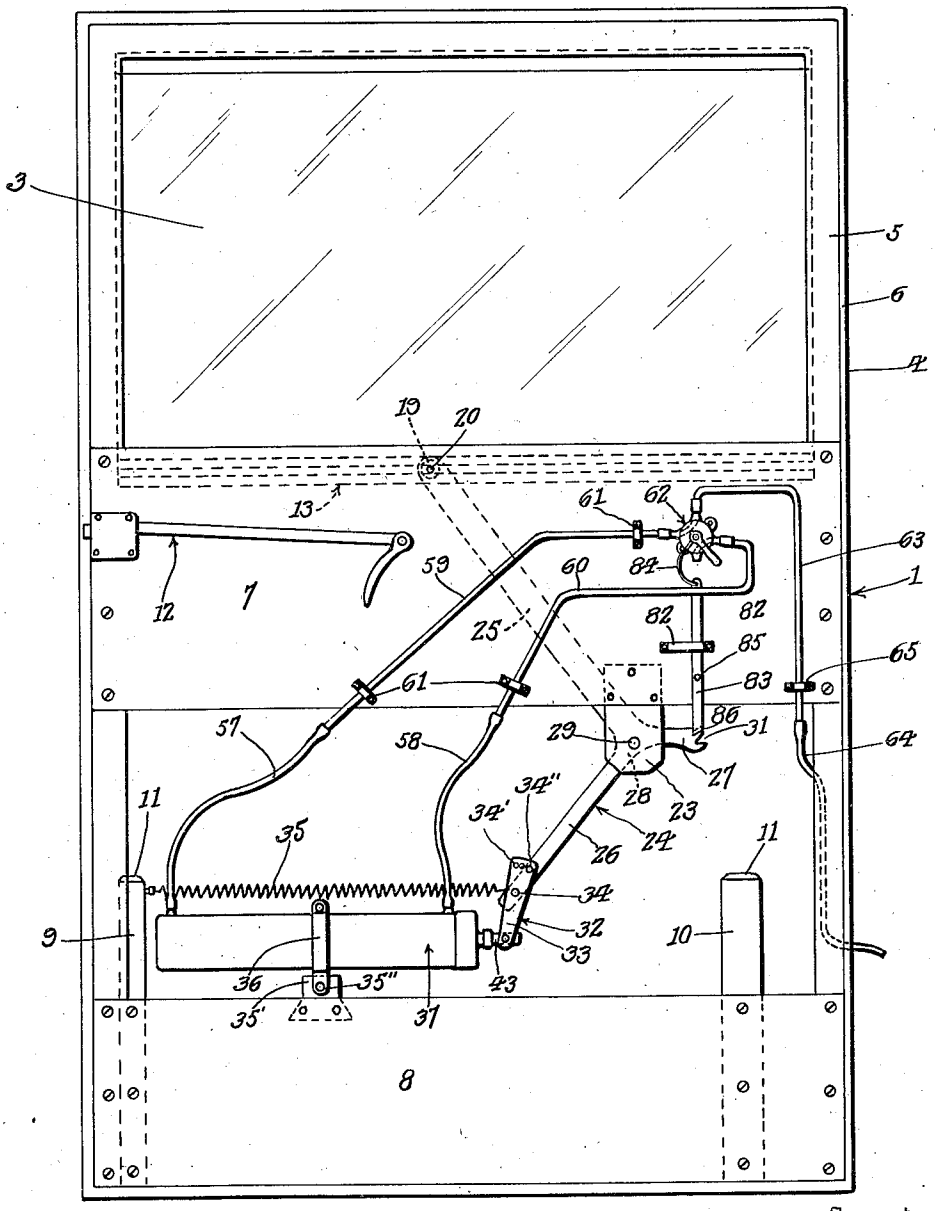
Sept. 5, 1933. W. A. BRACKEN 1,925,976

ELEVATING AND LOWERING MECHANISM

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Fig. 1.



