Nov. 3, 1925. 1,560,214

A. R. CLAS

WINDOW REGULATING MECHANISM

Filed Sept. 5, 1924

Fig 1

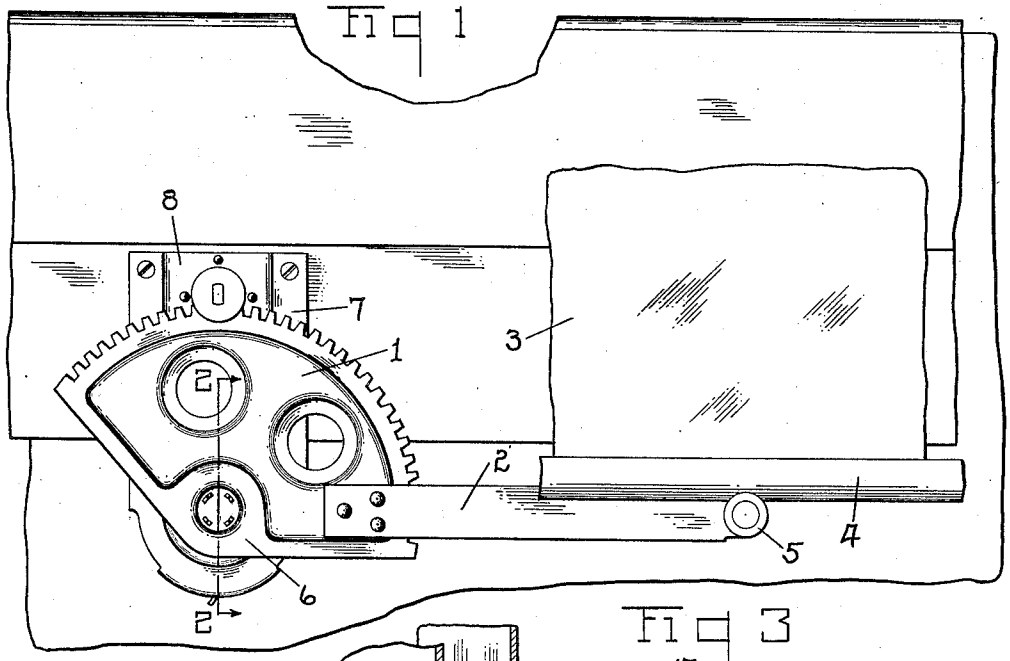


Fig 2

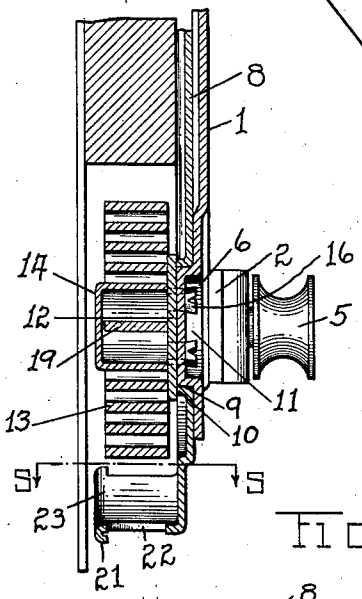


Fig 3

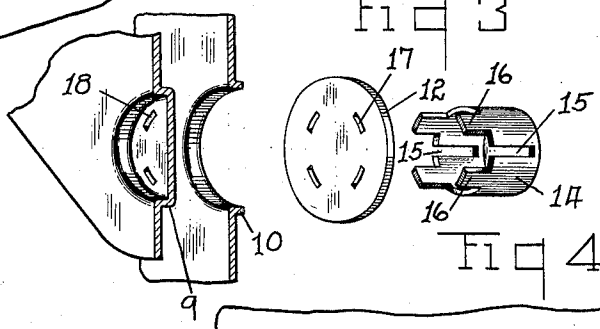


Fig 4

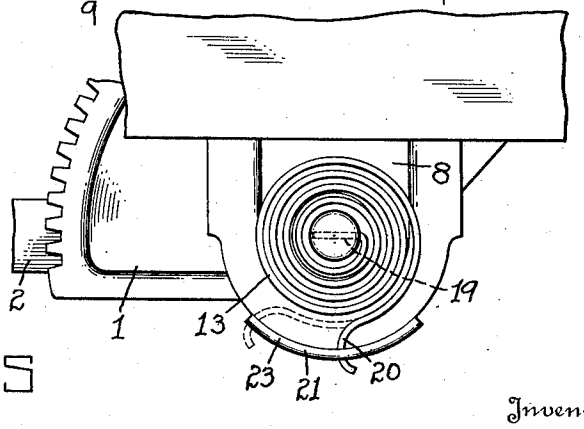
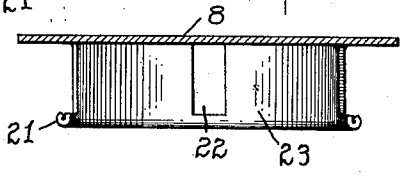


Fig 5



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UNITED STATES PATENT OFFICE.

ANGELO ROBERT CLAS, OF TOLEDO, OHIO, ASSIGNOR TO THE TOLEDO AUTOMOTIVE PRODUCTS COMPANY, A CORPORATION OF OHIO.

WINDOW-REGULATING MECHANISM.

Application filed September 5, 1924. Serial No. 736,014.

To all whom it may concern:

Be it known that I, ANGELO ROBERT CLAS, a citizen of the United States, and a resident of Toledo, in the county of Lucas and State of Ohio, have invented a new and useful Improvement in a Window-Regulating Mechanism, which invention is fully described in the following specification.

This invention particularly relates to window regulating mechanisms for use in closed vehicles, such as automobiles, and it has for its object to provide an efficient means for pivotally supporting a member operated to raise and lower the window and for connecting a counterbalancing spring to the member for counterbalancing the weight of the window as transmitted through the member. The particular object of the invention is to so construct the interconnecting means that it may be cheaply made and easily assembled, and when assembled will rigidly hold the parts in position and afford a large bearing area for the member in its support. Thus the invention provides an exceedingly efficient construction that may be made at a very low cost of production, since it provides a means whereby the construction may be made by automatic machinery, dies, presses, and the like, and may be readily assembled by the use of cheap labor.

The invention may be contained in structures of different forms and for the purpose of illustrating a practical application of the invention, I have selected a preferred embodiment of the invention as an example of such structures and shall describe it hereinafter. The structure selected is shown in the accompanying drawings.

