Oct. 4, 1938. L. SOLDATTI 2,132,325

HYDRAULIC WINDOW LIFT

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Fig. 1.

Fig. 7.

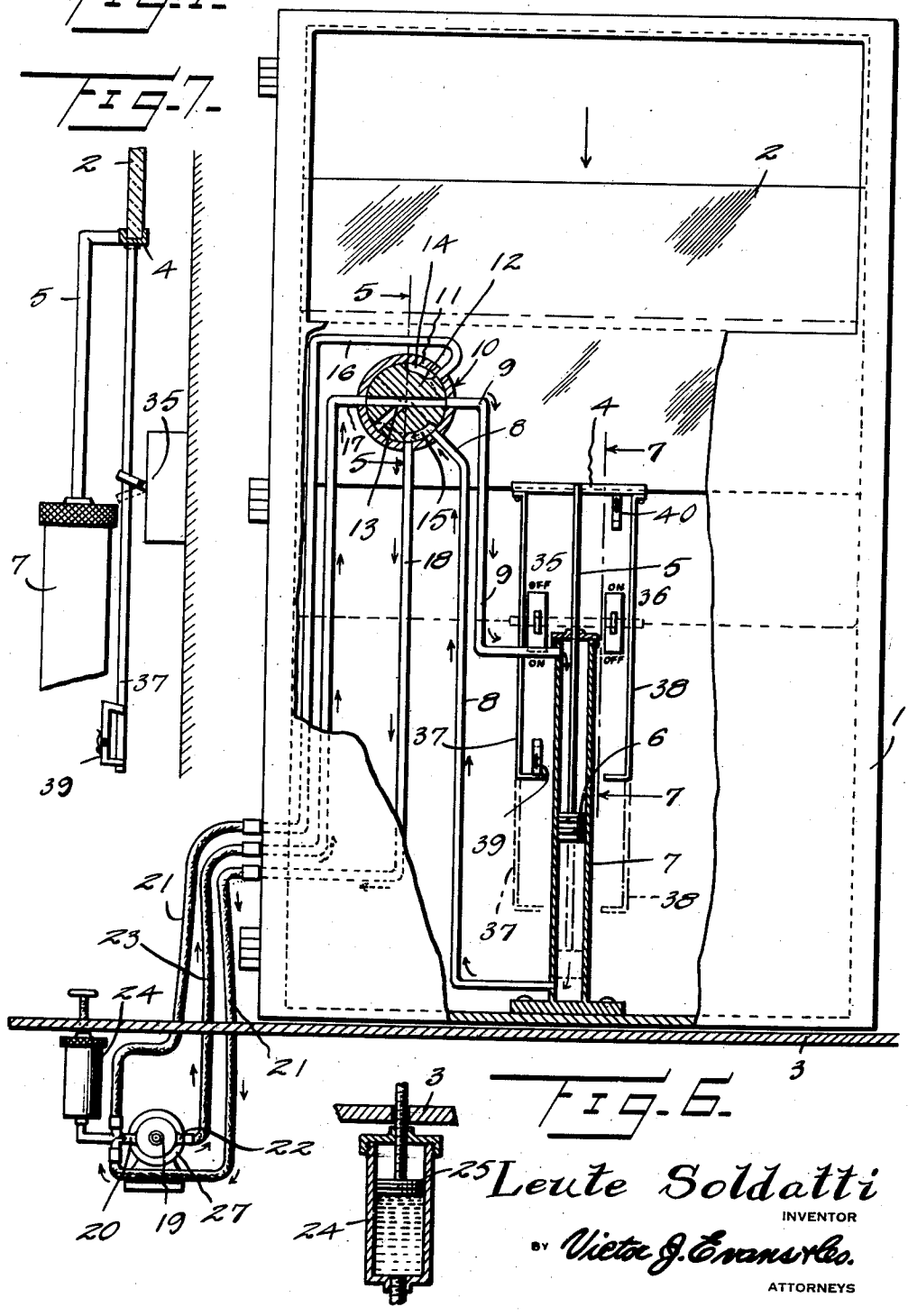


Fig. 6.

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Fig. 2.