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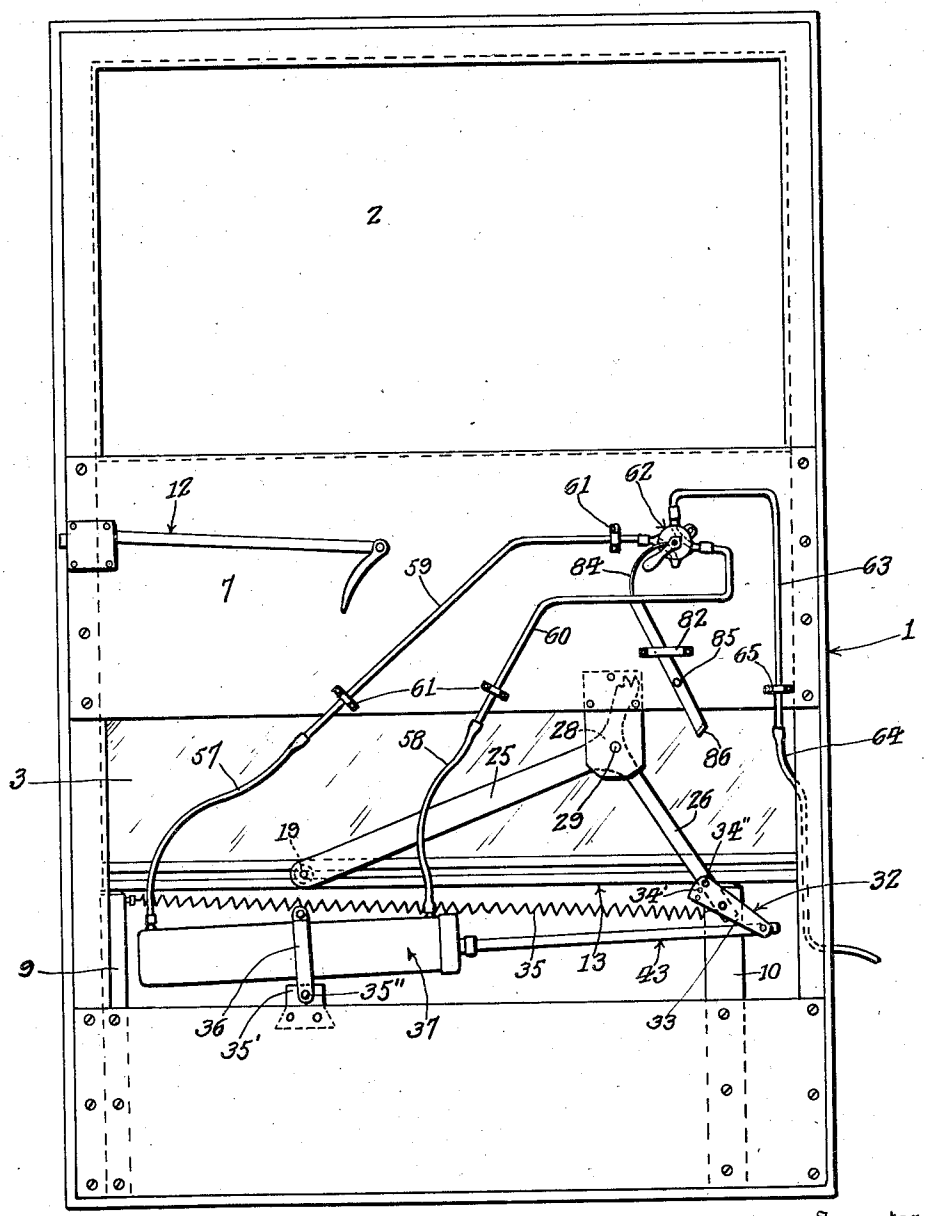
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ELEVATING AND LOWERING MECHANISM

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Fig. 2.



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ELEVATING AND LOWERING MECHANISM

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Fig. 3.

