Aug. 16, 1927. 1,638,897

W. VAUGHAN

WINDOW OPERATING DEVICE

Filed May 23, 1925 2 Sheets-Sheet 1

Fig. 1.

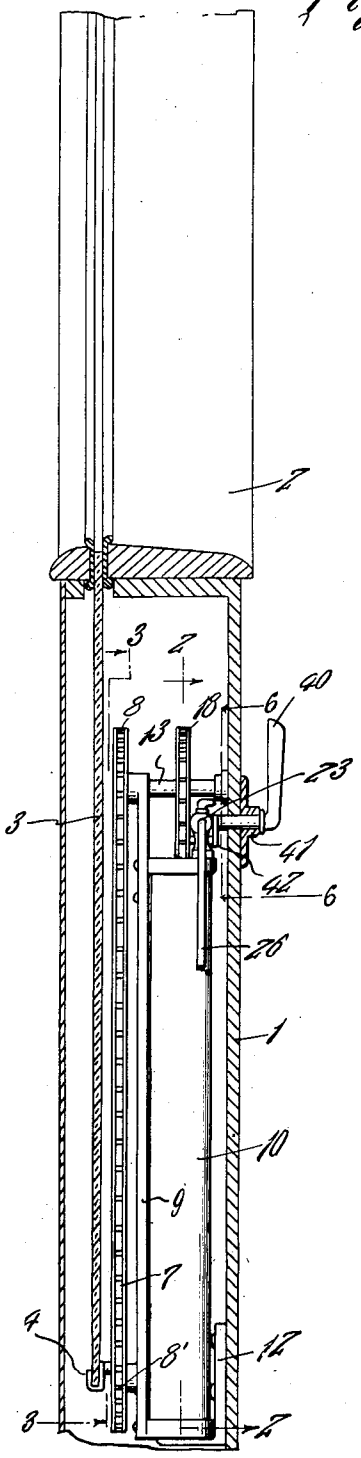


Fig. 5.

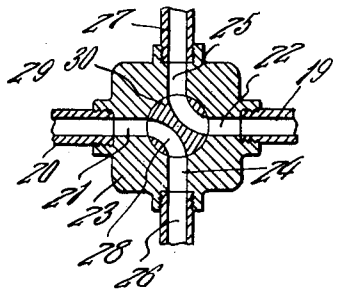
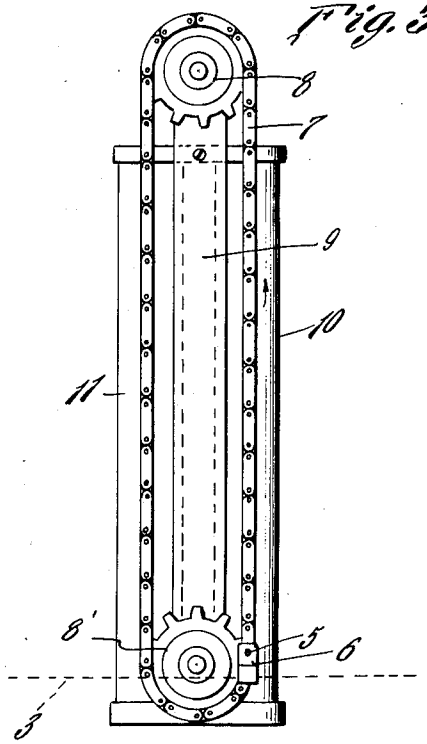


Fig. 3.



