

Oct. 9, 1928.

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B. S. FLORADAY ET AL

WINDOW REGULATOR

Filed March 25, 1927

2 Sheets-Sheet 1

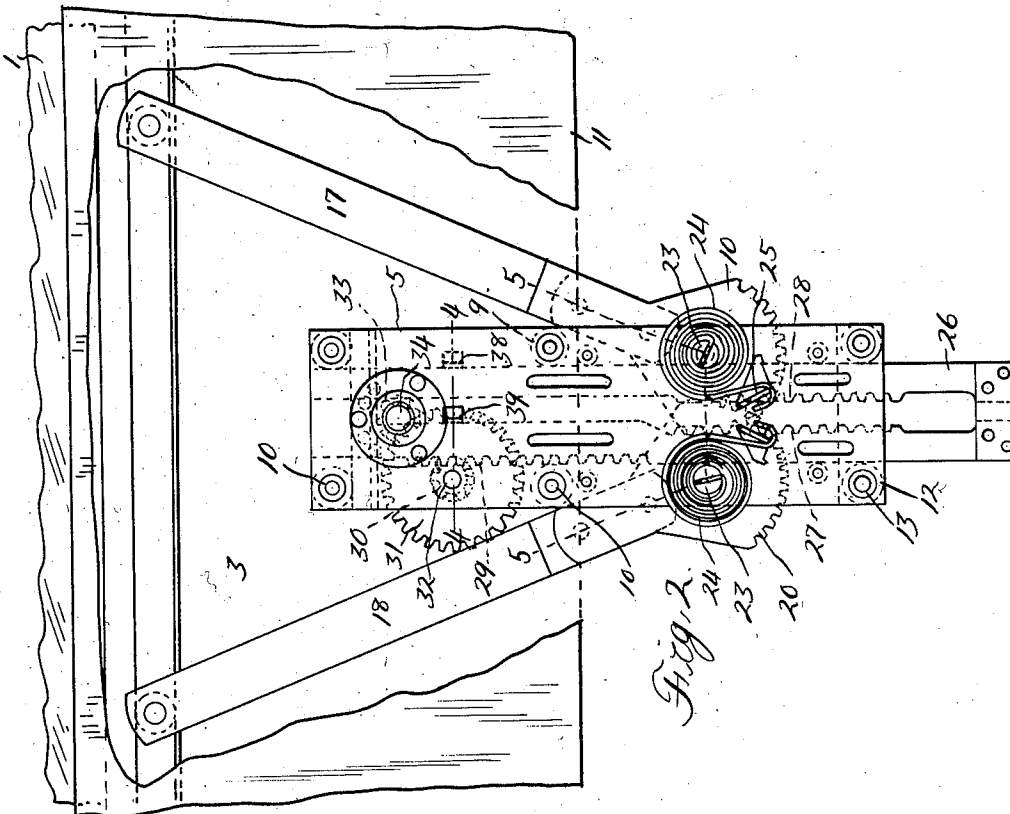


Fig. 2.

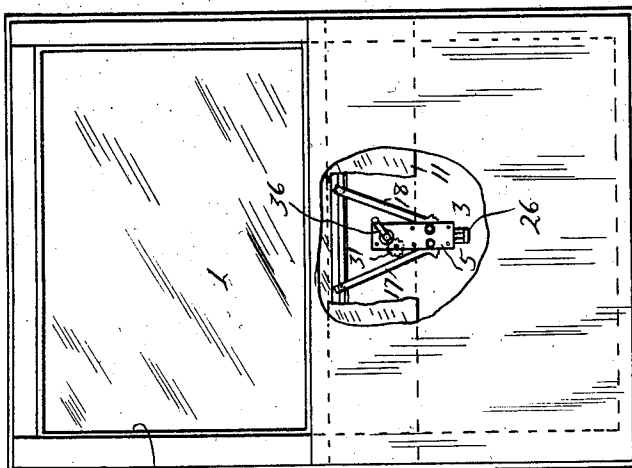


Fig. 1.