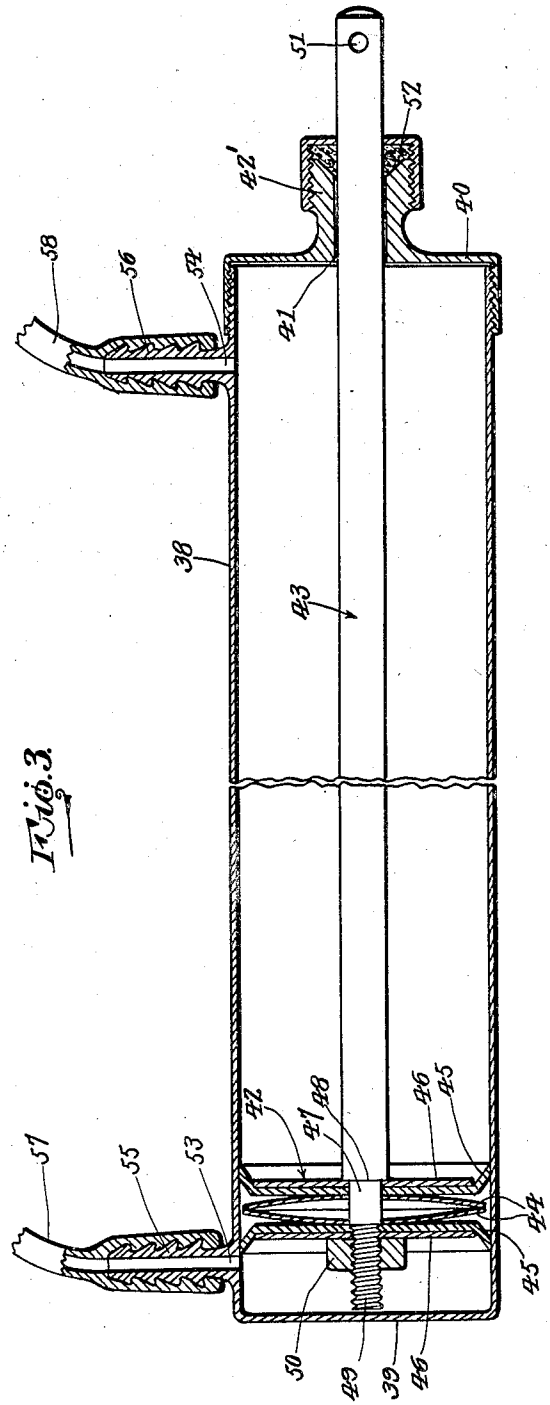


Fig. 6.

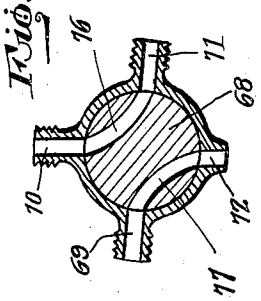


Fig. 5.

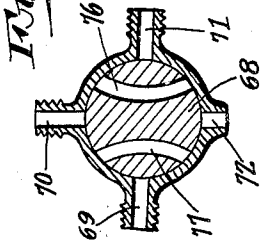
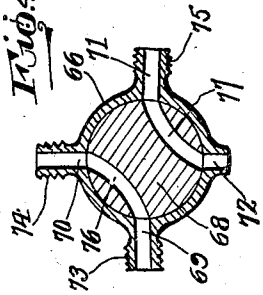


Fig. 4.



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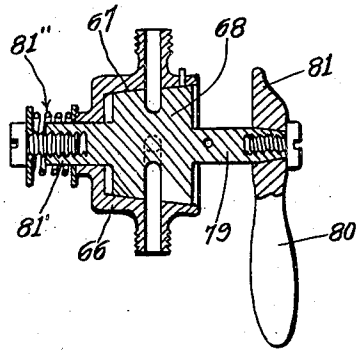
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Fig. 7.



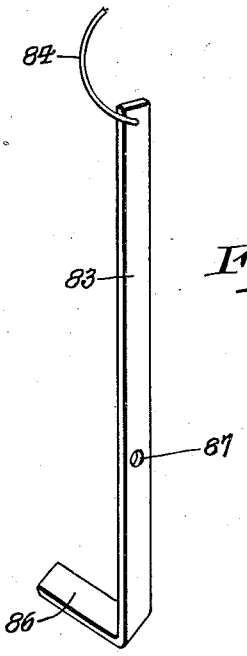


Fig. 8.

Fig. 9.

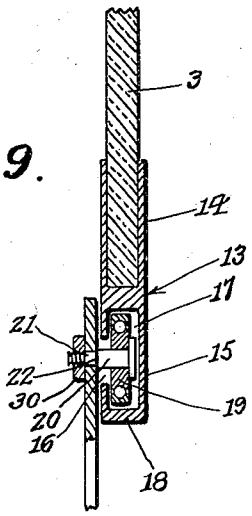


Fig. 10.