Figure 1 of the drawings illustrates a side view of a member used in raising and lowering a window of the type commonly found in closed automobiles. Figure 2 is a view of a section taken on the line 2—2 indicated in Fig. 1. Figure 3 is a perspective view of dis-assembled parts of the means for pivotally supporting the member and for connecting the member to a counterbalancing spring. Figure 4 illustrates the counterbalancing spring in position for counterbalancing the member. Figure 5 is a view of a section taken on the line 5—5 indicated in Fig. 2, the spring being omitted. The view in Fig. 5 is somewhat enlarged as compared to the view shown in Fig. 4.

Fig. 1 illustrates but fragmentary parts of the members of the construction with which the window regulating mechanism coacts and to which it is connected to perform the functions for which it is designed. The particular window regulating mechanism illustrated in the drawings comprises a gear segment 1 that may be oscillated by the rotation of any suitable pinion. The segment 1 is provided with an arm 2 that is carried about the pivot of the segment 1 by the movement of the segment. The outer end of the arm 2 is connected by any suitable means to the window 3, which is to be raised and lowered. The window 3 is provided wih a bar 4 that covers the lower edge portion of the window 3 in the manner well known in the art, and the arm 2 is provided with a roller 5 that is pressed against the bar 4 to raise or sustain the weight of the window 3. It will thus be seen that the force used to raise and lower the window and sustain the window in any position in which it is placed, is transmitted through a unitary oscillatory structure comprising the gear segment 1 and the arm 2, and that the pivotally supported means must be exceedingly rigid and durable in order to produce an efficient window raising and lowering mechanism.

