

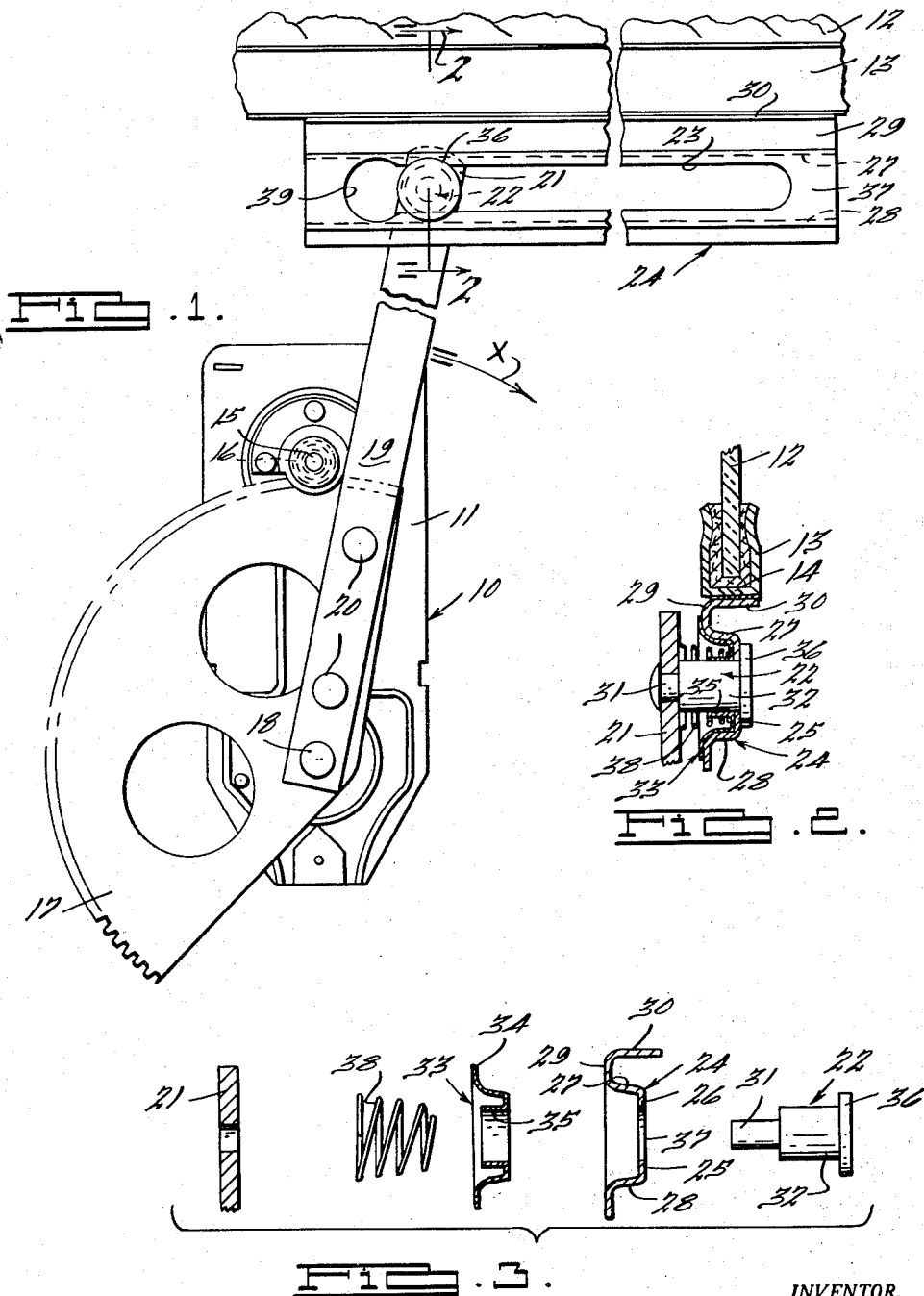
Dec. 4, 1956

J. H. ROETHEL

2,772,901

WINDOW REGULATOR CONNECTING MEANS

Filed Nov. 24, 1954



INVENTOR.
John H. Roethel
BY
John Joseph Roethel
ATTORNEY.

1

2,772,901

WINDOW REGULATOR CONNECTING MEANS

John H. Roethel, Coral Gables, Fla.

Application November 24, 1954, Serial No. 470,856

2 Claims. (Cl. 287—3)

This invention relates to means for guiding and controlling glass or transparent panels of windows, particularly windows of automobiles in which the transparent panels or panes are adapted to be raised or lowered. The invention is especially useful as applied to the window structure for a vehicle body having a window frame provided with a window well formed between inner and outer body or door panels within which the mechanism of the present invention as well as the window regulator mechanism are installed and concealed from view.

