

July 21, 1964

R. CHUPICK
WINDOW REGULATOR

3,141,664

Filed Aug. 21, 1962

2 Sheets-Sheet 1

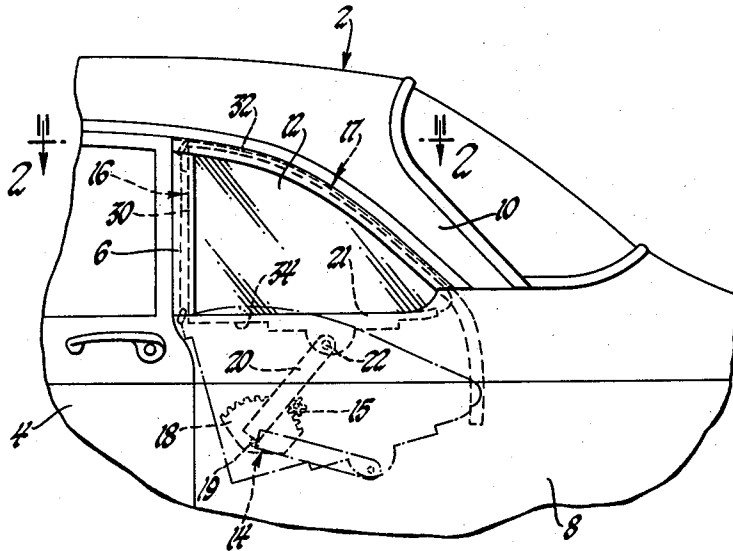


Fig. 1

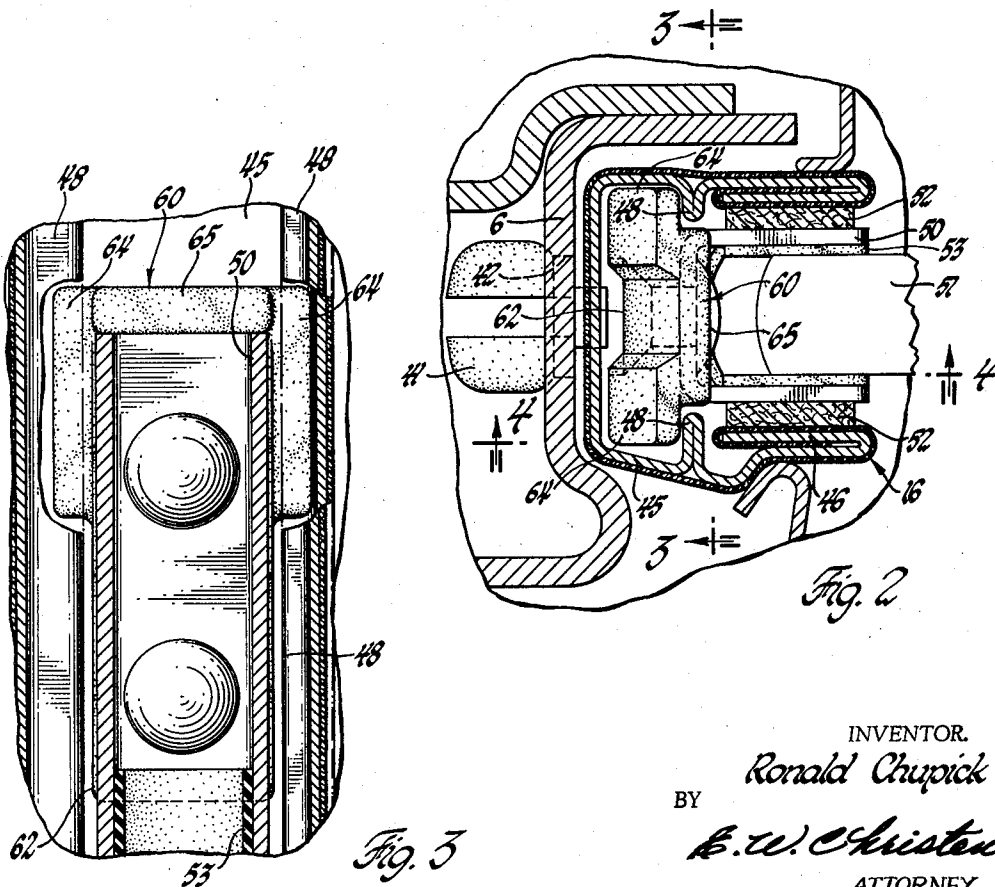


Fig. 2

