July 17, 1951 J. B. PARSONS 2,560,976

WINDOW REGULATOR

Filed Jan. 8, 1947

Fig. 1

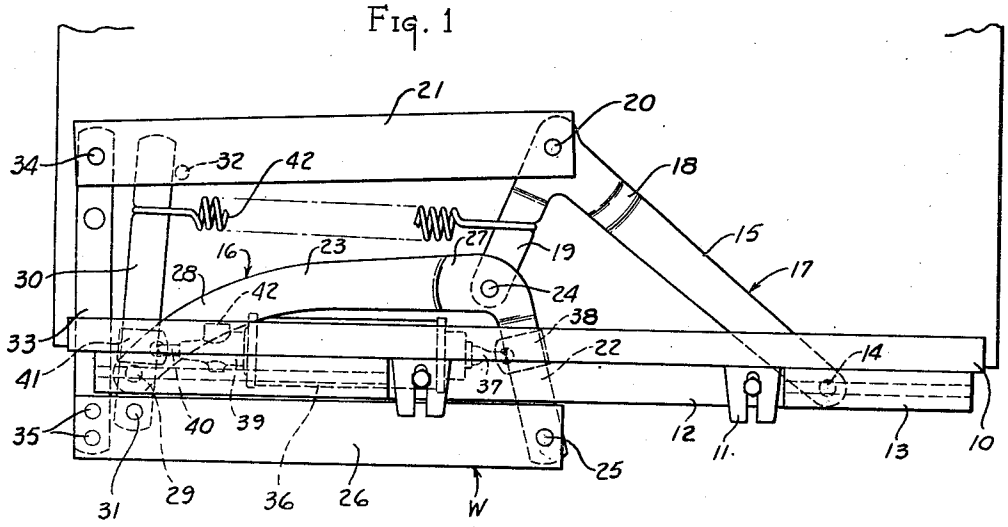
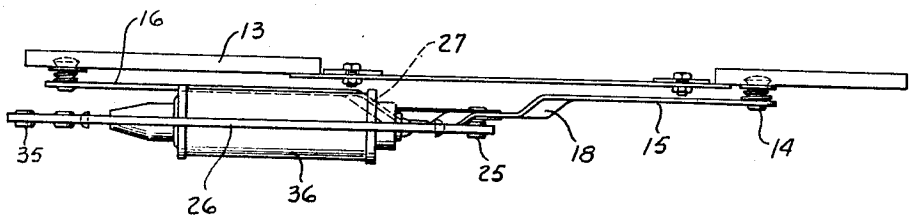


Fig. 2



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Patented July 17, 1951

2,560,976

UNITED STATES PATENT OFFICE

2,560,976

WINDOW REGULATOR

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Application January 8, 1947, Serial No. 720,849

1 Claim. (Cl. 268—125)

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This invention relates to a regulator mechanism particularly adapted for the windows of automobiles although it can be used to advantage for other purposes, and an object is to improve regulator mechanisms of this character to adapt them to fit conveniently in a limited amount of space and to improve their structural features, to enhance their operation and to produce a simple and efficient mechanism of this character lending itself admirably to large scale manufacturing operations.

Other objects and advantages of the invention will hereinafter appear, and for purposes of illustration but not of limitation, an embodiment of the invention is shown on the accompanying drawing, in which

Figure 1 is a side elevation of a regulator mechanism showing the same operatively connected to a vehicle window panel; and

Figure 2 is an edge or plan view of the regulator shown in Figure 1, viewed from the lower or under side thereof.

The illustrated embodiment of the invention comprises a regulator mechanism W for actuating a window panel or glass P of an automobile, the mechanism being adapted to be mounted in the well and suitably secured to a rigid part of the door or body structure.

Embracing the lower edge of the window panel P is the usual U-shaped channel 10, from the under side of which depends a bracket 11 which is vertically slotted to receive bolt and nut assemblies for securing a bar 12 having retainer element 13 fixed thereto. The retainer elements have horizontally elongate slots or guides to receive studs 14 which are secured to the free outer ends of bell cranks 16 and 17, a spring tensioned washer being mounted on each stud 14 to cooperate with the retainer for eliminating rattles and holding the associated parts in the desired guiding relation. The bell crank 17 has a relatively long arm 15 carrying the stud 14 and is embossed outwardly at 18. The bell crank 17 has a relatively short arm 19 projecting at approximately 90° therefrom.

At the juncture of the long arm 15 and the short arm 19, the bell crank 17 is pivoted at 20 to a stanchion or side bar 21. The bell crank 16 has a relatively short arm 22 of approximately the same length as the short arm 19 of the bell crank 17 and a relatively long arm 23. The free end of the short arm 19 of the bell crank 17 is pivoted to the juncture of the short arm 22 and long arm 23 at 24. The free end of the short arm 22 is pivoted at 25 to a stanchion 26. The

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long arm 23 is embossed outwardly at 27 and the end portion terminates in a downwardly curved portion 28, the free end being pivoted at 29 to a compensating lever 30 which is pivoted at one end to the stanchion 26 at 31, the free end of the arm 30 overlapping the stanchion 21 and being limited in its clockwise movement by a pin 32 providing a stop therefor. The stanchions 21 and 26 are joined at one end by a cross bar 33 to which the stanchion 21 is pivoted at 34 for swinging movement toward and away from the stanchion 26. The stanchion 26 is secured by two rivets 35 to the cross bar 33 in a rigid manner to hold it against relative movement.

