

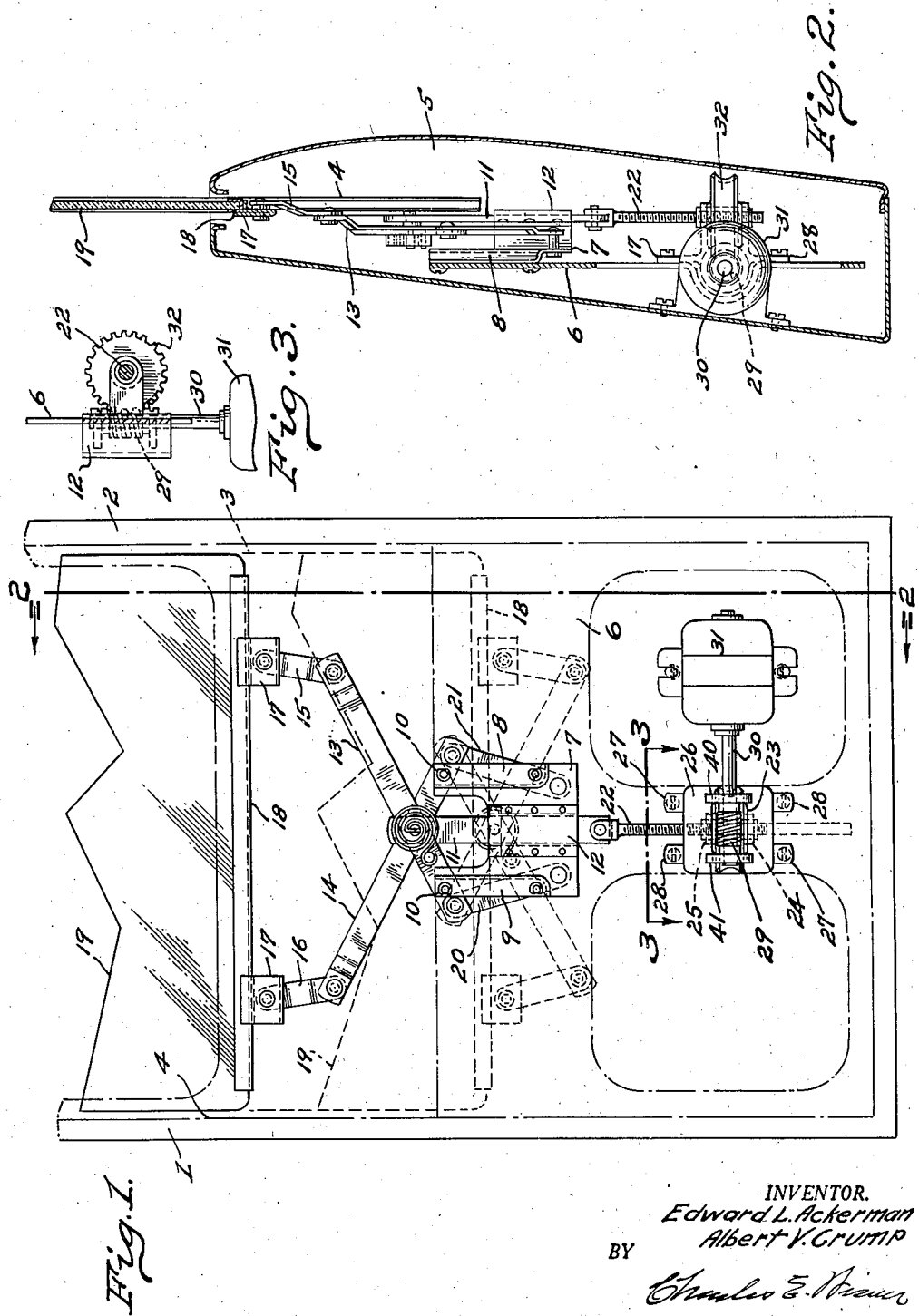
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ELECTRICALLY OPERATED WINDOW REGULATOR

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ELECTRICALLY OPERATED WINDOW
REGULATOR

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This invention relates to window regulators, the object being to provide an electrically operated window regulator utilizing a reversible electric motor for raising or lowering a glass or sash in respect to the window opening in an automobile or other inclosure.

The principal feature and object of the invention resides in the provision of crossed arms in a pivotal relation having a counterbalancing spring and a slidable bar to the end of which a pin is secured to one of the arms at the crossed point and the other arm is in a rotatable relation therewith. A screw is attached to the bar, a worm gear and nut thereon is positioned in the sash recess and a worm is provided on the motor shaft for rotating the nut to thereby cause longitudinal movement of the screw and the bar to turn the arms on the pivot all as hereinafter more fully described.