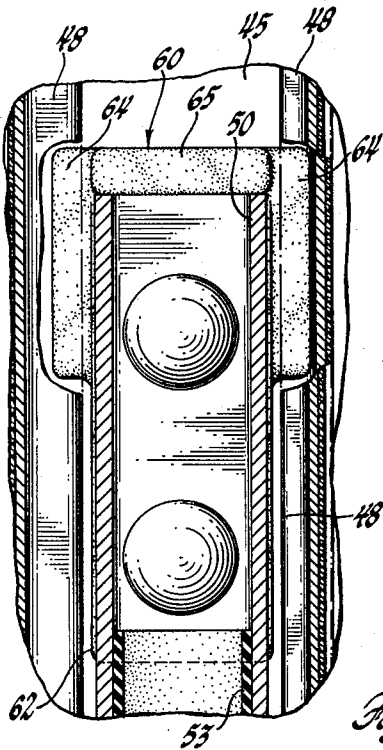


Fig. 3

INVENTOR.
Ronald Chupick
BY
E. W. Christen
ATTORNEY

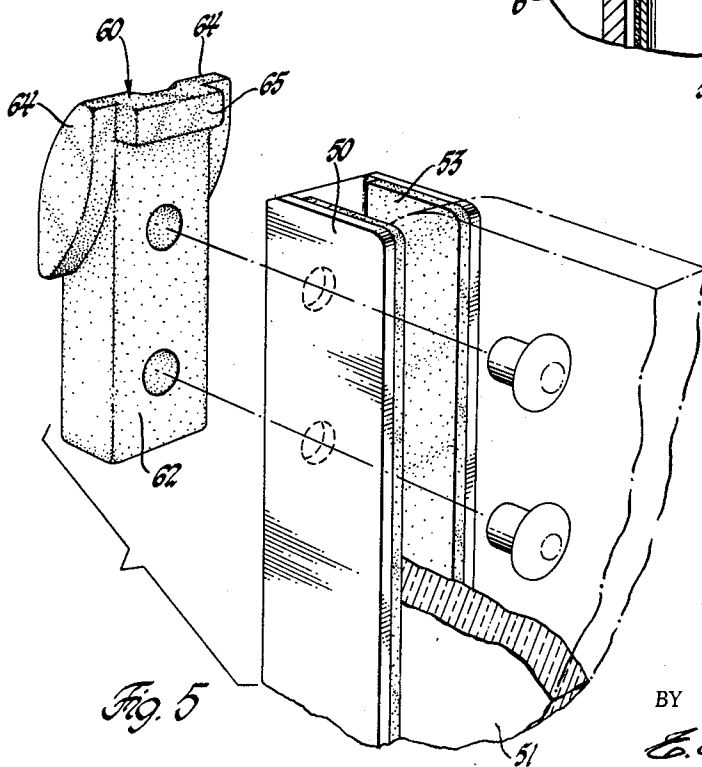
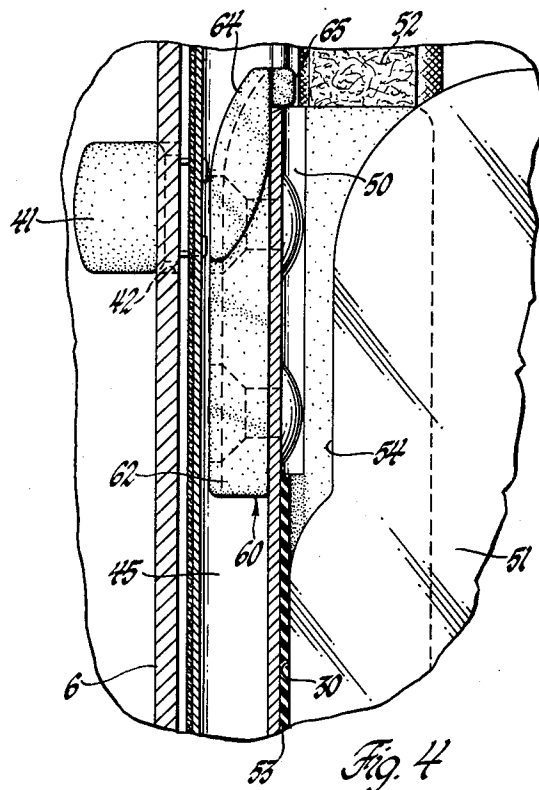
July 21, 1964

