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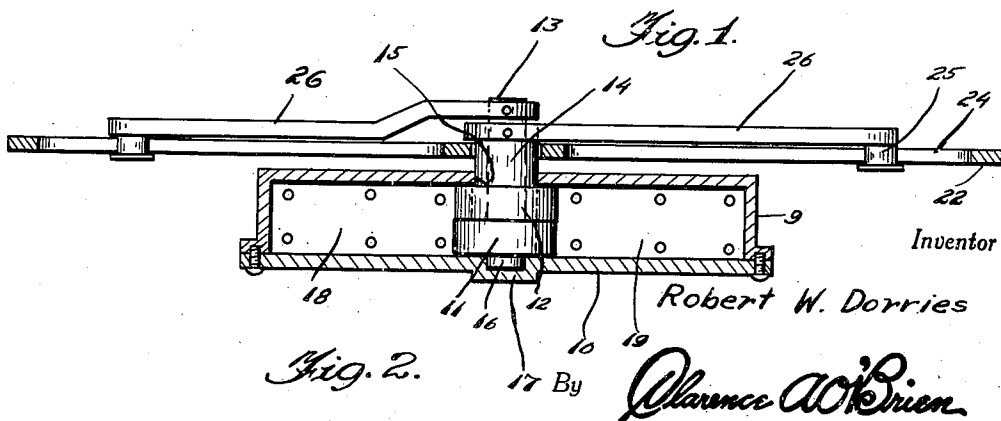
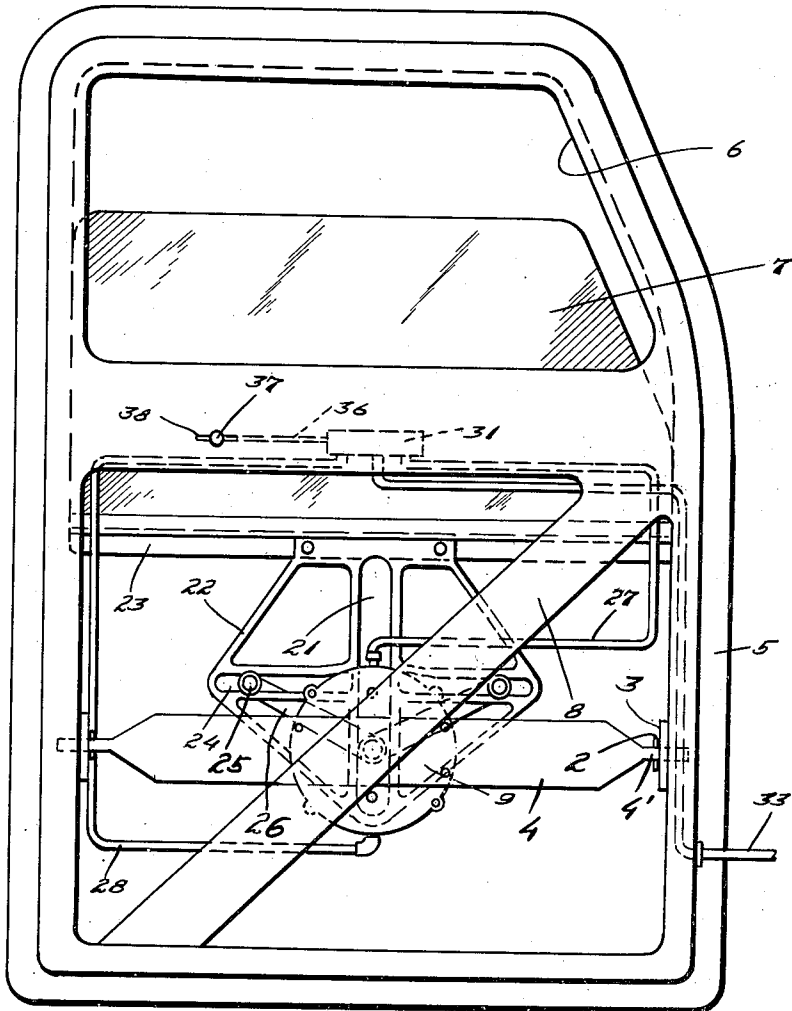
R. W. DORRIES

2,304,245

FLUID ACTUATED WINDOW OPERATOR

Filed Sept. 20, 1940

2 Sheets-Sheet 1



Inventor

Robert W. Dorries

Fig. 2.

By

Clarence A. O'Brien

Attorney

Dec. 8, 1942.

