Dec. 26, 1961 J. E. MARTENS 3,014,715

WINDOW REGULATOR

Filed Aug. 21, 1959

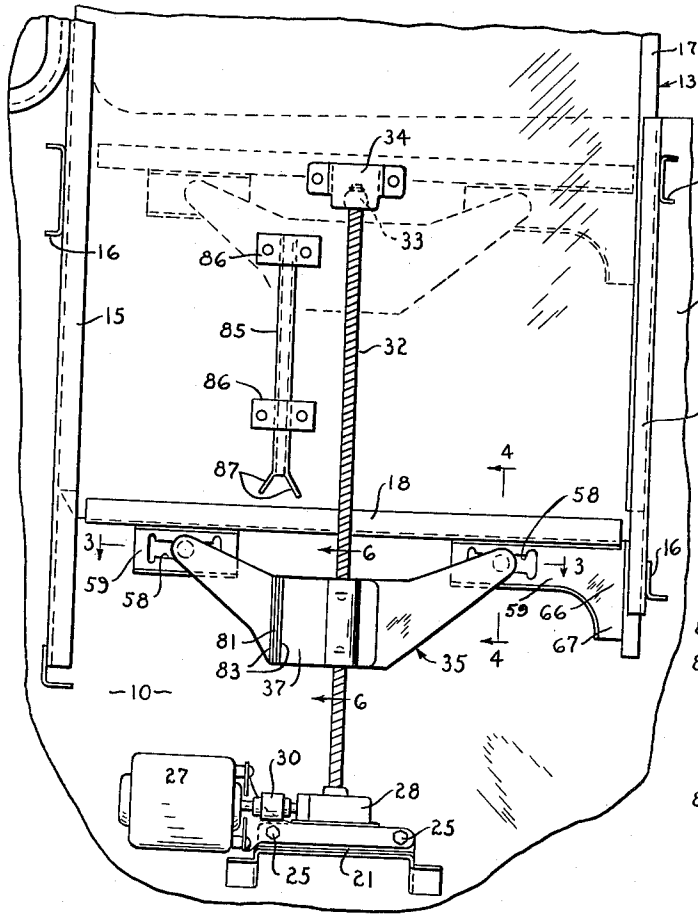


Fig.-1

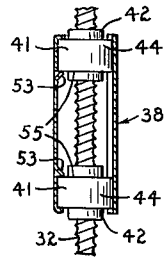


Fig.-6

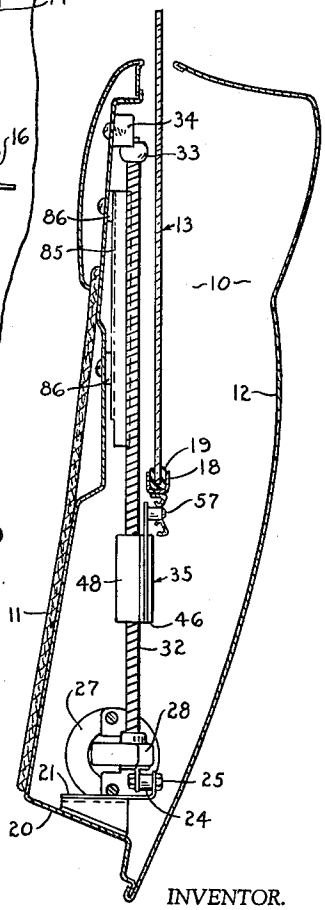


Fig.-2

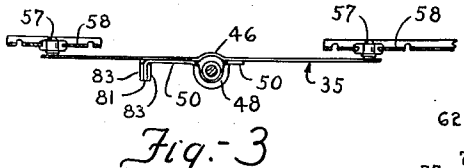


Fig.-3

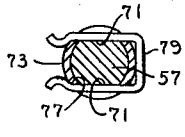


Fig.-5

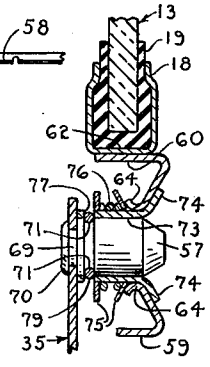


Fig.-4

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3,014,715
WINDOW REGULATOR

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This invention relates to power-operated window regulators for motor vehicles, and has particular reference to overcoming canting or wedging of the window in its guides during the elevating operation.