R. CHUPICK
WINDOW REGULATOR

3,141,664

Filed Aug. 21, 1962

2 Sheets-Sheet 2



INVENTOR.

Ronald Chupick

BY

E. W. Christen

ATTORNEY

1

3,141,664

WINDOW REGULATOR

Ronald Chupick, Livonia, Mich., assignor to General Motors Corporation, Detroit, Mich., a corporation of Delaware

Filed Aug. 21, 1962, Ser. No. 218,385

5 Claims. (Cl. 268—126)

This invention relates to a window regulator, and more particularly to a window regulator and guide means for moving a rear quarter panel window into and out of the window well of a coupe or two-door sedan type vehicle body.

There are many problems presented by this type of window installation. Due to the space limitations in a two-door sedan body between the door pillar and wheel well, the rear quarter panel windows are seldom lowered completely out of sight. With the recent introduction of the compact car this problem has become acute.

In some cases where it has been possible to lower the window below the belt line of the vehicle body, the regulator mechanism has involved complicated linkages and window guides. Due to the proximity of the wheel well, the rear quarter panel window must swing downwardly in a generally curvilinear path away from the door pillar coming to rest in a canted position in the body panel between the door pillar and wheel well construction. In the usual case, the window is guided above the body belt line by fore and aft glass run channels having felt or bristle covered walls to carry the window silently and to prevent vibration and rattle when fully raised. Since the window must swing below the belt line of the vehicle, separate tracks are usually provided extending downwardly from the glass run channels to guide the window as it swings into its lowered position. The window frame may have rollers which run in the tracks to maintain lateral and fore and aft stability. Furthermore, since the window does not move in a rectilinear fashion, a complicated linkage system for the regulator mechanism is usually required.

It is now possible to largely eliminate the lower guides and rollers and greatly simplify the regulator mechanism while permitting the window to be fully lowered. The present invention accomplishes this in a window control mechanism having a regulator arm actuated by a regulator means and pivotally connected at its upper end to the lower edge of a quarter panel window. Window guide means is mounted to the door pillar at the front of the window opening extending from the body belt line to the top of the opening for guiding the window, from a lowered position within the window well to a raised position closing the opening. Window guide follower means connected to the upper leading edge of the window is slidably and pivotally received in the window guide means whereby upon actuation of the regulator arm the window is tilted in the window guide means and is slidably guided by same between the raised and lowered positions.

These and other features of this invention will be readily apparent from the following description and drawings in which:

FIGURE 1 is a side elevation view of the window regulator of this invention mounted within the rear quarter panel of a two-door sedan with the window in the raised position;

FIGURE 2 is an enlarged sectional view taken generally along the plane indicated by line 2—2 of FIGURE 1 and showing the guide means mounted on the door pillar;

FIGURE 3 is a view taken along lines 3—3 of FIGURE 2 showing the window guide follower;

2

FIGURE 4 is a view of FIGURE 2 taken along lines 4—4 of the window guide follower; and

FIGURE 5 is an exploded view showing the mounting arrangement of the window guide follower to the window frame.

Referring to FIGURE 1 of the drawings, a vehicle body 2 is shown having a front door 4 closing on a door pillar 6 in the manner of a two-door sedan type vehicle. To the rear of the door is the rear quarter panel 8 joined with the roof 10 to form a roughly triangular shaped opening which is closed by the window 12. The window regulator mechanism 14 and fore and aft window guide channels 16 and 17 will be more fully described hereinafter.