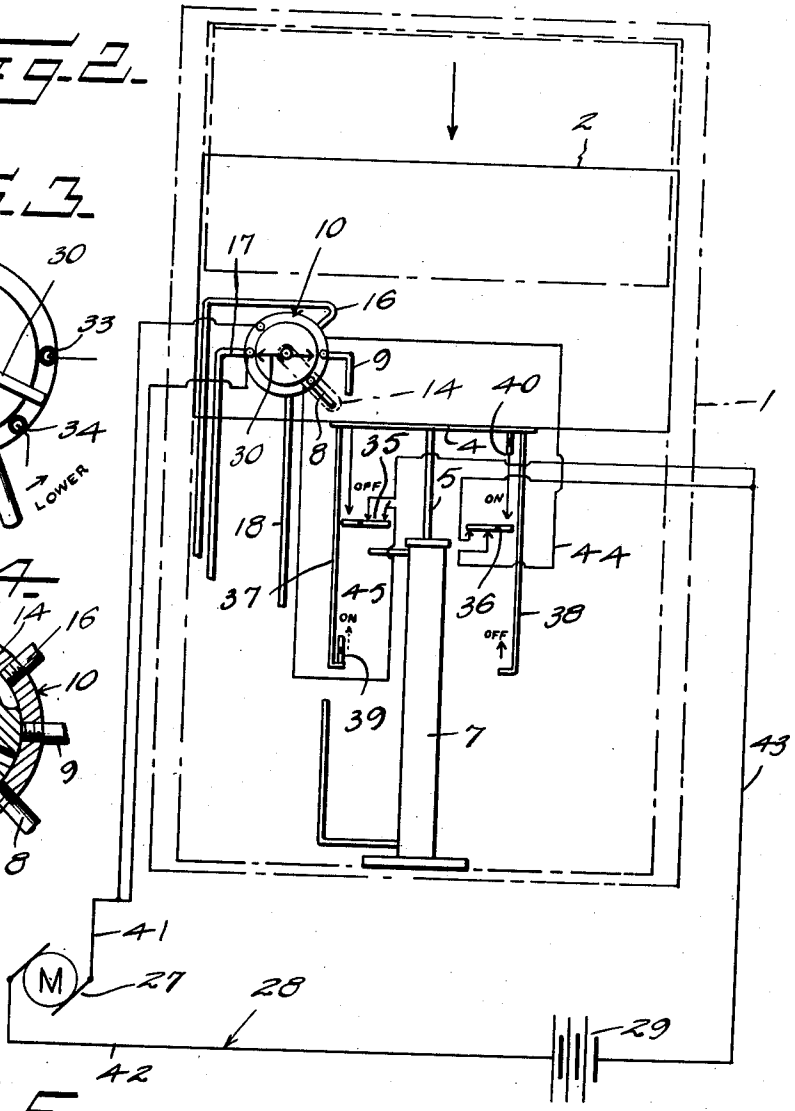


Fig. 3.

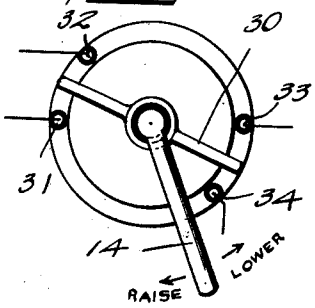


Fig. 4.

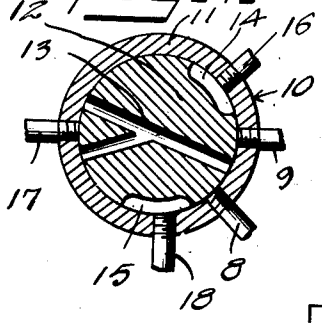
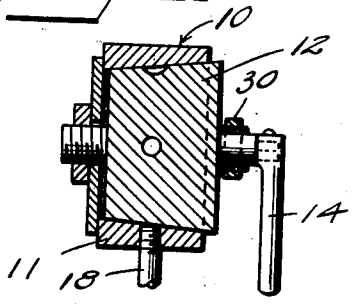


Fig. 5.



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HYDRAULIC WINDOW LIFT

Leute Soldatti, Benld, Ill.