R. W. DORRIES

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Attorney

UNITED STATES PATENT OFFICE

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FLUID ACTUATED WINDOW OPERATOR

Robert W. Dorries, Harrisburg, Ill.

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6 Claims. (Cl. 268-125)

The present invention relates to new and useful improvements in window operating means for windows of the vertically reciprocating type, such as provided for automobiles and other motor driven vehicles, and the invention has for its primary object to provide fluid operated means adapted to provide the moving force for the window.

An important object of the present invention is to provide a disk-like cylinder having a pair of blades swingably mounted therein and having a working fit in the cylinder and which are operatively connected to the window to provide for the raising and lowering movement thereof during opposite movement of the blades and also to subject the blades to fluid means for the actuation thereof.

A further object of the present invention is to provide a mechanism of this character in which either a suction or pressure force may be employed.

An additional object is to provide novel valve control means for the feeding of the fluid to opposite sides of the blade to move the same in a manner for raising and lowering the window.

A still further object is to provide an apparatus of this character of simple and practical construction, which is efficient and reliable in performance, relatively inexpensive to manufacture and install in operative position in the door or window frame of the vehicle and which is otherwise well adapted for the purposes for which the same is intended.

Other objects and advantages reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming part hereof, wherein like numerals refer to like parts throughout, and in which

Figure 1 is a side elevational view of an automobile door having the window mounted in the upper portion thereof and illustrating the invention operatively connected thereto.

Figure 2 is a horizontal sectional view through the fluid cylinder and illustrating the arms operatively connected thereto.

Figure 3 is an enlarged side elevational view of the cylinder with the cover plate removed and showing the frame provided for connecting to the window.

Figure 4 is a fragmentary side elevational view of a modified frame construction for connecting the arms of the blades directly thereto.

Figure 5 is a longitudinal sectional view through the control valve.

Figure 6 is a transverse sectional view thereof, and

Figure 7 is a fragmentary sectional view of the cylinder illustrating one of the adjustable screws to prevent collapsing of the cylinder walls when subjected to the fluid suction.

Referring now to the drawings in detail, and with particular reference to the form of the invention illustrated in Figures 1 to 3 inclusive, the numeral 5 designates an automobile door of conventional construction, which includes the window opening 6 at its upper portion and within which the vertically reciprocating window 7 is mounted.

The usual diagonal frame member 8 is provided for the lower portion of the door and extending horizontally between the sides of the door is a bar 4, having rounded ends 4' inserted in brackets 3 and secured against end play by pins 2. A substantially flat circular cylinder 9 having a removable cover plate 10 is secured flatwise to the bar 4.

A pair of hub members 11 and 12 are positioned in the cylinder, the hub member 11 being provided with a shaft 13 which is rotatably mounted in the hollow shaft 14 formed on the hub member 12, the shafts 13 and 14 being disposed coaxially as shown in Figure 2 of the drawings. The hollow shaft 14 is journaled in an opening in the rear wall of the cylinder 9 as shown at 15 and at the side of the hub member 11 opposite from the shaft 13 is a short shaft extension 16 which is journaled in a recess 17 formed on the inner face of the cover plate 10.

Blades 18 and 19 are secured at one end to the respective hub sections 11 and 12, the blades, in their present embodiment extending radially from the hub sections and are provided at their opposite faces with sheets of packing material 20 adapted to provide an air-tight and liquid-tight working fit with the walls of the cylinder.

The tubular shaft 14 is freely mounted in a slotted opening 21 formed in a frame member 22 which is secured at its upper edge to the bottom frame member 23 of the window. The frame member 22 is also provided with a pair of horizontal slotted openings 24 within which rollers 25 are slidably positioned, the rollers being formed on the outer ends of arms 26-26 which are secured at their inner ends to the respective shafts 13 and 14.

An upper feed pipe 27 has one end communicating with the cylinder 9 above the blades 18 and 19 and a lower feed pipe 28 has one end connected to the cylinder below the blades. The

other ends of the feed pipes communicate with ports 29 and 30 respectively formed in the bottom portion 31 of a sliding valve structure shown in detail in Figures 5 and 6 of the drawings. The bottom 31 of the valve is also provided with an intermediate port 32 with which a supply pipe 33 is connected, the supply pipe leading to a suitable source of fluid pressure or suction (not shown), as desired.

A slide valve 34 is mounted on the bottom 31 of the valve structure, the slide valve being provided with a recess 35 in its bottom surface adapted to provide communication of either the pipes 27 or 28 with the supply pipe 33 through their respective ports. The slide valve 34 is provided with an operating rod 36 having a manipulating handle 37 projecting through a slotted opening 38 formed in the inner side of the door 5.

