

May 9, 1933.

E. J. HARDTKE

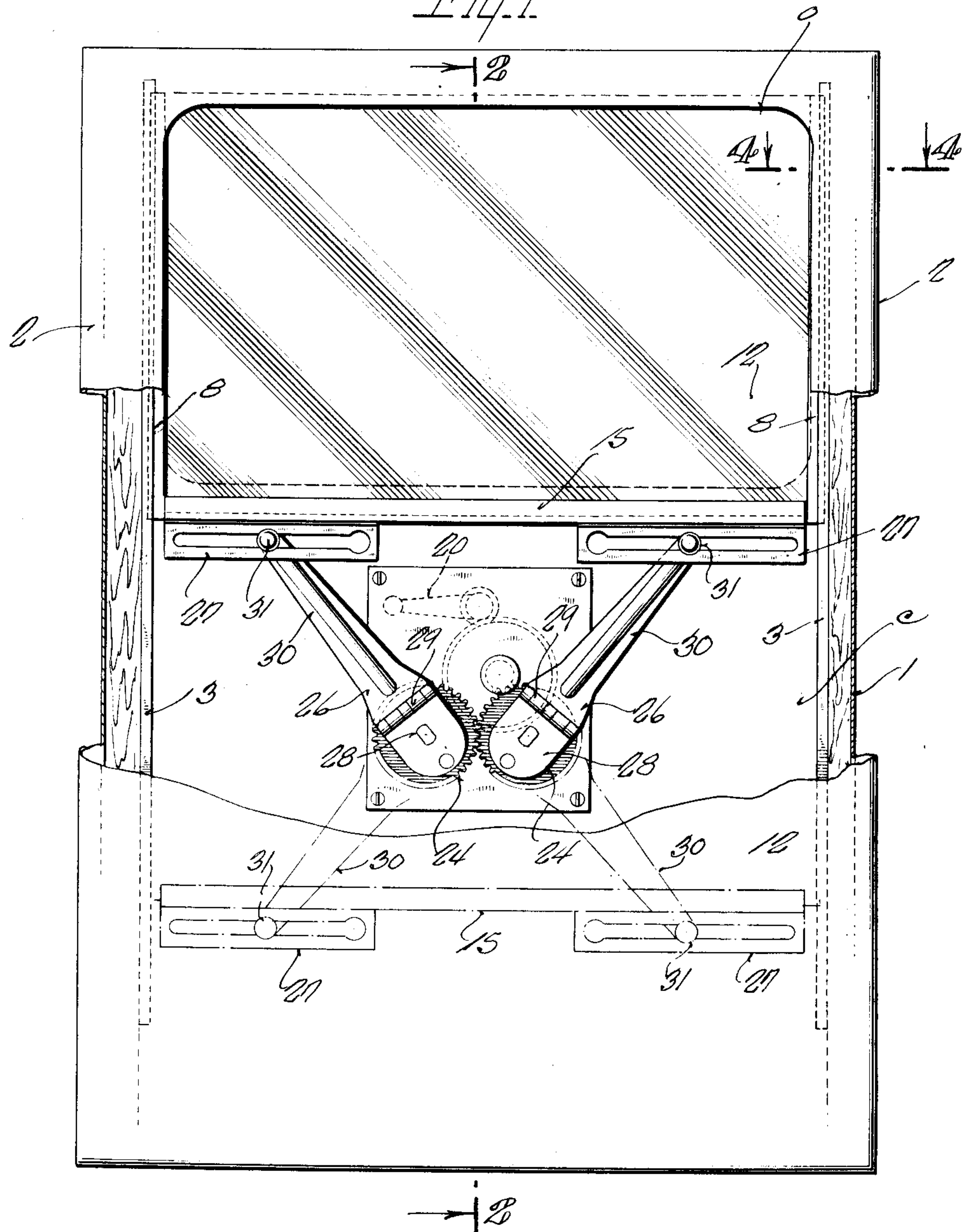
1,907,799

WINDOW OPERATOR

Filed June 11, 1931

2 Sheets-Sheet 1

Fig. 1



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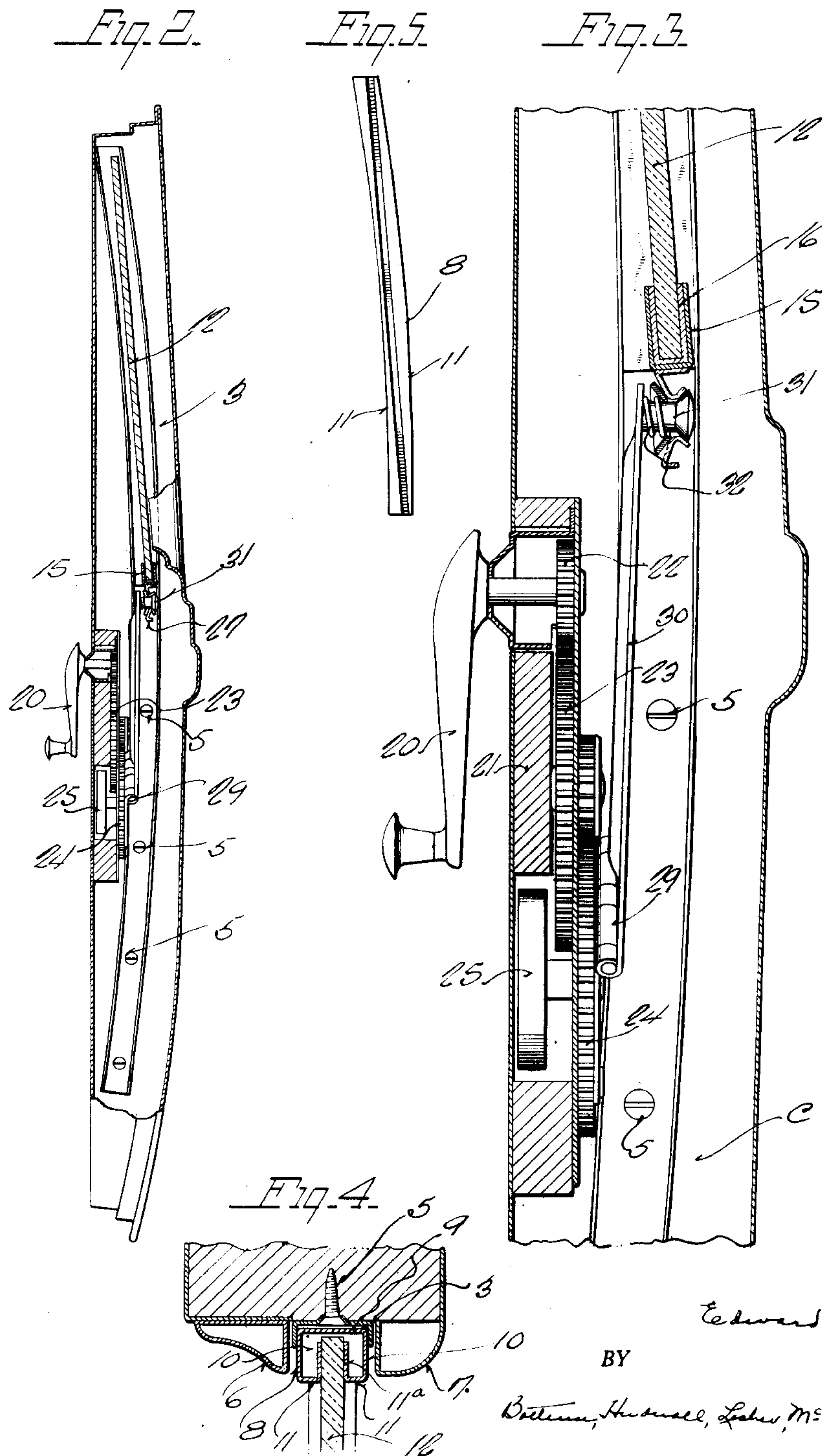
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# UNITED STATES PATENT OFFICE

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## WINDOW OPERATOR

Application filed June 11, 1931. Serial No. 543,513.

This invention relates to a window mounting and operating means therefor which may be embodied in the door of an automobile, in a window thereof, or in the partition between the compartments thereof.

One of the principal objects of the invention is to provide a simple, practical and durable construction for the windows of structures of this character which, when the window is in closed position, disposes the same at an angle to the vertical to minimize or eliminate reflections so disturbing to the driver and occupants when the window in closed position is vertically disposed.

Another object is to provide a structure having these advantages and capacities and yet so constituted as to permit the window to be fully opened and when so opened concealed in the body of the door or in other structure of the automobile.

A still further object is to provide a device of this character in which the opening and closing of the window may be effected from the usual crank handle and in a smooth and easy manner.