In the many automotive body designs, the frames around the windows, particularly in the doors, have been practically eliminated so that when the windows are raised they commonly project without benefit of any lateral or transverse support above the body of the door, The edgewise stabilization of the window is placed upon the upper portion of the side edge guides located within the door. Even in older model vehicles where the door includes an upper frame in which the window is guided, canting or wedging of the window in the guides often occurs. In either type door, the canting or wedging of the window in its guides is initiated by the jolting of the vehicle and imposes severe strain upon the glass, occasionally damaging the operating mechanism and the guides within the door.

It is the primary object of this invention, therefore, to provide an improved window regulator including an improved window support and stabilization means which will effectively overcome edgewse canting of the window.

It is a further object of this invention to provide an improved window regulator in which the window is supported upon an actuating member through the instrumentality of a bracket, the latter having the intermediate portion thereof engaging said member at vertically spaced areas and its ends slidably connected at widely spaced points to the lower portion of the window.

It is a further object of this invention to provide a window regulator of the kind mentioned including a supplemental stabilizing unit arranged to come into action as the window clears or leaves the conventional side edge guides, thereby insuring uniformity of stabilization throughout the travel of the window.

It is a still further object of this invention to provide a window regulator having a bracket designed to flex to allow face alignment of the window structure, which will yieldingly permit shifting of the window normal to the plane thereof during its vertical travel in order to compensate for minor variations in collocation of the side edge guides and the window-actuating and supporting mechanism.

Other and further important objects and advantages of the present invention will become apparent from a study of the invention as hereinafter set forth taken in connection with the accompanying drawings wherein:

FIGURE 1 is a side elevation with the inner panel of the vehicle door removed to show the window regulator of the present invention;

FIGURE 2 is a vertical section with said inner panel in place and looking toward the operating mechanism;

FIGURE 3 is a view taken along line 3—3 of FIGURE 1;

FIGURE 4 is a sectional detail view taken along line 4—4 of FIGURE 1;

FIGURE 5 is a sectional detail view of the fastening arrangement for the sleeve of FIGURE 4; and

FIGURE 6 is a further detail view of the connection of the supporting bracket to the threaded drive shaft taken along line 6—6 of FIGURE 1.

Referring now to the drawing and particularly to FIGURES 1 and 2, reference character **10** designates a door of a motor vehicle, here illustrated as a "hardtop" model. The door includes inner and outer panels **11, 12,** between which a window or glass **13** is mounted for vertical movement. Window **13** is guided in its vertical movement primarily by spaced channeled guides **14, 15** arranged within the body of the door to snugly receive the side edges of the window. Guides **14, 15** are mounted by brackets **16,** the latter preferably being spot-welded to the door panel **11.** It is preferred to reinforce the edges of the glass of said window by conventional clamping channel pieces **17,** the pieces along the side edges of the glass sliding in said side edge guides **14, 15.** The reinforcement of the lower edge of the glass is by a somewhat deeper and heavier supporting channel piece **18** (FIGURE 2), which latter piece is connected to the power-operating mechanism through means to be described hereinafter. Suitable resilient material **19** is incorporated between the channel pieces and the glass for effecting secure clamping action of the channel pieces and to cushion and dissipate strains between the glass and the channel pieces incident to jolting of the vehicle.

Mounted on a ledge **20** of the inner panel **11** is a platform **21** upon which in turn is resiliently mounted, through rubber couplings **24** and nuts **25,** a bracket **26** carrying a reversible electric motor **27** and a gear box **28** which are drivingly connected together through resilient coupling **30.** A helically threaded shaft **32** is driven from said gearing and extends vertically, centrally of and parallel with the window. The upper end of the shaft is journaled in a ball-and-socket structure **33** mounted in a bracket **34** secured on panel **11,** the arrangement being designed to compensate for minor misalignment or variation in collocation between the gear box and bracket. A wide-wing bracket or support **35,** in the form of a stamped-out plate having a tall intermediate portion **37,** is threadedly engaged to shaft **32** to be traversed therealong.