William Vaughan
INVENTOR

BY Victor J. Evans
ATTORNEY

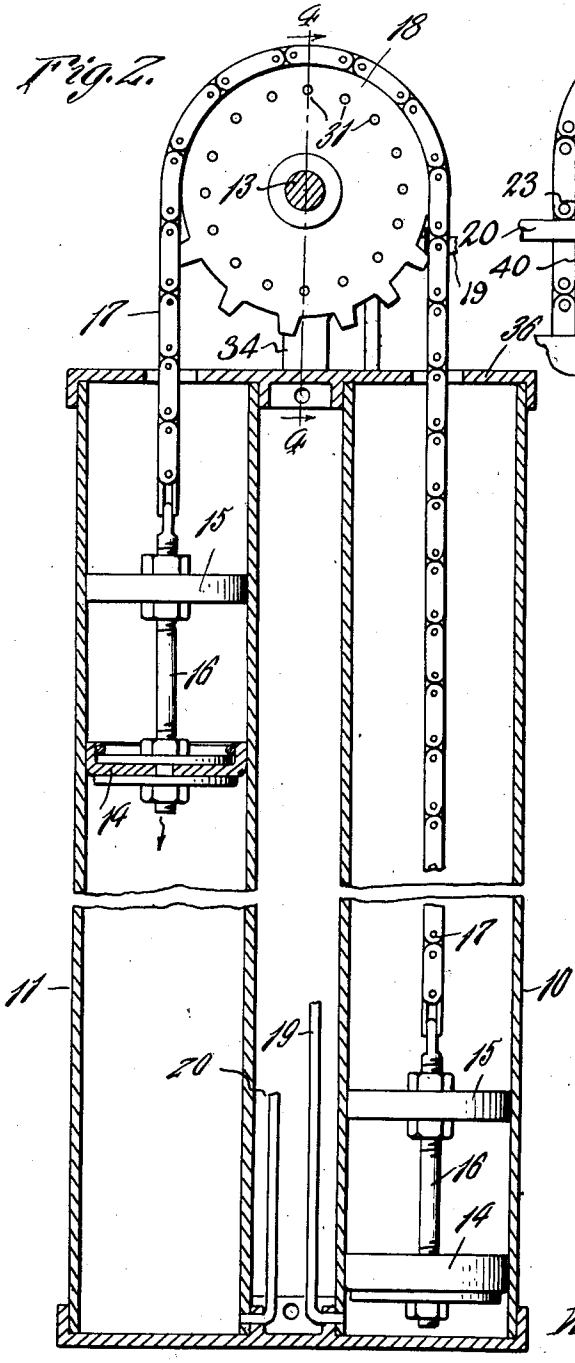
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WINDOW OPERATING DEVICE

Filed May 23, 1925 2 Sheets-Sheet 2

Fig. 2.



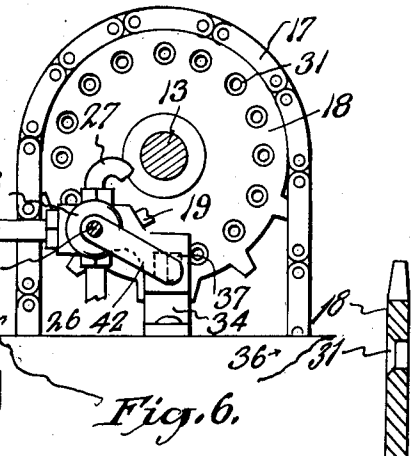


Fig. 6.

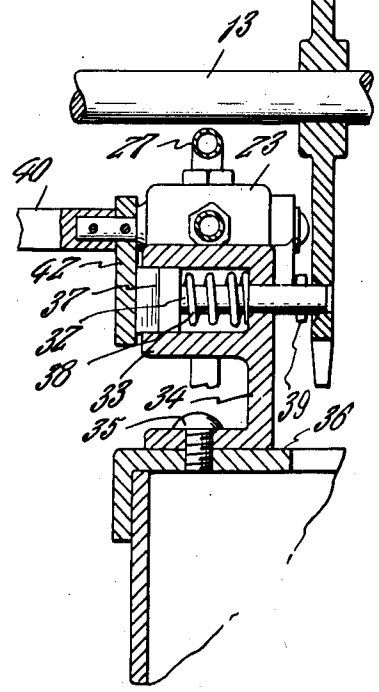


Fig. 4.

William Vaughan-

INVENTOR

BY Victor J. Evans

ATTORNEY

Patented Aug. 16, 1927. 1,638,897

UNITED STATES PATENT OFFICE.

WILLIAM VAUGHAN, OF SALEM, OHIO.

WINDOW-OPERATING DEVICE.

Application filed May 23, 1925. Serial No. 32,471.

My present invention has reference to a pneumatic means for raising or lowering sashes.