Other objects and advantages reside in certain novel features of the construction, arrangement and combination of parts which will be hereinafter more fully described and particularly pointed out in the appended claims, reference being had to the accompanying drawings, forming a part of this specification, and in which:

Figure 1 is a view in elevation of the inner side of a door embodying the present invention, with parts broken away and parts shown in section for the sake of illustration;

Figure 2 is a view in vertical section taken on line 2—2 of Figure 1, parts being shown in elevation for the sake of illustration;

Figure 3 is a fragmentary view similar to Figure 2 but showing the construction on an enlarged scale;

Figure 4 is a fragmentary view in transverse or horizontal section taken on line 4—4 of Figure 1; and

Figure 5 is a detail view of one of the slide members in which the window pane is mounted.

While, for the sake of illustration, the in-

vention will be described as embodied in a door structure, it should be understood that this is merely for the purpose of simplifying the illustration and that it may be embodied wherever a window pane is employed in a car and it is desirable to realize the advantages of the present invention.

Referring to the drawings, the numeral 1 designates generally a door structure which is shown more or less diagrammatically as the details may be varied. The door structure has a suitable opening O and is constituted to provide a glass receiving compartment or pocket C. To the side members 2 of the door, curved or arcuate channel guides 3, preferably constructed of sheet metal, are appropriately secured as by means of screws 5. Preferably, the upper portions of these guides are inset, as illustrated in Figure 4, within a molding strip 6 and door structure 7 having a corresponding function. Slidable in each of the guides 3 is a slide 8. The slides 8 are of similar construction and each is fashioned from a single piece of sheet metal and in cross section is of channel form in that it has a base 9 and side members 10. The side members 10 are provided with inwardly directed angular flanges 11, portions of which frictionally grip, and, if desired, are suitably secured to the side edges of a pane of glass designated at 12. The portions 11<sup>a</sup> of the flanges 11 of the slides define the slots which receive the glass as described and the slots so defined are transversely aligned but are angled or inclined with respect to the vertical. This inclination or angling is of such character and degree that when the window is closed the glass 12 is disposed at an angle to the vertical and thus so related to the driver and other occupants of the vehicle as not to disturb the driver or other occupants with disagreeable or distracting reflections. The lower ends of the slides 8 are secured to the ends of a bottom channel 15 which receives and is secured to a glass in any suitable manner. Preferably, a liner 16 is disposed between the bottom channel 15 and the glass 12. Means is provided for raising and lowering the glass 12 and holding the same in any in-



intermediate adjustment as well as in raised or lowered position and comprises an operating handle 20 which may be supported for rotation in a lock board 21. On the axis or shaft of the handle 20 a pinion 22 is provided and drives a reduction gear train 23 including as its driven members twin gears 24. A counterbalancing spring arrangement 25 is associated with the twin gears 24. As thus far described, this is the conventional window regulating or raising and lowering mechanism. The present invention provides crank arms designated generally at 26 and of special construction between the twin gears 24 and the slotted connecting strips 27 which are fastened to the bottom channel 15 of the glass 12. Each crank arm 26 includes a section 28 secured to one face of its gear 24. Hingedly connected as at 29 to the section 28 is an elongated arm section 30 which, at its outer end, is provided with a headed stud 31 slidably fitted in the slot of its connecting strip 27. To preclude vibration the usual springs 32 may be associated with the studs 31. By providing the hinged crank arms 26, the varying angular relation between the bottom channel 15 or rather between the connecting strips 27 and the gear wheels 24 is compensated for and binding or jamming is avoided, the transmission of the operating force or motion from the handle 20 to the window glass 12 being equally efficient in all adjustments.

While I have shown and described one particular construction in which my invention may be embodied, it is to be understood that the structure disclosed has been selected merely for the purpose of illustration and that various changes in the size, shape and arrangement of parts and in other structural respects may be resorted to without departing from the spirit of the invention or the scope of the subjoined claim.

The invention claimed is:

In a vehicle body structure of the type having a window slidable in curved guides and positioned at an angle to the vertical when closed, means for raising and lowering the window consisting of crank operated gear wheels, crank arms actuated by said gear wheels, each crank arm consisting of a section fixed to a gear wheel, and a second section hinged to said first-mentioned section and provided at its outer end with a headed stud, and slotted connecting strips adapted to be secured to the window and co-operable with the headed studs.

In witness whereof, I hereto affix my signature.

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EDWARD J. HARDTKE.