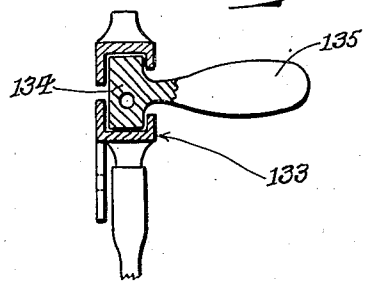
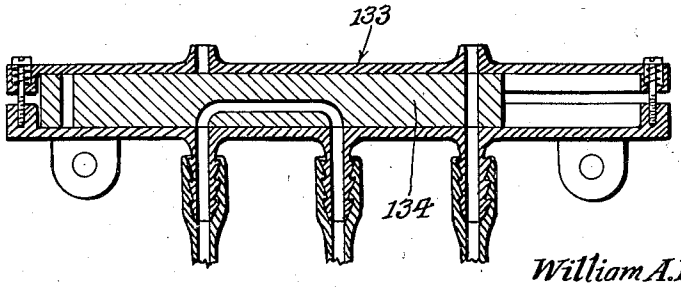


Fig. 11.



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Patented Sept. 5, 1933 1,925,976

UNITED STATES PATENT OFFICE

1,925,976

ELEVATING AND LOWERING MECHANISM

William A. Bracken, Little Rock, Ark., assignor, by direct and mesne assignments, of one-eighth to Lawrence B. Burrow and one-eighth to Aristo Brizzolara, Jr., and one-fourth to Alfred G. Kahn, all of Little Rock, Ark.

Application March 15, 1932. Serial No. 599,011

3 Claims. (Cl. 268—125)

This invention relates to an elevating and lowering mechanism designed primarily for use in connection with the glass in windows and doors of automobiles, but it is to be understood that a mechanism, in accordance with this invention may be employed in any connection for which it is found applicable, and the invention has for its object to provide, in a manner as hereinafter set forth, a mechanism of the class referred to, capable of being controlled by an occupant of and actuated from the suction stroke of the engine of the vehicle for elevating and lowering the glass when it is desired.

Further objects of the invention are to provide, in a manner as hereinafter set forth, a mechanism of the class referred to which is comparatively simple in its construction and arrangement for the purpose intended therefor, strong, durable, thoroughly efficient in its use, readily installed, conveniently controlled and comparatively inexpensive to manufacture.

To the above ends essentially and others which may hereinafter be set forth, the invention consists of such parts, and such combination of parts which fall within the scope of the invention as claimed.

In the drawings:—

Figure 1 is a side elevation of an elevating and lowering mechanism showing the adaptation thereof with respect to a window glass of a front door of an automobile and with the glass in an elevated position.

Figure 2 is a view similar to Figure 1 with the glass in a lowered position.

Figure 3 is a longitudinal sectional view of the suction operated actuating element for the glass elevating and lowering lever.

Figures 4, 5 and 6 are sectional details illustrating the several positions of the controlling valve.

Figure 7 is a longitudinal section of the controlling valve.

Figure 8 is a perspective view of the resilient suspended latching member.

Figure 9 is a sectional detail illustrating the connection between the elevating and lowering lever and the glass.

Figures 10 and 11 are respectively a cross section and a longitudinal section of a modified form of controlling valve.

Referring to Figures 1, 2, and 9 of the drawings, 1 denotes the front door of an automobile provided with a window opening 2, adapted to be opened and shut by a vertically movable glass 3 slidably mounted in a known manner in the door 1, and as shown the latter includes a rectangular frame 4 of angle shape cross section including an inner flange 5, and an outer flange 6 disposed at right angles to each other. Secured against the flange 5 and abutting flange 6 is a rectangular supporting plate 7 positioned intermediate the ends of frame 4. Arranged at the bottom of the latter, seated upon the bottom and abutting the sides of flange 6 is a rectangular plate 8, the latter being secured against the sides of flange 5. Secured to plate 8 and extending above the top edge thereof is a pair of spaced standards 9, 10, each having a cushioning element 11 arranged at the top thereof which provide cushioning abutments for arresting the lowering movement of the glass 3, see Figure 2. A door latch and operating means therefor, as indicated at 12 is attached to plate 7. The lower end of glass 3 has attached thereto a track forming element 13 having a bifurcated upper part 14 to receive the lower portion of glass 3 and a lengthwise chambered lower track forming part 15 provided in one side thereof with a lengthwise extending opening 16 communicating with the chamber 17 formed in part 15. The bottom wall 18 of chamber 17 provides a track for a trolley 19 which includes a shaft 20 extended through and projected from opening 17. The shaft 20 has a reduced cylindrical smooth part 21 and an outer peripherally threaded reduced part 22 extended from part 21. The purpose of the track forming part 15 and trolley 19 will be presently referred to. The element 13 and glass 3 opposes the forward side of plate 7.