My improvement is particularly directed to means for raising and lowering the sashes in closed automobiles or other motor operated vehicles, and in carrying out my invention I make use of a vacuum created in the intake manifold of the engine for the automobile, by establishing valve controlled pipes between the said manifold and cylinders in which there are pistons connected together by a flexible element, the movement of which imparts motion to means for raising and lowering the sash, the valve being of such a construction as to destroy the vacuum in one of the cylinders and to establish a communication between said cylinder and the atmospheric air to equalize the air pressure in this cylinder and to unequalize the air in the second cylinder to cause the pressure of air entering said cylinder to act on the piston therein to move the said piston and thereby actuating the sash operating means.

A further object is the provision in a device for this purpose, of means for locking the mechanism against actuation so that the sashes or panes may be locked either opened, closed or when in partly closed positions, the mechanism being also such as to prevent the rattling of the sashes.

To the attainment of the above broadly stated objects and others which will present themselves as the nature of the invention is better understood, reference is to be had to the drawings which accompany and form part of this application.

In the drawings:—

Figure 1 is a vertical transverse sectional view through a door, or other portion of an automobile having a slidable sash actuated in accordance with this invention.

Figure 2 is a sectional view approximately on the line 2—2 of Figure 1.

Figure 3 is a view looking in the direction of the arrow supplied on the line 3—3 of Figure 1.

Figure 4 is a fragmentary sectional view on line 4—4 of Fig. 2 showing the means for locking the sash in any desired position.

Figure 5 is a horizontal sectional view through the valve.

Figure 6 is a view of the locking device.

A portion of the side of the body of an automobile of the closed type is indicated by the numeral 1 in Figure 1 of the drawings. The body is hollow, and in the showing of the said Figure 1, the section is taken in a line with that portion of the body provided with a window opening, the casing for which being indicated by the numeral 2. The casing is provided with the usual slots through which the panes of glass 3, that provides the sash, moves. In the present instance, the sash 3 has secured on its lower edge a substantially U-shaped bracket 4 and this bracket has its inner portion secured by a link or like element 5 to a block or enlargement 6 on one of the links of an endless chain 7. The chain is trained around upper and lower sprocket wheels 8 and 8′, respectively. The shafts for the sprocket wheels are journaled in suitable bearings which are preferably provided on the ends of a plate 9 secured between two spaced but connected cylinders 10 and 11, respectively.

The cylinders and the endless chain are arranged in the hollow portion of the body 1, and the said cylinders are supported in the said body by a lower angle bracket 12 and the bearing for the shaft 13 of the upper sprocket wheel 8, the said shaft 13 being held in its bearing for free rotary but against longitudinal movement.

In each of the cylinders 10 and 11 there are weighted pistons. Each piston includes a lower head 14 and an upper head 15, there being an adjustable stem connection 16 between the said heads. The lower head is in the nature of spaced discs having a cup washer therebetween, while the upper heads 15 may be likewise provided with washers but are essentially in the nature of guide discs. The stems 16 have secured to their upper portions the end links of a chain 17. This chain is trained through suitable openings for the closed top members for the cylinders 11 and is guided around a sprocket wheel 18 which is fixed on the shaft 13.

Communicating with ports adjacent to the bottom of the cylinders 10 and 11, there are pipe members 19 and 20, respectively. These pipes communicate with oppositely arranged ports 21 and 22 in a valve casing 23. The valve casing has aligning ports 24 and 25 arranged at a right angle to the ports 21 and 22. The port 24 has a pipe connection 26 with the intake manifold of the engine for the automobile (not shown). The port 25 has connected thereto a pipe connec-