The primary purpose of employing a bracket having an intermediate portion of substantial height, as best shown in FIGURE 1, is to provide a cylindrical holder **38** (FIGURE 6) in which nut units **40, 41** can be rigidly fixed a substantial distance apart on shaft **32.** This spacing of the bearing contact of the bracket vertically along shaft **32,** coupled with the use of fitted nut units and a screw shaft of the proper strength and rigidity, effectively eliminates tilting of bracket **35** about the axis of shaft **32.** Thus, the problem of canting or wedging of the window in channel guides **14, 15** is first overcome at its main source—the connection of the bracket to the shaft.

Having devised a traversing window-supporting bracket of minimum tilting characteristics, it is essential that the thrust imparted by the bracket be evenly transmitted to the bottom of the window. It has been found that the nearer the thrust is applied to the lower side edge portions of the window, the less tendency there is for the bracket mounted as above described to allow canting of the window to develop in guides **14, 15.** Therefore, a "wide-wing" bracket **35** is used; that is to say, a bracket

having considerable span in proportion to the width of the window and in which the end portions or wings of the bracket are tapered and inclined upwardly. By selecting a wide-wing bracket having an over-all span of the order of half to three-quarters the width of the window, the elevating thrust upon the window is steady and substantially equally and evenly applied to the window. The window structure illustrated employs a bracket having a width of substantially half that of the window. The tapering of the ends of the bracket lends strength thereto, and the upward inclination thereof permits the ends of the bracket to extend well above the end of shaft 32 when the intermediate portion 37 thereof reaches the upper limit of its travel. By this arrangement, the lower edge of the window may be elevated to a point to project practically all the glass area of the window.

For anchoring the nut units 40, 41 to bracket 35, the center portion of the bracket is rounded at 46 to define a vertical channel of cylindrical contour, and a mating generally semicylindrical section 48 having integral oppositely directed plate portions 50 fitted over said rounded portion and spot-welded or otherwise secured to the bracket to form said cylindrical holder 38. The nut units are arranged in the ends of the cylindrical section and are held in place by the end edges of both the bracket and the holder which are turned in at 51 to engage the outside wall of the case 44 of the nuts, while lugs 53 are struck from the holder and the bracket for engaging the inner walls 55 of said cases for fixedly separating them.

The connection between the ends of the bracket and bottom edge of the window includes a pin 57 fixed to the end of each arm of the wide-wing bracket. Said pins project through slots 58 formed in spaced elongate horizontal guide brackets 59, which guide brackets in turn are secured to the lower wall of channel piece 18. As most clearly shown in FIGURE 4, guide brackets 59 are in the form of channel members, a side wall 60 of each being welded to the lower wall 62 of the channel piece 18. The intermediate walls of these guides are generally synclinal, with the medial portion or axis thereof formed with said slots 58. The edge portions defining said slots are turned inwardly and upwardly at 64 in order that each of said slots may define a way for receiving said pins 57 for slidable movement therethrough and therealong. The outer end of one of the guide brackets 59 has an integral portion 66 extending outwardly and downwardly to provide a planar adjunctive stabilizing edge portion 67 slidable in its adjoining guideway 14. Preferably, the edge portion 67 will be faced with wear plates for long life and quiet operation.

Each pin 57 has a reduced neck portion 69 at one end which extends through a hole provided in an end of bracket 35, and a head 70 formed on the outer end of the neck to anchor each pin to its respective end of the bracket. Parallel grooves 71 are formed in the body of each pin adjacent its anchored end. A cylindrical sleeve 73 is disposed on each pin with the outer end of each sleeve flared at 74 to contact the synclinal surfaces of its respective guide 59. Two washers or rings 75 encircle the body of each sleeve, with a compression spring 76 arranged between them. The ring 75 contiguous of the flanges 64 is shaped to effect good bearing contact with said flanges, such as by flaring it to an angle corresponding to that of the inner contact faces of said flanges. For securing the sleeves 73 to their respective pins, each sleeve is formed with opposed slots 77 adapted to be brought into registration with said grooves 71 of the pins. The legs of a U-shaped spring retaining clip 79 pass through the opposed slots 77 and seat in the grooves of the pins. Clip 79 further serves as an abutment for one ring 75 and thus places spring 76 under a compression load.