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2 Sheets-Sheet 2

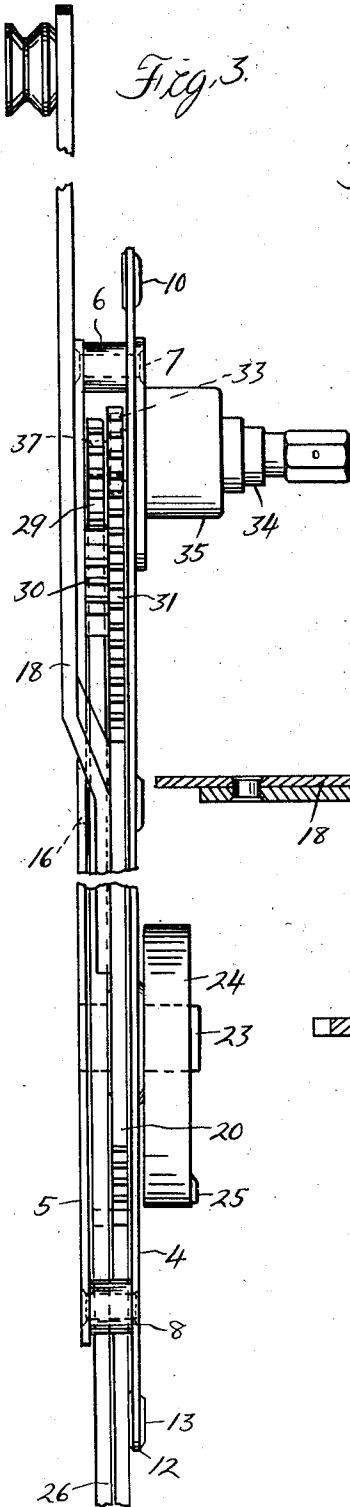


Fig. 6.

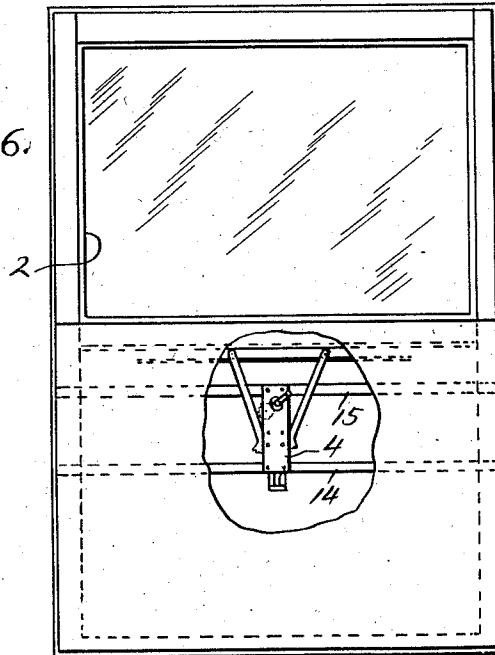


Fig. 5.

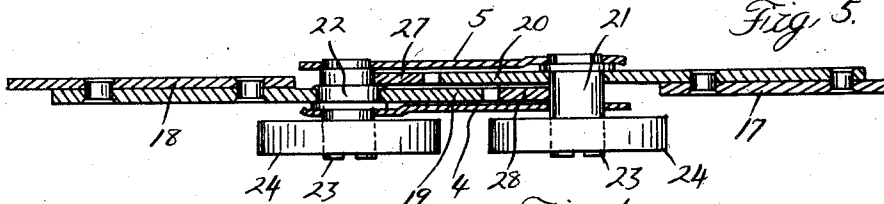
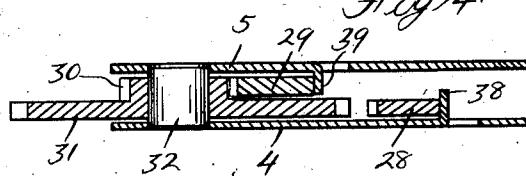


Fig. 4.



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UNITED STATES PATENT OFFICE.

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WINDOW REGULATOR.

Application filed March 25, 1927. Serial No. 178,203.

The invention relates to window regulators and refers more particularly to window regulators of that type having a pair of lifter arms movable in unison to raise or lower the window. One of the objects of the invention is to so construct the window regulator that it may be cheaply manufactured and assembled and easily operated to move the window through an extended range. Another object is to so construct the window regulator that the upper portion of the mounting plate may be secured to a lock board or other support or both its upper and lower ends may be secured to boards or supports. A further object is to so construct the window regulator that the pivotal means for the lifter arms may be located a substantial distance below the upper end of the mounting plate and the handle or crank for actuating the mechanism may be located at the upper end of the mounting plate. With these as well as other objects in view, the invention resides in the novel features of construction and combinations and arrangements of parts as more fully hereinafter set forth.