It is apparent from inspection of FIGURE 1 that the window 12 has a generally straight leading edge 30, a curved top edge 32 sloping rearwardly and downwardly and being joined to a bottom edge 34. Obviously the shape of the window must roughly be the same as that of the opening for which it is intended. The shape described is characteristic of rear quarter panel windows, but the inventive window regulator is not restricted to any particular window application.

The window regulator mechanism has a pinion 15 connected to the window crank handle (not shown) mounted on the vehicle interior. The pinion 15 engages a sector gear 18 rotatably mounted at 19 to the inside wall of the vehicle body below the window opening. A regulator arm 20 is welded or keyed to the sector gear 18 at its lower end and pivotally connected to a window frame 21 at its other end. The regulator arm directly supports and operates the window from a pivot 22 rearward of the center.

Referring to the FIGURES 2 through 5, the front window guide channel 16 is mounted by suitable fasteners 41 through openings 42 formed in the door pillar 6. For rapid assembly, clip type fasteners may be used. The window guide channel 16 comprises an inner track 45 and an outer glass run 46. A longitudinal shoulder 48 formed on opposite faces of the track walls separates the track from the glass run and provides a continuous axial pathway therebetween.

The glass run 46 is adapted to receive the window frame 50 and may have bristles or felt strip material 52 secured on its opposite faces to center the window, provide weather stripping, and insure quiet window operation. The glass pane 51 is mounted in the frame 50 between rubber sealing strips 53. The upper leading edge of the pane is relieved at 54 forming a gap between the pane and an extension of the frame 50. Secured on the front face of the frame 50 is the window guide follower 60. The follower has a rectangular shaped body portion 62 provided with apertures to mount it on the window frame extension. A pair of side-wing elements 64 are formed on the body portion. The side-wing elements 64 have a generally ovate cross section and are adapted to be received at a slight angle in the track 45, as shown best in FIGURE 4. A tab 65 projects rearwardly from the body portion 62 over the top edge of the window frame 50.

It may be seen by inspection that the body portion 62 of the follower is of a width approximately equal to the width between shoulders 48 and that the side-wings 64 project outwardly therefrom and extend behind the shoulders. Hence the upper leading edge of the window 12 is guided in the track 45 in a manner to be described.

Since it is desirable that the quarter panel window be lowered nearly out of sight, the provision of guide means below the vehicle belt line has always presented a problem. In my invention, the only window guide means below the body belt line is a short lower extension of channel 17 and this may be eliminated in some cases,

3

but at the loss of some window stability. The operation of the present invention will now be described.

The window is shown in FIGURE 1 in the raised position. Regulator arm 20 is secured to the sector gear 18 and will rotate conjointly therewith. When it is desired to lower the window, the initial downward movement of arm 20 is accompanied by a translation rearwardly of the window as determined by the effective radius of the arm 20. The follower 62 fixed at the top of frame 50 travels down the track 45 maintaining the upper leading edge of the window in a fixed plane relative to the swinging arm 20. When the arm 20 has moved to an intermediate position the window has been partially lowered and is tilted rearwardly at the bottom out of the front guide channel 16 with only the upper portion of the frame 50 remaining in the glass run 46. Continued movement of arm 20 brings the window to rest, as shown by the dot-dash lines in FIGURE 1. Since the upper end of arm 20 moves in an arc, the window must shift somewhat rearwardly at the bottom in the manner described for which reason the rear guide channel 17 has a downwardly and rearwardly curved projection that extends below the body belt line. The side-wing elements 64 are inclined at a slight backward angle in the track 45 and rotate forwardly as they slide down the track 45 to allow the window to tilt. When the window is completely lowered it is held in a stable position because the follower 62 never leaves the track 45; hence the window is guided at the trailing edge by channel 17, at the upper leading edge by track 45 and at the bottom by regulator arm 20. The window is stable during all positions because of this triangular-like support system. Of course, the movements of the window are reversed when being raised.