The bracket 35 is adapted to be somewhat flexible in the direction substantially transverse to the plane of the bracket such that irregularities in the collocation of the shaft, the bracket and the guides 14, 15 are readily compensated. That is, as viewed in FIGURE 3, when either or both of the brackets 59 on the window are positioned closer to or farther from the vertical plane of the screw shaft 32, the wing portions of the bracket 35 will deflect sufficiently to tie the brackets 58 and screw shaft together. Even in the deflected form, the bracket 35 continues to transmit driving force from the shaft 32 to the window in an operative and efficient manner. The manner of mounting bracket 35 on shaft 32, the wide spread of the bracket, and the mode of the connection of the ends of the bracket to the lower edge of the window including the adjunctive stabilizing edge 67, all as above described, combine to effectively overcome canting or wedging of the window in guides 14, 15. As a further assurance, however, there is provided a secondary stabilizing unit which comes into operation progressively as the window leaves guides 14, 15 and whereby the degree of stabilization is maintained substantially constant, as will presently be described.

A secondary, but important, purpose for the tall intermediate portion 37 of the wing bracket is for supporting and bracing the elongate vertical rib or fin 81 as an element of the aforementioned secondary stabilization arrangement. Fin 81, as shown, is formed by bending the outer end portion of holder plate 50 to a right angle with the plane of bracket 35. Wear shoes 83 similar to those facing stabilizing portion 67 are attached to the sides of the fin. Manifestly, the plate portion 50 must be of a width designed to position the fin at the desired distance from shaft 32. A channel element 85 of the secondary stabilizing unit is secured to the inner panel of the door by straps 86, with the channel in vertical alignment with fin 81. The lower end of the channel element is formed with diverging elements 87 adapted to direct fin 81 into channel 85 during the elevating operation of the window. It will be observed that the channel is located in the upper portion of the door, so that the secondary stabilizing unit comes into action progressively as the side edges of the window leave guides 14, 15, thereby effecting generally constant over-all stabilization of the window.

Having thus described my invention, it is obvious that various modifications may be made in the same without departing from the spirit of the invention; and, therefore, I do not wish to be understood as limiting myself to the exact form, construction, arrangement and combination of parts herein shown and described.

I claim:

A regulator for vertically raising and lowering a window of a motor vehicle door wherein the window may be selectively retracted into the door between the panels thereof and projected to varying heights above the door structure without external supports comprising; a window structure of a generally planar form, window guides within the door structure engaging the side edges of the window for defining the movement of the window, an elongate channel member supporting the lower portion of the window, guide bracket means secured to the lower edge of the channel member and extending therealong and vertically downward, a pair of spaced-apart substantially horizontally disposed slot means formed in the vertical portion of the guide bracket, said vertical downward portion of at least one of the guide bracket means engaging a window guide for linear movement thereon, a screw shaft within the door extending generally parallel to the direction of movement of the window, a reversible power means to rotate the screw in either direction, nut bracket means threadedly mounted on the screw shaft for linear movement thereon upon rotation of the screw, said nut bracket means having horizontally spaced-apart pins disposed on opposite sides of the screw and each received in the slot means thereby permitting limited lateral movement of the window relative to the nut bracket means, a stabilizing guide means for the nut bracket means spaced-apart therefrom when the nut bracket means is in its lower position and adapted to receive the nut bracket

means when the window is near its projected extent of travel for guiding and stabilizing the nut bracket means and the window, said stabilizing guide means fixed to the door structure comprising a channel member aligned with the movement of the nut bracket means and disposed at one side of the screw shaft in parallel relationship therewith and terminating at one end in a flared lip portion guiding a protrusion on the nut bracket means into linear stabilized sliding relationship with the channel member of the guide means upon axial movement of the nut bracket means and window near their projected extent of travel.

References Cited in the file of this patent

UNITED STATES PATENTS

1,310,367	O'Brien	July 15, 1919
1,907,028	Ackerman et al.	May 2, 1933
2,347,750	Moroney	May 2, 1944
2,409,068	Roethel	Oct. 8, 1946
2,804,297	Lenz et al.	Aug. 27, 1957

FOREIGN PATENTS

630,766	Great Britain	Oct. 20, 1949