

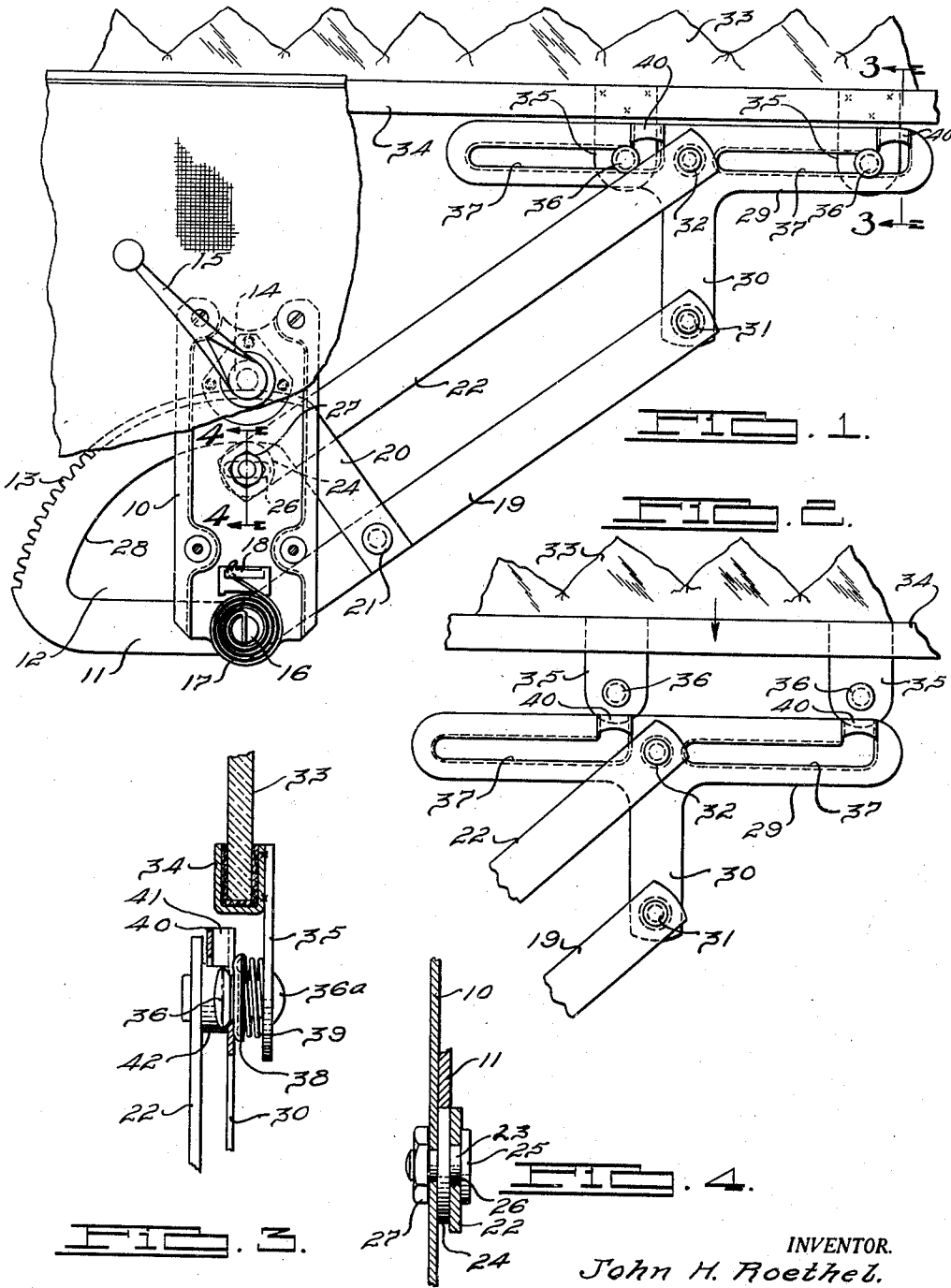
July 16, 1935.