With reference to Figures 1 and 2, there is illustrated a hanger 23 which is secured to the forward face of and depends below the bottom edge of plate 7, at a point between the vertical median of the latter and the hinged side of the door. Opposing the forward face of plate 7 and the hanger 23, as well as depending below the latter is an elevating and lowering lever 24 for the glass 3. The lever 24 includes an upper inclined arm 25, a lower inclined arm 26 of less length than that of the latter, and an intermediate laterally extending arm 27 of less length than that of either arm 25, 26. The inner ends of the arms merge into each other as at 28. The arms 25, 26 are disposed at approximately right angles, and when lever 24 is in elevated position, such arms extend in a direction towards the non-hinged side of the door, and arm 27 extends towards the hinged end of the door. When lever 24 is in its lowered position, arms 25, 26 extend towards plate 8 and arm 27 towards plate 7. The

lever 24 is pivoted, at the point of joinder 28, between the inner ends of the arms to the lower portion of hanger 23, as at 29. The outer end of arm 25 is pivotally mounted upon part 21 of trolley shaft 20 and retained thereon by a holding nut 30 which is secured to part 22 of shaft 20. The outer end of arm 27 is formed with a set of ratchet teeth 31 for a purpose to be referred to.

The outer end of arm 26 includes an adjuster 32, whereby means is provided for controlling the length of the stroke of piston rod 43 to be hereinafter particularly described. The adjuster 32 comprises a triangular shaped plate 33 pivoted intermediate its ends, as at 34 to arm 26. The wide end of plate 33 is formed with a row of openings 34' and extending through a selected opening 34' and arm 26 is a detachable holdfast means 34''. The adjuster 32, owing to the openings 34' can be adjustably positioned at an inclination with respect to arm 26 or set to form a lengthwise continuation of the latter. The adjuster 32 is connected to standard 9 by a coiled spring 35.

Secured to the forward face of plate 8 and extended thereabove is a bracket 35' to which is pivotally connected, as at 35'' the bottom of an upstanding clamping device 36 which encompasses and is secured to a suction operated actuating element 37 for the lever 24. With reference to Figure 3, the element 37 includes a cylinder 38 having a fixed head 39 for closing one end thereof. Threadedly engaging with the periphery of cylinder 38, at the other end thereof, is a head 40, in the form of a flanged cap provided with an axial opening 41 and an outwardly directed peripherally threaded short sleeve 42' having its inner face registering with the wall of opening 41. Operating with cylinder 38 is an actuating means for lever 24 consisting of a piston head 42 and a piston rod 43. The piston head 42 includes a pair of abutting, oppositely disposed, resilient, circular, axially apertured spreader members 44 of concavo-convexed cross section. Positioned against the outer faces of members 44 are flexible packing cups 45 which are oppositely disposed with respect to each other. The cups 45 ride against the inner face of cylinder 37 and have snug engagement therewith. Arranged in each cup 45 is an axially apertured disc 46.

The rod 43 has a smooth reduced part 47 which provides a shoulder 48. Extended from part 47 is a peripherally threaded inner end terminal portion 49 for the rod. The part 47 extends through a disc 46, a cup 45 and the members 43. The other cup and disc is mounted on portion 49. The disc 46 on part 47 abuts shoulder 48. A clamping nut 50 engages with portion 45 and abuts the disc 46 on the latter. The rod 43 extends through opening 41 and sleeve 42, as well as projects outwardly from the latter and has its outer end formed with an opening 51. Packing means, as at 52 is secured to sleeve 42.

The cylinder 38 in proximity to each end thereof is formed with an opening for alternate communication with the suction forming means and the atmosphere. The openings are indicated at 53, 54. Formed integral with cylinder 38 are peripherally threaded nipples 55, 56 which register respectively with the openings 53, 54. Attached to the nipples 55, 56 are flexible pipe branches 57, 58 respectively. Connected to the pipe branches 57, 58 are rigid pipe branches 59, 60 respectively which are attached to the rear face of plate 7 by keepers 61.

Secured to the rear face of plate 7 is a controlling valve device 62 for the element 37. The pipe branches 59, 60 open at spaced points into the valve device 62. Leading from the latter is a suction line 63 which communicates with the intake manifold, not shown, of the engine of the automobile. The line 63 extends through the frame 4 at the hinged end of the door and includes a rigid and a flexible section 63, 64 respectively, the former being secured to plate 7 by a keeper 65 and opens into the valve device 62 between the pipe branches 59, 60. The valve device 62 is for alternately establishing communication between the pipe branches 59 and 60 with suction line 63 and also is employed for establishing communication between the branches 59, 60 with the atmosphere.