It is an object of the present invention to provide an improved means for slidably connecting the end of a swinging regulator arm to the lower edge of a sliding window panel, the improved construction permitting not only easy installation of the regulator but also easier operation thereof due to the reduction in frictional resistance during operation of the window regulator, such means including a member adapted to be mounted on the lower end of the transparent pane or panel, which member is formed with a longitudinal channel having the back wall thereof provided with a longitudinal slot through which the transverse stud or pin on the end of the window regulator arm freely projects, the stud carrying a separate bearing element, said bearing element being a cup shaped member preferably pressed from sheet metal, said cup shaped member having smooth bearing engagement with the upper and lower generally horizontal wall of the channel, and the stud being held against withdrawal by suitable means carried or attached to the projecting end thereof.

Other features and 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 view illustrating a window regulator mechanism embodying the present invention.

Fig. 2 is an enlarged section taken substantially through lines 2—2 of Fig. 1 looking in the direction of the arrows.

Fig. 3 is an exploded view of the component parts of the structure shown in Fig. 2.

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 the arrangement of parts illustrated in the accompanying drawings, 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.

Referring to the drawing, the window regulator mechanism 10 is adapted to be disposed in a conventional manner inside the window well between the inner and outer panels of a vehicle door or vehicle body. As illustrated in Fig. 1, the window regulator mechanism 10 is provided with a mounting plate 11, which is adapted to be secured by screws or the like to the inner door panel. The win-

2

dow panel or pane 12 is provided with a retainer channel 13 secured to the lower edge 14 thereof to which the window regulator 10 is adapted to be attached as will be hereinafter explained.

The mounting plate 11 of the window regulator mechanism has a shaft 15 rotatably mounted thereon, which shaft 15 is adapted to extend through a hole in the inner panelling of the door. This shaft 15 is provided with a hand crank (not shown) disposed on the inner side of the door and also carries a driving pinion 16, the teeth of which are in mesh with the teeth on a gear sector 17 which is rotatably mounted at 18 on the mounting plate 11. A flat swinging arm 19 of the type conventional to single arm window regulators is secured, preferably with a plurality of rivets 20, to the gear sector 17. This arm 19 serves for raising and lowering the window and securing it in its raised and lowered positions. When the window is completely closed, i. e., is in its uppermost position, the swinging arm 19 assumes the upright position illustrated in the drawing (Fig. 1). To lower the window, it is swung in the direction of the arrow X indicated in Fig. 1 and, when the window is completely open, it assumes a position in which, viewed with relation to Fig. 1, it points to the right. Lifting of the window is effected by swinging the arm against the direction of the arrow X. Swinging is effected in each case in such manner that the gear sector 17 carrying the arm 19 is rotated, by means of the pinion 16, the shaft 15 and the hand crank fastened thereto, in either direction at will. On the mounting plate 11, a spring, preferably a flat spiral spring, not visible in the drawing, may be disposed in the usual manner to exert a twisting moment, in a direction opposed to the direction of the arrow X, on the gear sector 17 and the swinging arm 19, so as to compensate for the weight of the window to a greater or lesser extent.

Swinging arm 19 is provided at its outer end 21 with a connection including a transverse stud 22 adapted to travel within a longitudinal guideway or guide slot 23 formed in a bracket 24 secured to the bottom of the retainer channel 13. In cross-section, the bracket has a U-shaped channel 25 having a vertical back wall 26 which is disposed parallel to the plane of the window panel 12 and top and bottom horizontal walls 27 and 28, respectively. The edges of the horizontal wall of the channel 25 are angled off upwardly and downwardly so as to obtain a smooth front for the channel. On the angled off edge 29 of the top wall is situated a horizontal flange 30, which is used for connecting the guide bracket 24 to the retainer channel 13 and is adapted to be secured to the underside of the latter by spot welding or the like. The vertical back wall 26 of the channel shaped bracket 24 carries the uninterrupted continuous longitudinal guide slot 23 which is, however, closed at both ends. The transverse stud 22 is riveted by its smaller diameter end 31 in a hole of the arm 19 and is hence rigidly connected to the latter. The transverse stud 22 has a stem diameter 32 which is slightly smaller than the clear width of the longitudinal slot 23 so that it can pass through said slot without rubbing the edges thereof. On the stem 32 of the transverse stud 22 is mounted a bearing element 33 which comprises a hollow body pressed from sheet metal, the bearing being cup shaped and having a flange 34 and a sleeve 35 through which the driving or transverse stud extends. The bore diameter of the sleeve is such that the transverse stud will rotatably support the bearing without noticeable play. The external diameter of the cupped shape bearing element is so selected that the bearing element fits with sliding fit into the clear space between the horizontal walls of the U-shaped channel 25. It is thus guided in the channel without play so that it is in bearing contact with the upper channel wall 27 and the lower channel wall 28.

