

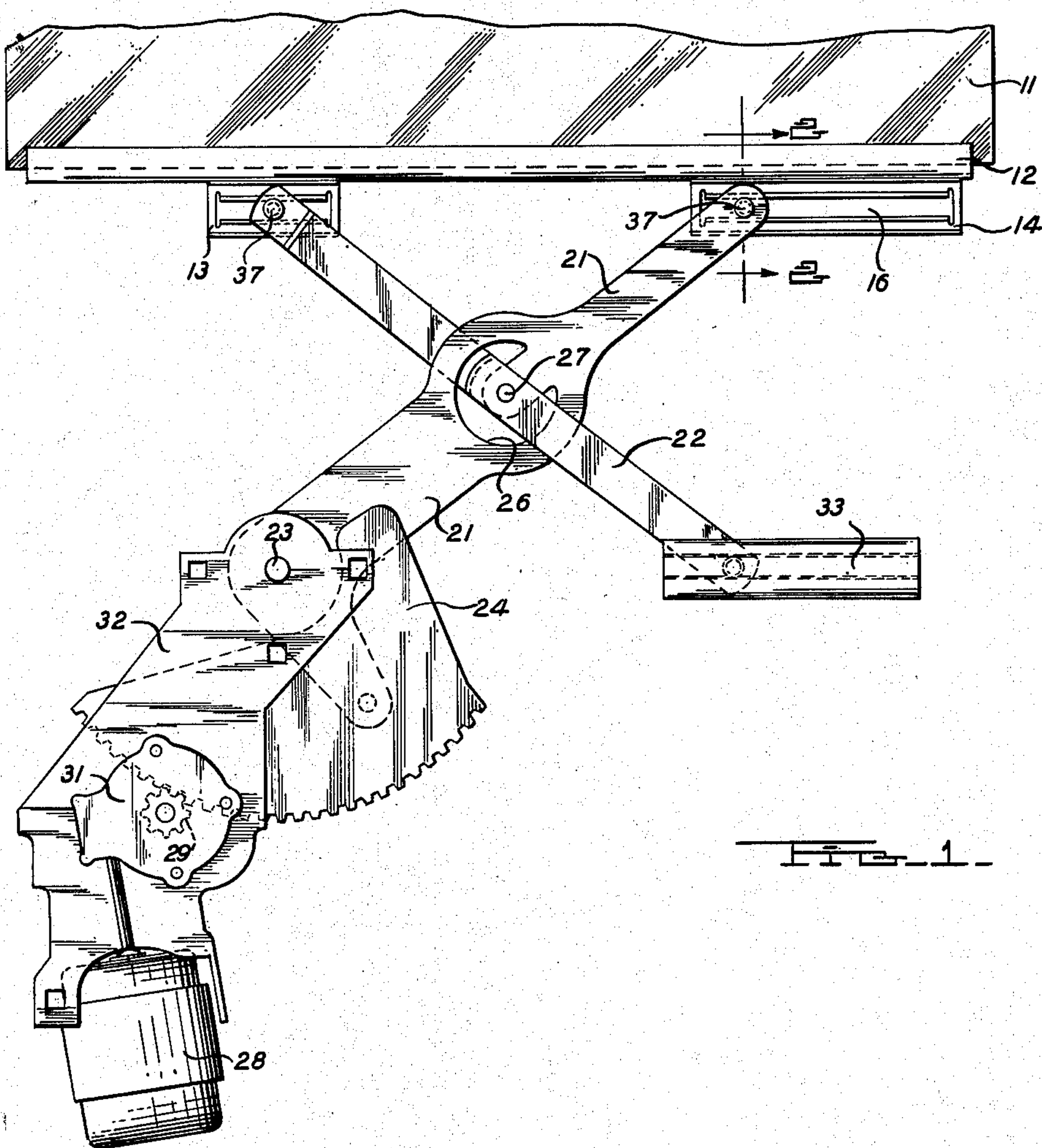
Feb. 17, 1953

C. H. BLANTON  
WINDOW REGULATOR

2,628,833

Filed Sept. 19, 1950

2 SHEETS—SHEET 1



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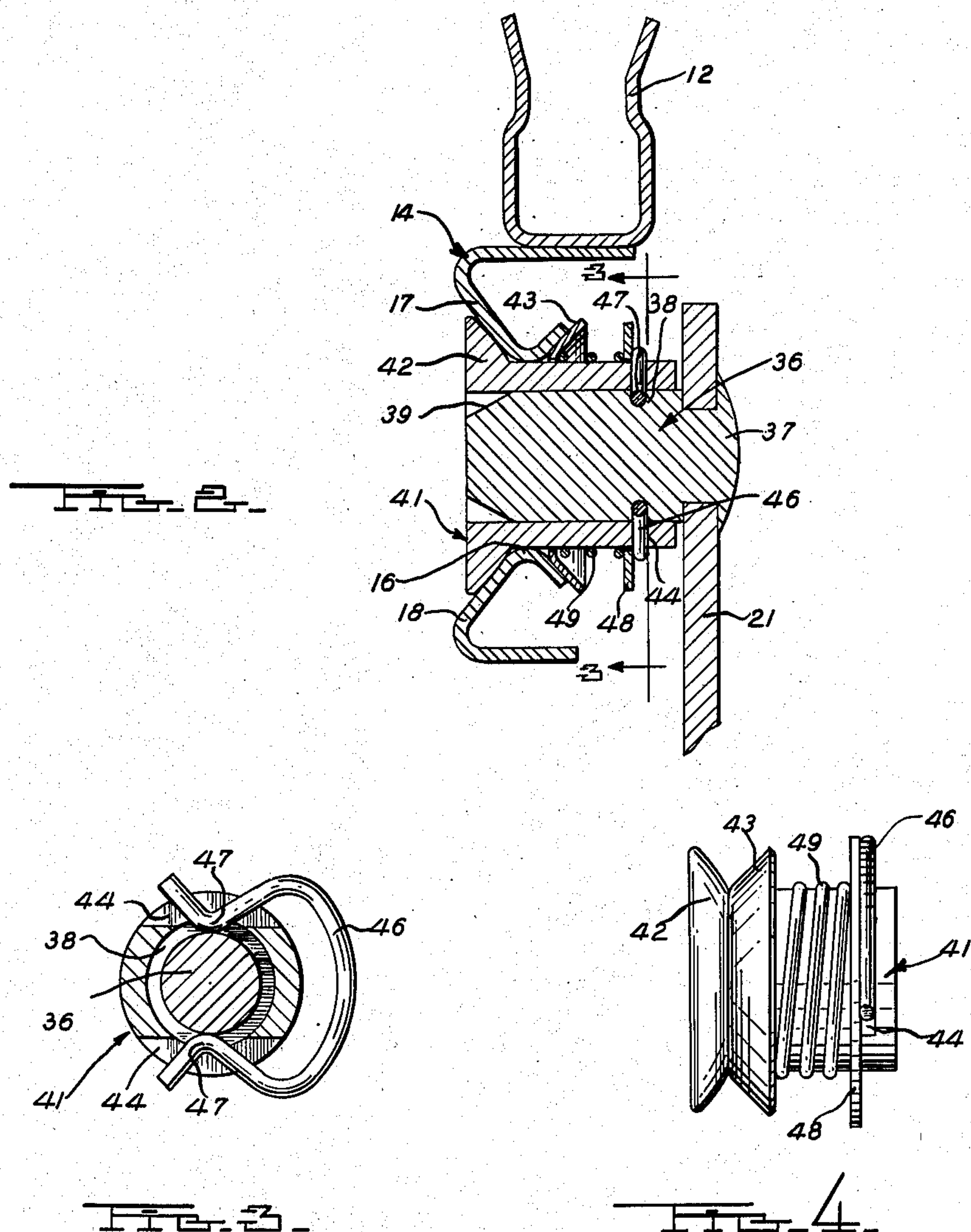
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2 SHEETS—SHEET 2



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## UNITED STATES PATENT OFFICE

2,628,833

## WINDOW REGULATOR

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2 Claims. (Cl. 268—126)

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This invention relates generally to window regulators for motor vehicles.

A principal object of the invention is to provide a window regulator construction in which the window regulator arms can be quickly and easily attached to the window frame and to the supporting structure. It is customary in the manufacture of motor vehicle bodies to preassemble the window regulator mechanism and install it as a unit within the vehicle door or body structure. The window glass is mounted in vertical glass runs provided in the door or body structure and thereafter the swinging arms of the window regulator are attached to the window frame and also to the body structure as required, depending upon the particular type of window regulator used. For example, with a cross arm type regulator it is necessary to attach one end of each of the two swinging arms to horizontally extending channel guideways carried by the window glass frame and also to connect one end of one of the arms to a channel guideway fixedly secured to the body structure. Difficulty is encountered in making these connections during assembly because of the restricted space between the inner and outer door or body panels, and in some cases this is accomplished by sliding the retainers carried by the regulator arms through open end portions of the channel shaped guideways. This is not entirely satisfactory however, due to the manipulation required to make these connections, and it is an object of the present invention to overcome these difficulties. In one embodiment of the invention attachment means are provided comprising a stud carried by each regulator arm and having a tapered or chamfered end portion easily insertable into a bore formed in a retainer which has been preassembled to the channel guideway. The retainer is slotted on opposite sides and carries a spring clip having detent portions projecting through the slots and engageable with an annular groove formed in the regulator arm stud to permit an automatic assembly to be readily made.