J. H. ROETHEL

2,008,517

WINDOW REGULATOR

Filed May 9, 1934



INVENTOR.  
*John H. Roethel.*  
BY  
*Dick, Colver & Gray*  
ATTORNEYS.

# UNITED STATES PATENT OFFICE

2,008,517

## WINDOW REGULATOR

John H. Roethel, Detroit, Mich.

Application May 9, 1934, Serial No. 724,658

8 Claims. (Cl. 268—126)

This invention relates to mechanism for raising and lowering windows, and is particularly adapted for use in motor vehicles.

An object of the invention is to provide improved window regulating mechanism for the window of a motor vehicle which is effective to maintain the glass in true vertical position, especially where used in connection with windows in which the glass has a slanting edge and is not guided at opposite upright edges thereof.

In accordance with an embodiment of the invention, the mechanism for raising and lowering the windows comprises a window supporting member capable of sliding horizontally with respect to the window glass and having substantially horizontal guideways, a member at the lower edge of the glass having laterally spaced devices engaging with said guideways, a pair of arms connected to said window supporting member at spaced points one above the other, the other ends of the arms being connected to fixed points on the window supporting structure, the said arms being adapted to swing in parallelism, and manual operating means adapted to swing one of the arms, said arm serving as a lever to raise or lower the window, while the other arm serves as a guiding link to prevent tilting of the window supporting member.

Other objects of this invention will appear in the following description and appended claims, reference being had to the accompanying drawing forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

Fig. 1 is a side elevation illustrating a window regulating mechanism embodying the invention, showing the parts connected to the lower edge of a window glass when in raised position.

Fig. 2 is a fragmentary view illustrating the manner in which the window glass is assembled with the regulator.

Fig. 3 is a section taken substantially on line 3—3 of Fig. 1 in the direction of the arrows.

Fig. 4 is a section taken substantially on line 4—4 of Fig. 1 in the direction of the arrows.

Before explaining in detail the present invention it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawing, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation, and it is not

intended to limit the invention claimed herein beyond the requirements of the prior art.

Referring to the drawing wherein one embodiment of the invention is illustrated by way of example, the apparatus includes a supporting plate 10 which is suitably embossed for the purpose of reinforcement and provided with apertured screw bosses for the reception of screws by means of which the plate may be secured, for example, to the body or door of an automobile.

In the present embodiment the regulator is shown as being driven through gearing, although the invention is not so limited, and accordingly there is provided a gear 11 which is punched from a metal blank to provide a central opening 12. The gear is in the form of an open sector having gear teeth 13 adapted to mesh with a pinion 14 on a shaft which is operated through a crank handle 15. The gear sector is fixed to a rotatable stud 16 mounted in the plate 10. One end of a coil spring 17 is secured to the stud 16, the other end of the spring being fastened to a piece 18 struck out from the plate 10. This spring is provided in the usual manner for counterbalancing purposes.

Secured at one end to the stud 16 and gear sector 11 is a swinging or oscillating arm or bar 19. The free end 20 of the gear sector is riveted at 21 to an intermediate portion of the arm 19. Extending parallel to this arm and pivoted at its inner end on a stud 23 carried by the plate 10 is a second arm or bar 22. The arm 22 is spaced from the gear sector 11, so as to swing over the face thereof, by means of a washer or disk 24 centrally apertured to receive a reduced portion of the pivot or stud 23. This stud has a head 25 engaging the arm 22 to hold the same in place and at its opposite end is threaded to receive a nut 27. The stud passes through an adjusting slot 26 in the plate 10 so that by loosening the nut 27 the position of the stud within the slot may be adjusted.