In the drawings:—

Figure 1 is an interior side elevation partly broken away of a motor vehicle door having applied thereto a window regulator embodying our invention;

Figure 2 is an enlarged interior side elevation of the window regulator;

Figure 3 is an end view thereof;

Figures 4 and 5 are cross sections respectively on the lines 4—4 and 5—5 of Figure 2;

Figure 6 is a view similar to Figure 1 showing a modified arrangement.

In the present instance we have shown the window regulator embodying our invention as applied to a motor vehicle door having the vertically slidable window 1 in the nature of a glass adapted to close the opening 2 in the upper portion of the door or to be received in the chamber 3 in the lower portion of the door, the window slidably engaging in the usual guide ways. 4 and 5 are vertically extending spaced inner and outer mounting plates respectively, the outer mounting plate terminating short of the inner mounting plate and being rigidly secured at its upper end in spaced relation to the inner mounting plate by the shouldered spacer 6 having the riveted ends 7. The lower end of the outer mounting plate is

rigidly secured in spaced relation to the inner mounting plate by similar shouldered spacers 8 while the intermediate portions of the two mounting plates are rigidly secured in spaced relation by the similar shouldered spacers 9. The upper portion of the inner mounting plate is in the nature of an anchoring portion, it being provided with the openings 10 for receiving screws or the like to secure the mounting plate to a lock board 11, as shown in Figure 1. The lower end of the mounting plate also forms another anchoring portion 12, it having openings 13 for receiving screws or the like to secure the lower end of the mounting plate to a board 14, as shown in Figure 6, at which time the upper end of the mounting plate is secured to a board 15. This latter board may or may not be the lock board. The portion of the outer mounting plate 5 opposite the lowermost openings 10 in the inner mounting plate is provided with the aligned openings 16 to permit the insertion of the screws or the like as well as suitable operating tools there-through while securing the inner mounting plate in place.

17 and 18 are the angularly movable lifter arms having their outer ends suitably operatively connected to the window and their inner ends rigidly secured to the gear segments 19 and 20, respectively. 21 and 22 are the pivots for the lifter arms extending through the inner and outer mounting plates 4 and 5, respectively, the gear segments 19 and 20 being rigidly secured respectively to these pivots. The inner ends of the pivots are provided with transverse slots 23 for receiving the innermost ends of the counterbalancing spiral springs 24, the outermost ends of which are provided with hooks to engage the lugs 25 upon the inner mounting plate 4. The gear segments are located between the inner and outer mounting plates and in order to locate the pivots for the lifter arms adjacent to each other and at the same time provide for the necessary leverage to swing the lifter arms the gear segments are laterally offset and overlap each other.

To rotate the gear segments in unison, we have provided the vertically reciprocable rack member 26 located between the inner and outer mounting plates and having at its lower end the laterally offset internal racks 27 and 28 facing each other and meshing re-

spectively with the gear segments 19 and 20. This rack member is provided at its upper end and along one of its edges with the external rack 29 extending parallel of the other racks and meshing with the pinion 30, which is rotated in unison with the gear 31, the pinion and gear being mounted upon the shaft 32 extending between the inner and outer mounting plates. 33 is a second pinion meshing with the gear 31 and adapted to be driven from the driving shaft 34 through suitable clutch mechanism within the cup 35, the driving shaft having secured to its inner end the handle or crank 36. The cup 35 is rigidly secured to the inner mounting plate and as a consequence the driving shaft may be said to be mounted upon the inner mounting plate. Furthermore, the pinion 33 is mounted upon the pin 37 having one end mounted in the outer mounting plate and the other end mounted in the driving shaft and consequently upon the inner mounting plate.

The rack member 26 has the lower portions of its edges 26 below the external rack 29 slidably engageable with the shoulders spacers 8 and the pivots 21 and 22. For holding the external rack 29 in mesh with the pinion 30 there are the lugs 38 and 39 which are preferably struck out from the mounting plates and extend transversely thereof to engage the inner and outer edges of the rack member 26 facing in a direction opposite to that of the rack 29.