Another object of the invention is to reduce the cost of manufacture and assembly of window regulator mechanisms by providing an economical construction having a minimum of parts which may be rapidly assembled thus also effecting a saving in labor.

Other objects and advantages of the invention will be made more apparent as this description proceeds, particularly when considered

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in connection with the accompanying drawings wherein:

Figure 1 is an elevational view of a window regulator mechanism embodying the present invention.

Figure 2 is an enlarged cross-sectional view on the line 2—2 of Figure 1.

Figure 3 is a transverse cross-sectional view taken on the line 3—3 of Figure 2.

Figure 4 is a side-elevational view on a portion of the structure shown in Figure 2.

Referring now to the drawings, the present invention is shown in connection with a conventional cross arm regulator, but it will be understood that it is also applicable to other types of regulators as well. The reference character 11 indicates a vertically slideable window glass for a motor vehicle, mounted either in a door thereof or in a portion of the body structure. The lower edge of the window glass 11 is mounted in a U-shaped frame member 12. A pair of horizontally extending guideways 13 and 14 depend from the frame 12 and are suitably secured thereto as by spotwelding. Upon reference to Figure 2 it will be noted that the guideway 14 is generally channel shaped in cross-section with the upper leg of the channel being secured to the glass frame 12. Intermediate its ends the vertical web of the guideway is formed with a horizontally extending slot 16 defined by inwardly bent upper and lower flanges 17 and 18 respectively. The end portions of the flanges 17 and 18 are bent outwardly and each of the flanges is thus a modified V in cross section. The guideway 13 is similar to the guideway 14 except that it is shorter in length.

The cross arm regulator comprises a pair of crossed arms 21 and 22 of equal length. The power arm 21 is mounted for pivotal movement about a fixed pivot 23 and has secured thereto a gear segment 24. The balance arm 22 extends through an arcuate slot 26 in the power arm 21 and is pivoted at 27 to the midpoint of the power arm.

The gear segment 24 may be actuated in any convenient manner, the drawing showing a power actuated regulator in which an electric motor 28 drives a pinion gear 29 through a gear box 31. The motor and gear box are mounted upon a supporting plate 32 carried by the vehicle body structure.

A fixed channel shaped guideway 33 is carried by the vehicle body structure and slideably receives a retainer supported at the lower end of the balance arm 22, while the guideways 13 and



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14 carried by the window glass frame slideably receive similar retainers mounted at the upper ends of the swinging regulator arms 21 and 22. The retaining means mentioned above will now be described and for this purpose reference is made to Figures 2, 3 and 4. Inasmuch as the three retainers utilized in connection with the cross arm regulator mechanism shown are identical in construction, only one will be described in detail.

A cylindrical stud 36 is rigidly mounted upon the outer end of the regulator arm 21, the reduced end portion 37 of the stud being riveted to the arm. A short distance from the regulator arm the stud is formed with an annular groove 38. The outer end portion of the stud is chamfered or tapered at 39.

Cooperating with the stud 36 carried by the regulator arm is a retainer assembly slideably received within the slot 16 formed in the window guideway 14. This retainer assembly comprises a roller or sleeve 41, the internal diameter being of such size as to permit rotation and sliding movement relative to the stud 36. The outer end of the sleeve 41 is provided with a flange 42 engageable with the adjacent sides of the horizontally extending V-shaped flanges 17 and 18 of the guideway 14. A conical washer 43 is slideably mounted upon the sleeve 41 and engages the opposite sides of the V-shaped flanges 17 and 18.

Near its opposite end the sleeve 41 is formed with a pair diametrically opposite chordal slots 44 extending completely through the walls of the sleeve and opening into the interior thereof. A spring clip 46 of the hairpin type has inwardly extending yieldable detent portions 47 adapted to project through the slots 44 of the sleeve for a purpose to be hereinafter described more in detail. The spring clip 46 serves as a retainer for a flat washer 48 which in turn supports one end of a coil spring 49 the opposite end of which bears upon the conical washer 43.