It is apparent that various changes may be made in the embodiments of the invention shown herein and I therefore do not intend to be limited except as defined by the scope and spirit of the appended claims.

I claim:

1. In a window control mechanism for raising and lowering a window in a motor vehicle body opening;
 - a regulator means mounted on said vehicle body below said opening operable from the interior of said vehicle and including actuating means pivotally connected to the lower edge of said window to raise and lower the same along a curved path;
 - window guide means mounted to said body at the front of said window opening and extending from the vehicle body belt line to the top of said opening for guiding said window along said curved path in conjunction with said actuating means from a lowered position within said vehicle body to a raised position closing said opening; and
 - window guide follower means connected to the upper leading edge of said window, said window guide follower means being slidably and pivotally connected to said window guide means, and the remainder of said leading edge of said window being freely received in said window guide means whereby upon actuation of said actuating means said window is tilted on said window guide follower means and partly out of said window guide means and is slidably guided therealong between the raised and lowered positions by said window guide follower means.
2. The device as described in claim 1 wherein said window guide means comprises an inner track means having parallel side walls adapted to receive and provide a pathway for said window guide follower means; and
 - an outer glass channel portion immediately adjacent and parallel to said track means for slidably receiving the leading edge of said window whereby the lower front portion of said window is caused to swing rearwardly and downwardly out of said glass channel portion when being lowered in said vehicle body.
3. In a window control mechanism for raising and

4

- lowering a window in a motor vehicle body opening;
 - a regulator means supporting said window mounted on said vehicle body below said opening and operable from the interior of said vehicle to raise and lower said window;
 - a regulator arm rotatably actuated by said regulator means to swing through a vertical arc adjacent the plane of said window and being pivotally connected at its upper end to the lower edge of said window;
 - window guide means mounted to said body at the front of said window opening and extending from the vehicle body belt line to the top of said opening for guiding said window from a lowered position within said vehicle body to a raised position closing said opening, the upper leading edge of said window being adapted to be guided by said window guide means in a fixed path relative to the path of travel of the upper end of said regulator arm; and
 - window guide follower means connected to the upper leading edge of said window and being slidably and pivotally received in said window guide means whereby upon actuation of said regulator arm said window is tilted on said window guide follower means and is slidably guided by same between the raised and lowered positions.
- 4. In a window control mechanism for raising and lowering a window to close a motor vehicle body opening;
 - a regulator arm pivotally connected at one end to the lower edge of said window rearwardly of the center thereof and supporting same in said vehicle;
 - a sector gear rotatably supported on said vehicle body below said opening, said regulator arm being connected to said sector gear at the other end thereof and movable therewith;
 - a drive pinion engaging said sector gear and being operable from the interior of said motor vehicle to impart rotational movement thereto;
 - a rear window guide means mounted to said vehicle body adjacent and in the plane of said window opening and extending below the vehicle body belt line to guide the rear portion of said window;
 - a front window guide means mounted to said vehicle body adjacent and in the plane of said window opening and extending from the top of said opening to the vehicle body belt line, said front window guide means comprising an inner track portion having a bottom and connected parallel side walls and an outer glass channel portion formed by an extension of said walls for slidably receiving the forward edge of said window; and
 - window guide follower means connected to the upper leading edge of said window being slidably and pivotally received in said track portion for guiding the upper leading edge of said window in a fixed plane relative to the pivotal connection with said regulator arm whereby upon rotation of said regulator arm said window is tilted on said window guide follower means and is slidably guided by same between the raised and lowered positions.
- 5. The device as described in claim 4 wherein said window guide follower means comprises a body portion having outwardly extending side-wing elements, said side-wing elements being pivotally and slidably received in said track portion and movable in a fixed plane relative to the pivotal connection of said regulator arm whereby said window is tilted on said side-wing elements and is slidably guided by same between the raised and lowered position.

References Cited in the file of this patent

UNITED STATES PATENTS

1,928,056	Holt et al. _____	Sept. 26, 1933
2,822,215	Blanton et al. _____	Feb. 4, 1958
2,893,781	Hoag et al. _____	July 7, 1959