Application September 20, 1937, Serial No. 164,787

1 Claim. (Cl. 268—125)

This invention relates to window lifts whereby windows may be made to open or close at the will of a person and with minimum effort on the part of said person, the primary object of the invention being the provision of a device of this character which includes a hydraulic operating means electrically driven and manually actuated for the starting of the device to either close or open the window and which will automatically stop operation as the window reaches the limit of its movement to open or closed positions and may be manually controlled to stop the movement of a window between either a fully open or closed position.

With these and other objects in view, this invention consists in certain novel features of construction, combination and arrangement of parts to be hereinafter more fully described and claimed.

For a complete understanding of my invention, reference is to be had to the following description and accompanying drawings, in which

Figure 1 is a front elevation partly in section illustrating a window lift adapted to a window and constructed in accordance with my invention.

Figure 2 is a diagrammatical view showing the wiring diagram of the invention.

Figure 3 is a plan view illustrating a combined control valve and switch.

Figure 4 is a sectional view illustrating the valve construction.

Figure 5 is a sectional view taken on the line 5—5 of Figure 1.

Figure 6 is a detail sectional view illustrating a fluid supply means.

Figure 7 is a detail sectional view taken on the line 7—7 of Figure 1.

This invention is especially adapted for the operation of windows of motor vehicles, however, through minor alterations the device may be adapted for the operation of windows of buildings, dwellings and the like.

Referring in detail to the drawings, the numeral 1 indicates a motor vehicle door, 2 the slidable window of said door and 3 the floor of the motor vehicle. A plate 4 is secured to the lower edge of the slidable window or panel 2 and has connected thereto a stem 5 of a piston 6. The piston slides in a cylinder 7 mounted in the door. Connected to the cylinder on opposite sides of the piston 6 are pipes 8 and 9 and they are in turn connected to a control valve 10. The control valve is suitably mounted on the door and includes a housing 11 in which is rotatably mounted a tapered valve element 12 provided with a substantially Y-shaped passage 13 therethrough. The valve element is equipped with a handle 14 for the rotation of the valve element in opposite directions. The valve element is also provided with recesses 14' and 15. The pipes 8 and 9 have communication with the interior of the valve housing and also connected to the latter are pipes 16, 17 and 18.

A fluid pump is indicated generally by the character 19 and the intake 20 thereof is connected to the pipes 16 and 17 by flexible tubes 21. The outlet 22 of the pump is connected to the pipe 17 by a flexible tube 23. The flexible tubes connecting the pipes 16, 17 and 18 to the pump 19 permits the door to swing open and closed. Also connected to the inlet 20 of the pump is a reservoir 24 for the purpose of supplying the pump and pipes as well as the cylinder with fluid. A piston 25 operates in the reservoir whereby the fluid may be forced into the pipes, pump and cylinder 7.

The handle 14 of the valve when moved in one direction will bring the passage 13 to connect pipes 17 and 9 and when moved in another direction will connect the pipes 17 and 8. Thus it will be seen that the fluid can be directed from the pump to either end of the cylinder for the purpose of either raising or lowering the window 2. The pump is operated by an electric motor 27 connected in an electric circuit 28 which includes a battery or other electrical source 29. When the valve is operated to connect the pipes 17 and 9, the recess 15 connects the pipes 8 and 18 so that the fluid in the lower end of the cylinder 7 may return to the pump while the pump is forcing fluid into the upper end of the cylinder to lower the piston. When the valve is operated to connect the pipe 17 with the pipe 8, the recess 14' connects the pipes 16 and 9 so that the fluid in the upper portion of the cylinder 7 may return to the pump while the pump is forcing fluid into the lower end of the cylinder to raise the piston. The valve may be operated to assume a natural position wherein the passage 13 is out of communication with the pipes, then the fluid in the cylinder will be trapped in the cylinder maintaining the window in its position.

The valve includes a switch construction consisting of a contact arm 30 fastened onto the valve element and mounted on and insulated from the valve housing are contacts 31, 32, 33 and 34 connected in the electric circuit. When the contact arm is disengaged from said con-

tacts the circuit is broken to the electric motor. The contact arm assumes the circuit breaking position when the valve is in neutral position.