The gear segment 1 is pivotally connected to its support so as to afford a large bearing area for the oscillatory movements of the gear segment and a stud is provided for interconnecting the oscillatable part with the counterbalancing spring that, notwithstanding the magnification of the force of the load produced by the length of the arm as measured between the point of contact of the roller 5 with the window to the center of the stud, will sustain the window although the stud is cheaply made and readily assembled. It is exceedingly rugged and will withstand the severity of the strains to which it is subjected.

The gear segment 1 is preferably formed of sheet metal and its corner portion 6 is depressed from the plane of the body portion of the segment. The edge of the depressed portion 6 substantially describes a circle. The circular depressed portion 6 forms a lateral bearing for the support of the segment 1. The segment 1 may be supported by a sheet metal depending member 7 having a raised central portion 8, the width of the raised central portion 8 being

preferably as great as the diameter of the depressed circular portion 6. Thus the depressed circular portion 6 has bearing contact with the raised central portion 8 of the depending supporting member 7 and these contacting portions slide, one relative to the other, when the segment 1 is oscillated.

The depending portion 7 is provided with an opening 9 having a flange 10 that protrudes substantially at right angles to the plane of the raised portion 8 of the depending member 7. The depressed portion 6 is provided with a further depressed cylindrical portion 11 that fits the flange 10 about the opening 9. Thus the depressed cylindrical portion 11 may be inserted in the opening 9 and the surfaces of the flange 10 and the depressed cylindrical portion 11 will afford relatively rotating bearing surfaces. A disc 12 may be located on the cylindrical depressed portion 11 and so as to extend over the edges of the flanges 10. The disc 12 is secured to the depressed portion 11 so that the edge of the flange 10 will be engaged by the peripheral portion of the disc 12. Thus the segment 1 will be securely held in position for oscillative movements about its axis.

The weight of the window is counterbalanced by a convolute spring 13 which is connected to the segment 1 and to the supporting member 7. In order to connect the spring 13 so that it will sustain the weight of the window which is transmitted through the arm 2, and at the same time secure the bearing surfaces of the segment and the supporting member 7 rigidly in their relative positions for rotatably supporting the segment 1, a stud 14 is secured to the segment 1 and the spring 13 is connected to the stud 14. The stud 14 is formed of sheet metal. It is made in the form of a thimble having slots 15 on opposite sides thereof, through which an end portion of the spring 13 extends, and when the spring 13 is placed under tension, its end portion will be located in the stud 14. The other end of the convolute spring 13 may be connected in any suitable way to a stationary part. It is preferably connected to the supporting member 7, and so that rotation of the segment 1 to further distort the spring will be resiliently resisted by the spring in the manner well known in the art. In order that the stud 14 may be rigidly connected, not only to the balancing spring but also to the segment to securely retain it in rotative position, the edges of the thimble-like stud are provided with four projecting tongues 16, that may be inserted through slots 17 located in the disc 12, and slots 18 located in the segment 1. The slots 17 and 18 have a cross-sectional area substantially the same as that of the tongues 16, and so that the tongues will tightly fit within the slots when they are inserted therein. When the connection is made the tongues are inserted in the slots and the ends of the tongues are split as shown in Fig. 2, so as to cause the outer end portions of the tongues to spread and thus rigidly engage not only the disc 12 but particularly the portions of the segment 1 located at the ends of the slots 18

The inner end portion 19 of the convolute spring is inserted through the slots 15 to engage the stud. The outer end portion 20 is connected to a stationary part of the structure such as the depending supporting member 7. This is done after the spring has been bent to sustain at all times the weight, or a material part of the weight of the window, in the manner well known in the art. In the form of spring shown, the outer end portion 20 is bent semi-circularly to form a hook, whereby engagement may be easily made with the supporting member 7. In order to provide a rigid anchor for the fixed end of the spring, the lower end of the supporting member 7 may be provided with a flange 21, preferably curved to conform to the segment of the cylinder having an axis that extends through the center of rotation of the segment, and recesses 22 are formed in the flange. The hooked end of the spring 13 may be located in any one of the recesses according to the degree that it is desired to distort the spring from its normal form. The plurality of engaging points for the outer end of the convolute spring provides a means for adjusting the yielding resistance, and consequently the counterbalancing effect of the spring. The flange 21 is provided with a bead 23, whereby the flange is greatly reinforced and enables the flange to sustain the unusual pressure to which the flange is subjected by the spring. The constructions of the spring 13, the stud 14, and the anchoring flange 21, are such that the spring may be readily positioned so as to resiliently sustain the arm 2 as against right hand rotation, or in position such that it may resiliently sustain the arm 2 as against left hand rotation, and adjustment made in either case.