With the above construction it will be seen that the rack member is effectively guided during its reciprocation and that it simultaneously actuates the gear segments and thereby swings the lifter arms in unison. It will also be seen that the handle or crank for actuating the mechanism is located at the upper end of the mounting plate, while the pivots for the lifter arms may be located near its lower end. It will be further seen that the construction is such that it provides for a very simple form of reduction gearing. In addition to these features and of decided importance is the fact that separate pivots are provided for the lifter arms and arranged adjacent to each other.

What we claim as our invention is:

1. In a window regulator, the combination with a pair of angularly movable lifter arms, a gear segment connected to each lifter arm, said gear segments being laterally offset from each other, and a toothed member having laterally offset toothed portions meshing with said gear segments for actuating the same.

2. In a window regulator, the combination with a pair of angularly movable lifter arms, a gear segment connected to each lifter arm, said gear segments being laterally offset from each other, laterally offset racks meshing with said gear segments, and means for actuating said racks in unison.

3. In a window regulator, the combination with a pair of angularly movable lifter arms, a gear segment connected to each lifter arm, said gear segments being laterally offset from each other, and a reciprocable rack member having laterally offset racks meshing with said gear segments for actuating the same.

4. In a window regulator, the combination with a pair of angularly movable lifter arms, a gear segment connected to each lifter arm, said gear segments being laterally offset from each other, a reciprocable rack member having laterally offset racks meshing with said gear segments, and a third rack, and a rotatable toothed member meshing with said third rack for actuating said rack member.

5. In a window regulator, the combination with a pair of angularly movable lifter arms, gear segments connected to said lifter arms and having overlapping portions, a reciprocable rack member having laterally offset racks meshing with said gear segments, and a third rack extending substantially parallel to said first mentioned racks, a rotatable toothed member spaced from said gear segments and meshing with said third rack, and a second rotatable toothed member for actuating said first mentioned toothed member.

6. In a window regulator, the combination with a pair of pivotal lifter arms, gear segments connected to said lifter arms and having overlapping portions, and a rack member guided by the pivots for the lifter arm and having laterally offset racks meshing with said gear segments.

7. In a window regulator, the combination with a mounting plate and a transverse lug thereon, of a pair of angularly movable lifter arms, pivots for said lifter arms upon said mounting plate, gear segments connected to said lifter arms and having overlapping portions, a rack member having laterally offset racks meshing with said gear segments, said rack member having its edges slidably engaging said pivots and lug, and a rotatable toothed member for actuating said rack member, said toothed member engaging the edge of said rack member opposite that engaged by said lug.

8. In a window regulator, the combination with a mounting plate, of a pair of angularly movable lifter arms, pivots upon said mounting plate for said lifter arms, toothed members rigidly secured to said lifter arms, a reciprocable rack member for actuating said toothed members, said rack member slidably engaging said pivots, and a lug struck out from said mounting plate for also guiding said rack member.

9. In a window regulator, the combination with a pair of spaced mounting plates, of a pair of angularly movable lifter arms, pivots for said lifter arms extending between said mounting plates, toothed members rigidly connected to said lifter arms and having lat-

erally offset portions, said toothed members extending between said mounting plates, and a reciprocable rack member extending between said mounting plates and having laterally offset racks meshing with said toothed members for actuating the same.

10. In a window regulator, the combination with a mounting plate having anchoring portions at its opposite ends for securing said mounting plate to a support, of a pair of angularly movable lifter arms, pivots for said lifter arms upon said mounting plate near one of its ends, gear segments connected to said lifter arms and having laterally offset overlapping portions, a rack member reciprocable longitudinally of said mounting plate and having laterally offset racks meshing with said gear segments, and a third rack, a toothed member mounted upon said mounting plate near its opposite end and meshing with said third rack, and a driving shaft mounted upon said mounting plate near its last men-

tioned end and adapted to be operatively connected to said toothed member.

11. In a window regulator, the combination with a pair of angularly movable lifter arms, toothed members connected to said lifter arms and having laterally offset portions, and an actuating member having laterally offset toothed portions meshing with said toothed members.

12. In a window regulator, the combination with a pair of angularly movable lifter arms, toothed members connected to said lifter arms and having laterally offset overlapping portions, and a reciprocable rack member having laterally offset racks meshing with said toothed members for actuating the same.

In testimony whereof we affix our signatures.

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HOWARD B. HASKINS.