The upper surface of the slide 34 is provided with a recess 39 within which a ball 40 is adapted to be seated, the ball being yieldably urged into position by means of a spring 41 confined by a bridge piece 42 extending transversely across the top of the slide valve 34. Coil springs 52 engage each end of the valve 34 to normally return the valve to a central position closing both ports 29 and 30 to maintain the window in its adjusted position.

In certain types of door and window construction the frame member 22 may be dispensed with and the horizontally extending slotted openings 43 may be formed in the flange portion 44 of the frame member 45 secured to the lower edge of the window 46 as shown in Figure 4 of the drawings, the slotted openings in this form of the invention being adapted to slidably receive the rollers 25 of the arms 26.

In the operation of the device the suction or pressure of air fed to the pipes 27 and 28 will act upon the blades 18 and 19 to swingably actuate the same whereby to cause a similar movement of the arms 26, thus moving the roller 25 inwardly or outwardly in the slotted openings 24 and thus raise or lower the window. The pipe 33 may be connected to the intake manifold of the engine of the vehicle whereby to employ a vacuum for the actuation of the blades. When utilizing such means for the operation of the device the cylinder 9 may be provided with a quantity of oil 47 above as well as below the blades 18 and 19, whereby to suitably lubricate the walls of the cylinder. In order to prevent entrance of the lubricant into the lower pipe 28 an extension 48 is provided which extends upwardly into the cylinder and is provided with a downturned extremity 49.

In order to prevent possible collapsing of the front and rear walls of the cylinder an adjustable screw 50 is threaded through the cover plate 10 with its inner end abutting the rear wall.

In order to prevent settling of the window downwardly after the same has been raised, the ends of the slotted openings 24 and 43 are provided at their upper edges with upwardly inclined portions 51 to form a seat for the rollers 25.

It is believed the details of construction, operation and advantages of the device will be readily understood from the foregoing without further detailed explanation.

Having described the invention, what I claim is—

1. A window operator comprising a cylinder having co-axial hub members journaled therein, blades secured to the hub members having a

working fit with the walls of the cylinder, fluid actuating means connected to the cylinder adapted to swingably actuate the blades in opposite directions and means connecting the hub members with a portion of the window, said blades being adapted to simultaneously exert a similar force on the window to reciprocally actuate the same upon movement of the blades in both directions.

2. A window operator comprising a cylinder having co-axial hub members journaled therein, blades secured to the hub members having a working fit with the walls of the cylinder, said blades extending radially from the respective hub members and arranged to provide chambers at opposite sides of the blades, fluid actuating means connected to each chamber adapted to swingably actuate the blades in opposite directions relative to each other and means connecting the hub members with a portion of the window to reciprocally actuate the same upon movement of the blades in either direction.

3. A window operator comprising a cylinder having co-axial hub members journaled therein, blades secured to the hub members having a working fit with the walls of the cylinder, fluid actuating means connected to the cylinder adapted to swingably actuate the blades in opposite directions, an arm projecting radially from each hub member outwardly of the cylinder and means connecting the outer ends of the arms to a portion of the window, said blades being adapted to simultaneously exert a similar force on the window for reciprocally actuating the same upon movement of the blades in both directions.

4. A window operator comprising a cylinder having co-axial hub members journaled therein, blades secured to the hub members having a working fit with the walls of the cylinder, said blades extending radially from the respective hub members and arranged to provide chambers at opposite sides of the blades, fluid actuating means connected to each chamber adapted to swingably actuate the blades in opposite directions relative to each other, an arm projecting radially from each hub member outwardly of the cylinder and means connecting the outer ends of the arms to a portion of the window for reciprocally actuating the same upon movement of the blades in either direction.

5. A window operator comprising a casing, a plurality of oppositely movable abutments in the casing defining expansible chambers therein, fluid means connected to the respective chambers to simultaneously subject the abutments to a similar operating influence of the fluid for uniformly moving the abutments in opposite directions, and means outwardly of the casing adapted for connecting the abutments to a slidably mounted window for actuation of the window by the abutments.

6. A window operator comprising a cylinder, a plurality of oppositely movable abutments in the cylinder defining expansible chambers therein, means for mounting the abutments for swinging about the axis of the cylinder, fluid means connected to the respective chambers to simultaneously subject the abutments to a similar operating influence of the fluid for uniformly moving the abutments in opposite directions, and means outwardly of the cylinder adapted for connecting the abutments to a slidably mounted window for actuation of the window by the abutments.

ROBERT W. DORRIES.