I claim:—

1. In a window regulating mechanism, a support, a window actuating member in close juxtaposition to the support, an integral portion of said member protruding into one side of said support thereby pivotally to connect the member thereto, and a plate engaging the end portion of said protruding portion on the opposite side of the support.

2. In a window regulating mechanism, a sheet metal support, an inwardly extending annular flange on said support, a sheet metal toothed sector for actuating the window, an inwardly depressed annular por-

tion on said sector protruding into said support and bearing against said flange, and a disc connected to the end of the protruding portion and engaging the support thereby pivotally to connect the sector thereto.

3. A window regulating mechanism, consisting of a self-contained unit comprising a sheet metal support, a sheet metal window actuating member in close juxtaposition to said support, a pivot member secured to said window actuating member and projecting through said support, a retaining member fixed to said pivot member and bearing against said support thereby to hold said actuating member against lateral displacement relatively to said support and a convolute spring on said support fixed at one end to said pivot member and at the other end to said support, said support having a plurality of abutments to receive the end of said spring whereby adjustment thereof may be effected.

4. In a window regulating mechanism, a support, a pivoted member on one side of said support for sustaining and raising the window, a sheet metal cup-shaped stud on the opposite side of said support and extending therethru, integral tongues on said stud engaging said pivoted member, said stud engaging said support and providing a journal for said pivoted member, said stud having slots, and a convolute spring having one end portion located in the slots and the other end portion connected to the support.

5. In a window regulating mechanism, a pivoted member for sustaining and raising the window, a support for the member, a stud connected to the member, a convolute spring having one end connected to the stud, the support having a flange, the flange having recesses located in spaced relation and the remaining end portion of the convolute spring adapted to engage any one of the edges of the recesses for adjusting the torsional resistance of the spring.

6. In a window regulating mechanism, a sheet metal member for sustaining and raising the window, a sheet metal support for the member, the member having a raised cylindrical portion protruding into the support for pivotally connecting the member to the support, a disc, a thimble having tongues for connecting the disc to the said portion, for securing the member in rotating position on the support and connecting the thimble to the member, a convolute spring connected to the thimble and to the support.

7. In a window regulating mechanism, a sheet metal member for sustaining and raising the window, a sheet metal support for the member and having a raised central portion, the member having a depressed circular portion and a cylindrical portion protruding into the support for forming bearing surfaces, a disc, a thimble having tongues for connecting the disc to the said cylindrical portion, for securing the member in rotating position on the support and connecting the thimble to the member, the support having a flange, the flange having a plurality of openings, a convolute spring connected to the thimble and to the flange in any one of the said openings.

8. In a window regulating mechanism, a channelled sheet metal support, a sheet metal sector in close juxtaposition to one side of said support, a retaining member connected to said sector on the opposite side of said support thereby to hold said sector against lateral displacement, and a spring in the channel of said support connected to be tensioned by movement of said sector in one direction, the outer surface of said spring being substantially flush with the outer surface of said support.

9. In a window regulating mechanism, a support, a bracket secured to said support, a pivot stud journaled intermediate its ends in the bracket, a gear on said stud in close juxtaposition to the side of the bracket opposed to the support, and a counter-balance spring on said stud on the opposite side of said bracket, and disposed in the plane of said support.

10. In a window regulating mechanism, a support, a bracket secured to said support with the lower portion of the bracket extending beyond the edge of said support, a pivot stud projecting through the outer end of said bracket, a gear on said stud in close juxtaposition to the side of the bracket opposed to the support, a counterbalance spring of said stud on the opposite side of said bracket and disposed within the plane of said support, and a flange on the outer end of said bracket having an abutment forming an anchor for said spring.

In testimony whereof, I have hereunto signed my name to this specification.

ANGELO ROBERT CLAS.