With reference to Figures 4, 5, 6 and 7, the valve device 62 is shown, as consisting of a housing 66 providing a tapered chamber 67 for a rotatable controlling valve 68 which is in the form of a tapered plug. The housing 66 is formed with openings 69, 70, 71 and 72 arranged equi-distant with respect to each other. Integral with housing 66 are peripherally threaded nipples 73, 74 and 75 which register with openings 69, 70 and 71. The opening 72 communicates with the atmosphere. Attached to the nipples 73, 74 and 75 are the pipe branch 59, suction line 62 and pipe branch 60. The valve 68 is formed with a pair of curved ports 76, 77, the former functioning to establish communication between the nipples 74 and 73 and between nipples 74 and 75. The port 77 functions to establish communication between nipple 73 and opening 72 and between nipple 75 and opening 72. The valve 68 has its largest end formed with a stem 79 to which is fixed a handle member 80 provided with a pointer 81. The valve 68 at its smallest end is formed with a tubular extension 81' to which is attached an adjustable spring controlled device 81'' for adjustably connecting the valve 68 to the housing 66.

Pivotally attached to the plate 7 in proximity to the bottom thereof and extending through a stop member 82 which is also secured to plate 7, is a latching bar 83 which coacts with the ratchet teeth 31 to detachably secure the glass 3 at a short distance from the top of the window opening 2 for the purpose of ventilation. The bar 83 is connected to the stem of the controlling valve by a bow-shaped controlling spring 84. In Figure 2 of the drawings, bar 83 is shown in inoperative position and in Figure 1 in latching position. The teeth 31 provide for varying the distance between the top of the glass 3 and top of the window opening 2. The pivot between bar 83 and plate 7 is indicated at 85. The bar 83 has an angularly disposed lower end 86 which is to selectively engage the teeth 31. Bar 83 has an opening 87 for the passage of pivot 85. When the valve stem of valve 68 is shifted for the lowering of the glass, the spring 84 releases the bar 83.

When using a window elevating and lowering mechanism in accordance with this invention in connection with the device now used on vehicle windows, it is necessary to remove the spring in the clutch or locking device and by doing this, it enables a mechanism in accordance with this invention to run the glass up and down.

Figures 10 and 11 illustrate a four way controlling valve mechanism 133 including a slide valve 134 provided with a handle 135. The mechanism

133 can be substituted for the controlling valve 62.

What I claim is:—

1. A suction operated elevating and lowering mechanism for a vertically movable window glass comprising, a suction operated actuating element including a reciprocatory member, a glass elevating and lowering lever formed of three arms, one of said arms being attached with said member for operating the lever, another of said arms being connected with the bottom of the glass and the other of said arms having ratchet teeth, means for pivotally supporting said lever at the point of joinder of said arms, a manually operable valve for controlling the movement of said member in opposite directions by simultaneously establishing communication between said element and the atmosphere and a suction source, and a means coacting with said teeth for latching said lever in selected position.

2. A suction operated elevating and lowering mechanism for a vertically movable window glass comprising, a suction operated actuating element including a reciprocatory member, a pivotally mounted window glass elevating and lowering lever, adjustable means for connecting said lever with said member and for controlling the stroke of the latter, means for slidably connecting the lever with the bottom of the window glass, a tension spring for the lever anchored at one end and having its other end attached to said adjustable connecting means, and a manually operable valve for controlling the movement of said member in opposite directions by simultaneously establishing communication between said element and the atmosphere and a suction source, said lever including a pair of arms approximately at right angles, one being attached to said adjustable connecting means and the other to said slidable connecting means.

3. A suction operated elevating and lowering mechanism for a vertically movable window glass comprising, a suction operated actuating element including a reciprocatory member, a pivotally mounted window glass elevating and lowering lever, adjustable means for connecting said lever with said member and for controlling the stroke of the latter, means for slidably connecting the lever with the bottom of the window glass, a tension spring for the lever anchored at one end and having its other end attached to said adjustable connecting means, and a manually operable valve for controlling the movement of said member in opposite directions by simultaneously establishing communication between said element and the atmosphere and a suction source, said lever including a pair of arms approximately at right angles, one being attached at its outer end to said adjustable connecting means intermediate the ends of the latter and the other attached at its outer end to said slidable connecting means, said adjustable connecting means and that arm attached thereto having coacting means for anchoring the adjustable connecting means in adjusted position.

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