Actuation of the bell cranks 16 and 17 is effected in one direction by a linear motor which in this instance is in the form of a cylinder 36, having a piston reciprocable therein provided with a piston rod 37 connected by a fastener 38 to the short arm 22 of the bell crank 16. The opposite end of the cylinder has a fitting 39 provided with a post 40 which is connected by a fastener 41 to the compensating arm 30 on the end portion thereof adjacent its pivot 31.

By embossing the long arms 15 and 23 of the bell cranks in the manner shown and described, the bell cranks are enabled to swing during their operative movement without interfering with each other. The downwardly curving of the arm 23 as above described, enables the use of a shorter arm and one that does not interfere with the cylinder 36 so that a greater window movement can be achieved with a relatively small mechanism. This is further advantageous in that the regulator unit occupies a relatively small amount of space and can be fitted into a window well where the space requirements are exceedingly small.

Fluid such as liquid under pressure is admitted to the cylinder 36 through the inlet 42 of the fitting 39 to drive the piston to the right of Figure 1, thereby to cause the bell crank 16 to rock in a clockwise direction and the bell crank 17 in a counterclockwise direction. In this manner, the window panel P is caused to move upwardly, the studs 14 moving laterally in the slotted retainers 13. During such upward movement of the window panel P, a helical coil spring 42, one end of which hooks around the outer end portion of the compensating arm and the other end of which hooks around an intermediate portion of the short arm 19 of the bell crank 17, is placed under tension so that upon release of the pressure fluid from the cylinder 36, the tensioned coil spring 42 imparts opposite swinging move-

ment to the bell cranks 16 and 17 thereby causing the window panel P to move downwardly. It is to be understood that fluid such as liquid supplied under pressure by a pump to the cylinder 36 and by suitable valve means, the fluid within the cylinder is trapped after the window has been moved to a predetermined extent.

Manifestly, by suitable control of such valve mechanism and the rendering of the pump ineffective, the coil spring 42 is enabled to be effective for accomplishing window movement. The compensating arm 30 functions to militate against damage to the window panel P or regulator parts when the window is in closed position and in the event of expansion of the fluid within the cylinder 36. The operation of the fluid motor, the coil spring, the compensating arm is fully shown and described in previous patents of mine, such, for example, as 2,346,387, dated April 11, 1944, 2,371,183, dated March 13, 1945, and 2,393,409, dated January 22, 1946. These features per se form no part of the present invention and further description or illustration thereof is not considered necessary.

The above regulator mechanism is designed to fit into small places without sacrificing the desired window movement. The arrangement of the bell crank levers is such as to effect the maximum travel with the expenditure of a minimum amount of power. The arrangement of the linear motor and the curvature of the adjacent bell crank arm assist in the conservation of space. The entire mechanism can be preassembled and installed as a unit on the job, it being merely necessary to attach the cross bar 33 to a desired support, and in order to hold the mechanism rigidly and resist forces imparted during operation, it is also feasible to secure the lower stanchion 26 also to a rigid support.

It is to be understood that numerous changes in details of construction, arrangement and operation may be effected without departing from the spirit of the invention especially as defined in the appended claim.

What I claim is:

A regulator mechanism for vehicle windows mounted for up and down movements between lowermost and uppermost positions comprising a horizontally disposed frame lying substantially in one vertical plane and including a vertically disposed flat cross bar and upper and lower flat frame arms connected at one end to said cross bar, one frame arm being pivotally connected to said cross bar, a vehicle window and supporting elements disposed therebeneath, said window and supporting elements being substantially flat and lying substantially in a vertical plane parallel and closely spaced from said first plane, said supporting elements including substantially horizontally disposed slideways, a pair of bell crank levers, each lever having a relatively short arm, a relatively long arm, and an angular juncture of said long and short arms, a sliding connection between the free ends of the long arms of said levers and the slideways, a pivotal connection between the juncture of one of said levers and said upper frame arm, the arrangement being such that when said window is in lowermost position the long arms of said levers extend downwardly and the supporting elements for said window lie adjacent the level of said lower frame member, a pivotal connection between the free end of the short arm of the other lever and said lower frame arm, a pivotal connection between the juncture of said other lever and the free end of the short arm of said one lever, the long arms of both of said levers including lateral offsets adjacent said junctures whereby said short arms and junctures lie substantially in the first plane and the free ends of said long arms extend substantially from the first plane to the second plane, and a linear motor engaging the short arm of said other lever, said motor including a cylinder overlying between said lower frame member but having a side thereof lying between said planes whereby when said window is in said lowermost position, a straight line from the juncture of said other lever to the free end of the long arm thereof passes through said side, the last-named long arm having a downward hook adjacent the free end thereof whereby the lateral offset and the hook cooperate with one another to avoid interference between the last-named long arm and said cylinder side.

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The following references are of record in the file of this patent:

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