The opening 12 within the gear sector is cut out so that one internal edge 28 thereof is of proper curvature to travel at all times in contact with the washer 24. As a result the open gear sector is supported by the washer and buckling or distortion thereof during operation and consequent disengagement of the pinion teeth therewith are effectually prevented. By blanking out the gear sector in the manner shown considerable saving in material is possible since a second sector can be punched out at the same time from the same metal blank and having a

substantial part thereof formed from the metal cut out to provide the opening 12.

The arms 19 and 22 are thus pivoted to the supporting plate 10 at vertically spaced points 5 16 and 23. Accordingly the outer ends of the arms are pivoted at correspondingly spaced points 31 and 32 to an angle bar, this bar comprising a horizontal portion 29 and a depending angular extension 30. In the present instance this bar 10 is preferably although not necessarily in the form of a T-bar with the extension 30 disposed midway of the horizontal member 29.

At the lower edge of the window glass 33 there is secured a metal channel member or retainer strip 34. A pair of horizontally spaced metal hangers 35 are secured, as by welding, to one face of the channel 34. Each of these hangers or straps carries a button shaped device 36, these devices being spaced laterally so as to travel horizontally within horizontal guideways or slots 37 formed in the bar 29 at opposite sides of the pivot 32. The devices 36 comprise headed studs having their ends riveted over at 36a to the hangers 35, and these studs carry washers 38 yieldingly engaging the bar 29 along the upper and lower edges of the guide slots 37. The washers 38 are yieldingly held in this position by springs 39.

In the present instance a construction is provided whereby the horizontally spaced devices or buttons 36 may be assembled within the ways or guide slots 37 of the bar 29 by a simple vertical movement of the glass when the regulator mechanism is in its fully elevated position. For this purpose the metal at corresponding ends of the guide slots 37 is embossed to provide inwardly offset portions 40, thereby providing vertical notches or openings 41 communicating at right angles with the ends of the slots 37. Thus, in assembling the window glass with the regulator merely 40 a simple vertical movement of the glass is necessary to cause the buttons or devices 36 to pass downwardly through the openings 41 into the ends of the slots 37, whereupon a lowering of the bar 29 will cause the devices 36 to travel into 45 operative positions within the guide slots. It is understood that in normal operation the limit of travel of the devices 36 is substantially that shown in Fig. 1 so that when the window is fully elevated during normal use the devices will not 50 pass out of the horizontal guide slots into the portions 41. Where it is found, during assembly of the regulator with the window glass, that the guide slots 37 do not extend in a true horizontal line on account of slight inaccuracies in production, the pivot or stud 23 may be adjusted within 55 the adjusting slot 26 so as to adjust the angular position of bar 29. In this manner the angularity of the guide slots 37 may be varied so as to cause the devices 36 to travel therein without binding 60 during operation of the regulator.

I claim:

1. In a window regulator, a fixed support, a member having substantially horizontally spaced devices mounted at the lower edge of the glass, a 65 window supporting member capable of sliding horizontally with respect to the window and having substantially horizontal guideways within which said devices are engageable at laterally spaced points, a pair of arms pivoted at their ends to said window supporting member at spaced points one 70 above the other, the other ends of said arms being pivoted at correspondingly spaced points to said support, the said arms being adapted to swing in parallelism, and manual operating means 75 adapted to swing one of said arms, said last named

arm serving as a lever to raise or lower the window while the other arm serves as a guiding link to prevent tilting of the window supporting member.

2. In a window regulator, a fixed support, a window supporting member having means for sliding connection to the lower edge of a window for supporting the same against angular displacement, a pair of swinging arms pivoted at their outer ends to said member at spaced points 10 one above the other, the other ends of said arms being pivoted at correspondingly spaced points to said support, the said arms being adapted to swing in parallelism, means for swinging said arms, and means for adjusting the pivot of one 15 of said arms on said fixed support to vary the angularity of said window supporting member.