tion 27 communicating with the atmosphere. The valve 28 in the casing is of the plug type and is provided with two curved passages 29 and 30, respectively. In the showing of Figure 5 of the drawings the valve 28 is turned so as to establish a communication between the pipes 20 and 26 and establish a vacuum between the cylinder 11 and the manifold of the engine. This turning of the valve also establishes a communication between the pipe 19 of the cylinder 10 and the pipe 27 which communicates with the atmosphere. Thus the atmospheric pressure in the cylinder 10 is equalized, but in the cylinder 11 there is an air pressure of atmospheric air against the head 15 of the piston in the said cylinder 11. This causes the piston in the said cylinder 11 to move downwardly in the direction of the arrow in Figure 2. This movement draws on the chain 17, revolves the sprocket wheel 18 to cause the chain 11 to move in the direction of the arrow in Figure 2 and thereby slide the sash 3 to closing position. The movement of the piston in the cylinder 11 is accelerated by the weight of the said piston and any suction which may be created in the intake manifold. As the piston in the cylinder 11 is lowered the piston in the cylinder 10 is raised and by turning the valve 28 to connect the cylinder 10 with the manifold and the cylinder 11 with the atmosphere, the air pressure in the said cylinder will be equalized and the atmospheric air entering through the opening in the top of the cylinder 10 will act on the piston therein to lower the same. This actuates the mechanism for moving the sash in the second direction.

It is an important feature of my invention to provide means for locking the sash in any desired position. Therefore, I provide the sprocket wheel 18 with circumferentially arranged equi-distantly spaced openings 31. Preferably one face of the wheel is reamed around these openings. Designed to be received in one of the said openings there is a spring influenced plunger 32. This plunger is movable through a compartment in a block 33 that is preferably formed on one side of the valve casing 23. The block is preferably formed with an angle depending bracket 34, which is secured, by means 35, to the top of a connecting cap 36 for the cylinders 10 and 11. The plunger 32 has a headed end 37 that is normally projected by the spring 38 through the opening or compartment in the block. The plunger is provided with a stop pin 39 which limits the longitudinal movement thereof when influenced by the spring 38. The operating handle for the valve 28 is of the usual angle formation, and is indicated by the numeral 40. The shaft portion of the handle passes through a suitable bearing plate 41 on the inner face of the body 1, and the shaft end thereof is formed with a laterally extending finger 42. This finger 42 is in the path of contact with the head 37 of the plunger 32 when the valve 28 is moved to bring its passages 29 and 30 out of communication with the ports in the valve casing. Thus the plunger will be brought into one of the openings 31 and the wheel 18 and consequently the remainder of the structure will be prevented from movement in any direction.

My improvement is of a type that may be applied to any closed automobile. The improvement is simple and the parts constituting the same may be inexpensively constructed and operatively arranged, and the manifest advantages of my device will be perfectly apparent to those skilled in the art to which the invention relates. The description and drawings disclose merely a satisfactory embodiment as it now appears to me and, therefore, I desire it to be understood that I am not to be restricted thereto and may make any such changes therefrom as fairly fall within the scope of what I claim.

Having described the invention, I claim:—

1. In combination, means for sliding a window sash including a rotatable shaft, a sprocket wheel mounted on said shaft, spaced cylinders, weighted pistons operating in said cylinders, a chain trained over said sprocket and terminally connected with said pistons, means for creating a vacuum below the piston in either cylinder, means for equalizing the air pressure on both sides of the piston in the other cylinder, and means cooperating with said sprocket wheel for holding the sash immovable in a given position.

2. In combination, means for sliding a window sash, including a rotatable shaft, a sprocket fixed thereon and provided with a circumferential series of spaced openings, spaced cylinders, weighted pistons operating in said cylinders, a chain trained over said sprocket and having its terminals connected with said pistons, means for creating a vacuum below the piston in either one of the cylinders, means for equalizing the air pressure on both sides of the piston in the other cylinder, a pin mounted for sliding movement, means for moving said pin into one of the openings of said sprocket for holding the latter and its shaft against rotation, and yieldable means for retracting said pin when the latter is released from the last mentioned means.

3. In combination, means for sliding a window sash, including a rotatable shaft, a sprocket fixed thereon and having a circumferential series of openings therein, spaced cylinders, weighted pistons in each cylinder, a chain trained over said sprocket and having its terminals connected with said pistons, valve controlled means for creating a vacuum below the piston in either one of

the cylinders, means for equalizing the air pressure on both sides of the piston in the other cylinder, a handle for operating said valve, a pin mounted for sliding movement, means projecting from said handle for moving said pin in one direction and into one of the openings in said sprocket, whereby the shaft therefor is held against rotation in one position of the valve, and yieldable means for retracting said pin when the valve is moved to its other position.

In testimony whereof I affix my signature.

WILLIAM VAUGHAN.