22 characterized by an open lower end adjacent the fixed window frame 16, and perpendicular thereto. The housing 22 is mounted in overlying relation with window pane 14 and the vent frame 12 associated therewith. Mounting flanges 24 appending from the lateral sides of housing 22 are suitably fastened by means of fasteners 26 to the vent frame 12 as shown in FIGURES 1 and 3 of the drawings.

Attention is directed to FIGURE 2 which illustrates the latch mechanism contained within the housing 22. This mechanism includes a striker generally denoted by 28 which includes an outward portion 30 characterized by an inwardly planar surface 32 and an outward wedge-shaped end portion 34. This latter mentioned wedge portion includes a bearing surface 36 normally disposed in abutting relation with a portion of the fixed window frame 16 which functions as a striker plate when the vent window is closed. An interior recess volume 38 is disposed inwardly of the outward striker portion. An upper striker portion 40 is disposed in spaced relation to the recess 38 and includes an inclined or cam follower surface 41 parallel to the outward striker surface 34, the aforementioned surface 41 bounding the interior recess 38. The inward end portion 42 of the striker 28 includes a cylindrical recess therein for receiving a coil spring 44 which abuts said cylindrical recess at one end thereof and abuts a confronting interior surface of the housing 22 thereby causing an outward bias of the striker 28 from the housing 22.

As will be seen from the figures, a guide pin 48 is received within raised pin retainers 46. An intermediate length of the guide pin 48 is exposed and engaged by an elongated aperture 23 formed within the central portion of cam member which is denoted by the reference numeral 50. This cam member is mounted at one end thereof to a bellows 52, the latter being disposed perpendicularly of the sash 11. The opposite end of the cam member 50 is generally characterized by a truncated triangular end portion 54 disposed inwardly of the housing 22 through the slot 23 formed within the housing side confronting the cam member 50. The upward triangular side of the triangular sides 56 is retained in parallel abutting relation with the edge 41 of the upward striker portion 40. It is noted that the inward end of the cam member 60 is received within the interior recess 38 of the striker 28.

The opposite end of the bellows includes a shaft extension 58 appending outwardly therefrom, said shaft terminating in a retaining lug or button 60. The retaining button is supported within a generally U-shaped slot 62 formed in a first plate portion 64 of an L-plate denoted by 66. The opposite end of the L-plate includes a mounting flange 68 which is secured to the fixed window frame 16 by means of suitable fasteners 70. A removable retaining plate 72 is positioned across the U-shaped slot 72 thereby selectively retaining the button 60 therein. The retaining plate 72 is maintained in secured overlying relation with the plate portion 64 by means of suitable fasteners 74.

The bellows are pneumatically driven through a pipe connector input 76 to which is connected a pneumatic line 78 passing through an aperture 80 formed within the L-plate 68. The opposite end of the pneumatic supply line 78 is connected to a suitable pneumatic source and control which characteristically includes a pump for selectively exerting an intake or exhaust pressure to the supply line 78 through a suitable control switch.

In operation of the device, assuming a closed position of the vent window frame 12, the bellows 52 assume a deflated condition and the outward striker portion 34 is retained in overlying relation with a striker plate portion 81 of the fixed window frame 16. A lower flange portion 82 of the vent frame 12 abuts the opposite surface of the striker plate portion 81 thereby retaining the vent from in coplanar relation with the fixed window frame. When one desires to open the vent window, an appropriate pneumatic control is energized thereby causing inflation of the bellows 52. This in turn causes camming action between the cam member 60 and the surface 41 of the striker 28 resulting in striker retraction into the housing 22. As the bellows 52 continue to expand an outward force is exerted upon the vent frame 12 thereby causing the same to move outwardly to an open position as indicated by reference numeral 84. When return of the vent window to a closed position is desired, the aforementioned suitable pneumatic control is energized which causes a deflation of the bellows 52 causing an inward pulling force to be exerted upon the vent frame 12. It will be noted from FIGURE 2 that the striker 28 is maintained in its retracted position as indicated by reference numeral 86 while the vent window is retained in its open position 84. Return of the vent window to its closed position will cause the striker to project outwardly as the position of the cam 50 varies with respect to the striker cam follower surface 41. However, when contact is made between the inclined striker outer end 34 and the outwardly disposed surface of striker plate 81, the striker is forced inwardly thereby permitting coplanar closing alignment of vent window frame 12 and fixed window frame 16. In this final closed position, the spring loaded striker is cleared of any upward forces and therefore snaps outwardly to retain the vent window in its closed position.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A latch assembly comprising a housing, a striker positioned in the housing, means disposed in the housing for normally protracting the striker outwardly of the

housing bellows mounted adjacent the housing, a cam attached to one end of the bellows for projection into the housing, the striker having a bearing surface for engaging the cam, means for suitably varying the expansion of said bellows and the attached cam which caused inward displacement of the striker, a guide pin fixed to the housing, the cam having a slot formed therein for receiving the pin, the pin serving to retain the cam in engaging relation with the bearing surface of the striker during operation of the latch assembly.

2. A displaceable vent frame and mating fixed frame assembly in combination with a latch assembly, the latter comprising striker means normally disposed in overlying relation with said fixed frame, spring means for yieldably retaining said striker means outwardly in said overlying relation, a housing mounted to said vent frame enclosing said striker means and said spring means, cam means abutting said striker means, bellow means mounted at a first end thereof to said cam, means for expanding said bellow means causing displacement of said cam means for causing retraction of said striker means within said housing, the force of said expanded bellow means further causing an outward displacement of said vent frame from its mating relation with said fixed frame, said fixed frame mounting a bracket at one end thereof, the opposite end thereof securing a second end of said bellow means, and means for selectively deflating said bellow means thereby causing return of said vent frame to its original latched position.

3. The apparatus set forth in claim 2 wherein said fixed frame includes a striker plate portion, and wherein said striker means has a camming surface for contacting said striker plate portion when said camming surface and striker means are displaced from one another within a predetermined distance thereby causing retraction of said striker means within said housing.

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