On the side facing the swinging arm, the bearing element 33 has a flange 34 by which it is guided on the angled off edges of the channel walls. The length of the bearing element 33 is so selected that the same extends with its bearing surface into the complete depth of the U-shaped channel 25 or, in other words, extends over the complete width of the horizontal channel walls 27 and 28.

In order to keep the bearing element 33 in engagement with the channel shaped guide bracket 24 and to prevent the withdrawal of the transverse stud from the slot 23 as the result of transverse movement thereof, a stop in the form of a flange 36 is provided on the free end of the transverse stud, the flange 36 engaging the back surface 37 of the vertical back wall 26. In the illustrated embodiment the flange 36 is formed in one piece with the driving pin. Between the bearing element and the end of the swinging arm 19 is a resilient member 38, preferably a coil spring. As will be noted, the spring 38 fits down into the cup shaped bearing element.

To permit the assembly of the transverse stud 22 in the slot 23, the slot 23 is slightly extended at one end, namely, the left hand end in the drawing, beyond the end position of the traverse of the driving stud 22, and is provided with an enlargement 39, which permits passage of the flange 36. If a detachable stop is provided, the slot in the back wall 26 of the channel 25 need not be longer than the distance traversed by the transverse stud 22 or the bearing element 33 in the channel shaped bracket 24 when the window is raised or lowered.

The window regulator mechanism can be assembled to the window pane or panel as follows: After the insertion of the window panel 12 in the window well of the door or the upper part of the vehicle body, but before securing the regulator mounting plate 11, the swinging arm 19 is connected to the window in such manner that the transverse stud 22 mounted on the end of the arm 19 and the bearing element 33 carried by the said stud is inserted into the U-shaped channel 25 formed in the bracket 24, the flange 34 of the stud 22 being passed through the enlarged portion 39 of the slot 23. The swinging arm 19 is then moved slightly to the right so that the transverse stud 22 engages in the slot 23 and the flange 34 engages behind the longitudinal edges of the slot, as shown in Fig. 1. The regulator mounting plate 11 may be then screwed onto the inner panel of the door or the body of the vehicle. The enlarged end 39 of the slot 23 in the back wall of the channel shaped bracket 25 has no effect on the operation of the mechanism because the enlargement of the slot lies outside the limits of the stroke of the driving or transverse stud or, in other words, because the swinging arm cannot be swung to the left beyond the position shown in Fig. 1 during operation thereof to raise the window.

I claim:

1. Connecting means for an end of a swinging regulator arm having a transverse stud secured to the end of the arm, comprising a unitary member having a front vertical wall formed with a longitudinal channel to provide vertically spaced upper and lower longitudinally extending generally horizontal bearing walls terminating at their outer edges in a single upright back wall joining said edges together, said back wall being formed with a longitudinal slot receiving said stud, a bearing element, said bearing element comprising a cup shaped cylindrical member having its outer cylindrical surface in bearing engagement with said bearing walls, a flange portion engaging the front wall of said unitary member and a sleeve portion journalling said cylindrical bearing means on said stud, and spring means carried by said stud between said regulator arm and an interior portion of said cylindrical member, said spring means overlying said sleeve portion and maintaining the regulator arm in spaced relation to said unitary member and holding said bearing element within said bearing surfaces.

2. Connecting means for an end of a swinging regulator arm having a transverse stud secured to the end of the arm, comprising a unitary member having a front vertical wall formed with a longitudinal channel to provide vertically spaced upper and lower longitudinally extending generally horizontal bearing walls terminating at their outer edges in a single upright back wall joining said edges together, said back wall being formed with a longitudinal slot receiving an end portion of said stud, said slot being larger than said end portion whereby the latter is substantially free of frictional engagement with the edges of said slot, means carried on said end portion to prevent withdrawal of said stud through said slot, a bearing element, said bearing element comprising a cup shaped cylindrical member having its outer cylindrical surface in bearing engagement with said bearing walls, a flange portion engaging the front wall of said unitary member and a sleeve portion journalling said cylindrical bearing means on said stud, and spring means carried by said stud between said regulator arm and an interior portion of said cylindrical member, said spring means overlying said sleeve portion and maintaining the regulator arm in spaced relation to said unitary member and holding said bearing element within said bearing surfaces.

References Cited in the file of this patent

UNITED STATES PATENTS

2,319,088	Roethel	May 11, 1943
2,610,876	Roethel	Sept. 16, 1952