3. In a window regulator, a fixed support, a window supporting member adapted to be connected to the lower edge of a window for horizontal sliding movement relative thereto, a pair of swinging arms pivoted at their outer ends to said member at spaced points one above the other, the other ends of said arms being pivoted at correspondingly spaced points to said support, the 25 said arms being adapted to swing in parallelism, means for swinging said arms, and means for adjusting the pivot of one of said arms on said fixed support to vary the angularity of said window supporting member, said means comprising a slot 30 in said fixed support within which the pivot of said last named member is slidably mounted.

4. In a window regulator, a fixed support, a window supporting member, a window glass retainer member adapted to be secured to the lower 35 edge of a glass, said members having relatively slidable connections for supporting the window glass on said supporting member at laterally spaced points, upper and lower swinging arms pivoted at their outer ends to said window supporting member at spaced points one above the other, the other ends of said arms being pivoted at correspondingly spaced points to said support, a gear 40 secured to the lower of said arms having in its area an opening within which the upper of said arms is pivoted to said support, and means at the locality of said pivot slidably engaging an edge of said gear for supporting the gear during operation.

5. In a window regulator, a fixed support, a window supporting member, a window glass retainer member adapted to be secured to the lower edge of a glass, said members having relatively slidable connections for supporting the window glass on said supporting member at laterally 55 spaced points, upper and lower swinging arms pivoted at their ends to said window supporting member at spaced points one above the other, the other ends of said arms being pivoted at correspondingly spaced points to said support, a gear 60 secured to the lower of said arms and having in its area an opening within which the upper of said arms is pivoted to said support, and means at the locality of said pivot slidably engaging an edge of said gear for supporting the gear during operation, said means comprising a disk on 65 said pivot interposed between said support and the upper arm.

6. A window glass channel for a window regulator having a fixed support, a pair of parallel 70 swinging arms pivoted at vertically spaced points to the support, a horizontally movable bar pivoted to the outer ends of the arms at correspondingly spaced points and in which said bar is provided with horizontally aligned guideways; said window

glass channel comprising a metal channel strip adapted to be secured to the lower edge of a window glass, a pair of horizontally spaced depending hangers secured to a face of said channel strip

tending open portions adapted to permit simultaneous insertion of said devices into the guideways by relatively moving the window glass and regulator in substantially a vertical direction.

5 and having projecting headed devices adapted to be interlocked with said guideways against horizontal withdrawal during normal operation, said guideways terminating at corresponding ends in spaced means for permitting simultaneous insertion of said devices into the guideways.

8. In a window regulator, a fixed support, a channel member mounted at the lower edge of the glass provided with spaced hangers fixed to and depending therefrom, studs carried by said hangers, a one-piece window supporting member capable of sliding horizontally relative to the glass and having substantially horizontal guideways within which said studs are engageable at laterally spaced points, a pair of arms pivoted at their ends to said window supporting member at spaced points one above the other, the other ends of said arms being pivoted at correspondingly spaced points to said fixed support, the said arms being adapted to swing in parallelism, said guideways having like ends thereof provided with angularly disposed entrance openings whereby to permit the simultaneous insertion of said lugs into the guideways during the assembly of the window and the parts associated therewith, and manual operating means adapted to swing one of said arms, said last named arm serving as a lever to raise or lower the window while the other arm serves as a guiding link to prevent tilting of the window supporting member.

10 7. A window glass channel for a window regulator having a fixed support, a pair of parallel swinging arms pivoted at vertically spaced points to the support, a horizontally movable bar pivoted to the outer ends of the arms at correspondingly spaced points in which said bar is provided with alined spaced guideways having horizontally extending portions, and in which the pivotal connection at the outer end of one of said arms is located between the spaced guideways; said window glass channel comprising a metal channel strip adapted to be secured to the lower edge of a window glass, a pair of horizontally spaced depending hangers secured to a face of said channel strip and having projecting headed devices adapted to be interlocked with said guideways against horizontal withdrawal during normal operation, said guideways terminating at corresponding ends in vertically ex-

JOHN H. ROETHEL.