Carried by the door are switches 35 and 36 each of the snap type, that is, they will remain against accidental movement either in an off or on position. The switches 35 and 36 are connected in the electric circuit. The switch 35 is connected in series with the contact 34 of the switch forming part of the control valve while the switch 36 is connected in series with the contact 33 of said switch which forms a part of the control valve. A switch operating rod 37 is carried by the plate 4 for moving the switch 35 into circuit breaking position when the window reaches its uppermost position. A switch operating rod 38 is carried by the plate 4 for moving the switch 36 into circuit closing position when the window reaches its uppermost position. A pivotally mounted spring pressed trip 39 is carried by the switch operating rod 37 for the purpose of closing the switch 35 after the window has traveled a short distance in a downward direction. A similar trip 40 is carried by the plate for opening the switch 36 when the window reaches the limit of its movement in a downward direction.

In operation, when the window is in a closed or uppermost position, the switch 36 is closed so that when the lever 14 of the valve is moved to connect the pipes 9 and 17 the switch arm 30 bridges the contacts 31 and 33, completing the electric circuit to the electric motor through the switch 36. Fluid entering the upper end of the cylinder 7 from the pump shoves the piston downwardly lowering the window and the fluid in the lower part of the cylinder is displaced by the piston and returns to the pump by way of the pipes 8 and 18. As the window reaches its lowermost position, the trip 40 operates the switch 36 and breaks the circuit stopping the electric motor. As the window starts on its downward movement the trip 39 closes the switch 35 so that when the operator actuates the valve to raise the window by connecting the pipe 17 with the pipe 8 the circuit will be closed by the contact arm bridging the contacts 32 and 34, the switch 35 which is in series therewith having already been closed will set the pump in operation so that the fluid entering the lower end of the cylinder will force the window upwardly to a closed position and as it reaches the closed position the trip 39 opens the switch 35 and the switch arm 38 closes the switch 36. Thus it will be seen that it is only necessary for the operator to move the lever 14 into either of its valve closing positions to start the device to open or close the window and that the device will automatically be stopped when the window reaches either an open or closed position due to the arrangement of the switches 35 and 36 and the operating means therefor. However, the operator may stop a window at any desired time from its movement towards either open or closed position by swinging the valve lever 14 into a neutral position and again start the operation of the device to either fully open or close said window by moving the lever in the proper direction to control the fluid to the cylinder 7 and complete the circuit to the electric motor.

The electric circuit consists of conductors 41 and 42 connected to the electric motor. The conductor 41 is connected to the contacts 31 and 32 while the conductor 42 is connected to the battery 29. A conductor 43 is connected to the battery and to one side of the switches 35 and 36. A conductor 44 is connected to the other side of the switch 36 from the conductor 43 and a conductor 45 is connected to the other side of the switch 35 from the conductor 43. The conductor 44 is connected to the contact 33 and the conductor 45 is connected to the contact 34.

The electric motor and pump as well as the supply reservoir 24 are mounted at any suitable place upon the motor vehicle.

What is claimed is:

In combination with a window construction including a frame opened and closed by a slidable panel, a cylinder carried by said frame, a plate fixed to said panel, a piston operating in said cylinder and connected to said plate, a fluid system including a pump connected to opposite ends of the cylinder and a control valve for directing fluid from the pump to either end of the cylinder and permitting fluid to return to said pump from the cylinder, an electric motor for driving said pump, an electric circuit including a source of electrical energy connected to said motor, a double pole switch for said circuit and operated by the movements of said valve, a pair of switches connected in said circuit and one switch of said pair of switches connected in series with one pole of the double pole switch and the other switch of the pair of switches connected in series with the other pole of the double pole switch, a pair of spaced switch actuating arms carried by said plate for actuating said pair of switches in a manner to alternately close and break the respective circuits therethrough, and a pair of trips, one carried by said plate and the other mounted on one of said switch arms, said trips arranged to actuate said pair of switches in a manner to alternately break and close the circuits thereof after actuation of said pair of switches by said arms whereby the motor will be automatically stopped on the panel reaching frame closing position and frame opening position and automatically setting said circuit to be closed by said first mentioned switch on the next actuation of the control valve.

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