The three retainer assemblies described above are assembled to the channel shaped guideways 13, 14 and 33 and it will be seen that they may be readily slid or rolled horizontally within the guide flanges 17 and 18 of the guideways. The window regulator mechanism including the cross arms 21 and 22, gear segment 24, motor 28 and gear box 31 are preassembled to the supporting plate 32 and this unit is then inserted between the inner and outer door or body panels and the supporting plate 32 is suitably secured to one of the panels.

To complete the assembly it is only necessary to insert the studs 36 carried at the ends of the regulator arms through the sleeves 41 of the retainer assemblies. The tapered end portions 39 of the studs facilitates this attachment and also enables the yieldable detent portions 47 of the spring clip 46 to be spread apart as the stud is inserted. When the studs 36 have been fully inserted into the sleeves 41, the detent portions 47 of the spring clips snap into the annular grooves 38 formed in the studs 36 and the assembly is completed. Removal of the mechanism can be readily effected by detaching the spring clips 46 with a suitable tool. It will be apparent that with the construction described above the connections between the regulator arms and the guideways can be readily accomplished, even though the space between the door or body panels is rather restricted, since it is only necessary to snap the studs carried by the ends of the regulator arms into the retainer assemblies carried

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by the guideways. A resulting saving in labor cost results.

It will be understood that the invention is not to be limited to the exact construction shown and described, but that various changes and modifications may be made without departing from the spirit and scope of the invention, as defined in the appended claims.

What is claimed is:

1. In a window regulator for a vertically slideable motor vehicle window, spaced horizontal guideways secured to the lower edge of said window, a retainer assembly slideably and rotatably mounted in each of said guideways, each of said retainer assemblies comprising a hollow sleeve having an enlarged flange at one end thereof, a pair of washers slideably mounted on said sleeve, a coil spring encircling said sleeve between said washers, and a spring clip embracing said sleeve and having inwardly extending detent portions projecting through slots formed in opposite sidewalls of said sleeve, said retainer assemblies being adapted to be preassembled to said guideways, a window regulator mechanism comprising a support, a pair of crossed regulator arms, a gear segment secured to one of said arms, and studs secured to the outer ends of said regulator arms and extending into the hollow sleeves of said retainer assemblies, each of said studs having an annular groove formed in its periphery to receive the detent portions of said spring clips and a tapered end portion at the end of the stud remote from the regulator arm, said regulator assembly being preassembled as a unit and readily attached to the horizontal guideways by inserting the studs at the ends of the regulator arms into the sleeves of the retainer assemblies carried by the guideways until the detent portions of the spring clips thereof snap into the annular grooves formed in the studs to complete the assembly.

2. In a window regulator for a vertically slideable window, a pair of spaced horizontal channels secured to the lower edge of said window, each of said channels being formed with vertically opposed V-shaped guideways forming horizontal slots therebetween, a retainer assembly slideably and rotatably mounted in each of said slotted channels, each of said retainers comprising a hollow sleeve having an enlarged integral flange at one end, said flange being formed with a conical surface engageable with one side of the V-shaped guideways of the channels, a conical washer slideably mounted upon said sleeve facing the integral end flange of said sleeve and engageable with the other side of said V-shaped guideways, a flat washer on said sleeve, a spring clip embracing said sleeve and having radially inwardly extending detent portions projecting through slots formed in opposite sidewalls of said sleeve adjacent the end of said sleeve remote from said integral end flange, said clip forming a backing for said flat washer, a coil spring encircling said sleeve between said flat and conical washers and yieldably urging said conical washer and the integral end flange of said sleeve into engagement with opposite sides of said guideways, a window regulator mechanism comprising a support, a pair of crossed regulator arms, and studs secured to the outer ends of said regulator arms and extending into the hollow sleeves of said retainer assemblies, each of said studs having an annular groove formed in its periphery adjacent the regulator arm to receive the detent portions of said spring clips and a tapered end



portion at the end of the stud remote from the regulator arm, said regulator assembly being pre-assembled as a unit and readily attached to the horizontal guideways by inserting the tapered ends of the studs at the ends of the regulator arms into the sleeves of the retainer assemblies carried by the guideways until the detent portions of the spring clips thereof automatically snap into the annular grooves formed in the studs to complete the assembly.

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