The structure embodying our invention is shown in preferred form in the accompanying drawing in which—

Fig. 1 is an elevation showing the general relationship of parts according to our invention.

Fig. 2 is a vertical section taken on line 2—2 of Fig. 1.

Fig. 3 is a sectional elevation taken on line 3—3 of Fig. 1.

In the preferred form of the invention, here shown, the window regulator and the motor for operating the same is mounted within the sash recess or pocket below the window opening, the opposed vertical edges of which opening being indicated at 1 and 2. On the opposite vertical edges of the window opening are mounted the guide channels 3 and 4 which extend into the sash recess or pocket 5.

In the sash pocket is mounted a plate 6 and to this plate is secured a base plate 7 having at its respective opposite vertical edges raised flanges 8 and 9 on each of which is threaded lugs 10 to receive bolts for securing the same to the plate 6. The base plate 7 is provided with a recessed body in which a slide 11 rides and a cover plate 12 is provided having a similar recessed portion, which together with the recessed portion of the plate 7, support the slide 11 and restricts movement thereof to a vertical plane. The flanges 8 and 9 are secured to the plate 6.

The crossed arms 13 and 14 have at their respective upper long ends links 15 and 16 which are each pivoted to the respective ends of the arms and at the opposite end to brackets 17 which are secured to a glass receiving channel 18 se-

cured to the lower edge of the glass 19. The short ends of the arms 13 and 14 are each respectively pivotally secured to links 20 for the arm 13 and 21 for the arm 14 and these links are in turn pivotally supported at the respective opposite ends to the plate 7. Through longitudinal movement of the bar 11 by the screw 22, the arms are movable from the position shown in full lines in Fig. 1 to the position shown by dotted lines therein thus moving the glass from the closed position downwardly to the open position. The glass may be partially moved in either direction to vary the degree to which the window is opened to provide for desired ventilation of the automobile body.

For the movement of the bar 11 I provide the screw 22 which is non-rotatably fixed at its upper end to the lower end of the bar 11 and extends through a revoluble nut 23 held from longitudinal movement on the screw by the ears 24 and 25 which may be struck outwardly from the plate 26 which is secured to the supporting plate 6 as by screws 27 extending through lugs 28 and into the supporting plate 6.

There is a worm 29 on the shaft 30 of the reversible motor 31. The worm is held from longitudinal movement on the shaft 30 by elements 40 and 41 and meshes with a worm wheel 32. Rotation of the shaft 30 in either direction by the motor turns the worm wheel and the nut 23 and causes the screw shaft 22 to move longitudinally in one direction or the other to correspondingly move the glass relative to the window opening.

As heretofore stated the motor is preferably of the reversible type and is connected with a commonly known electric circuit (not here shown) to cause rotation of the motor and the shaft 30 in one direction or the other as may be desired. It will be understood from Fig. 2 that the motor is secured to the inner wall of the sash pocket and extends outwardly therefrom to a position required to properly position the worm 29 in mesh with the toothed periphery of the worm wheel 32.

From the foregoing it will be understood that the degree of movement of the glass or sash is determined by the period that current is applied to the motor to cause rotation of the worm in a right or left hand direction and in so doing cause the worm to move longitudinally through the nut 23 and held from longitudinal displacement by the ears 24 and 25. The bar 11 is thus movable longitudinally to bring the crossed arms from the full line position to the dotted line position shown

in Fig. 1 or to position therebetween as may be required to provide a greater or less opening of the window as may be desired. By the arrangement of parts as described the operator need only to close the motor circuit for the period required to move the window to the desired extent in either direction and when the motor is not operating it is not possible to raise or lower the glass as the screw 22 cannot be moved through the nut which is held from rotation due to the worm wheel being held from rotation by the worm when the motor is not energized.

From the foregoing description it is believed evident that the various features and objects of the invention are attained by the structure and arrangement of parts hereinbefore described and that various changes and modifications may be made without departing from the spirit and scope of the invention as set forth in the appended claims.

Having thus fully described our invention, its utility and mode of operation, what we claim and desire to secure by Letters Patent of the United States is:

1. Window regulator mechanism for moving a sash or glass in respect to an opening in an inclosure having inner and outer walls providing a recess for the glass therebetween, said mechanism comprising a supporting plate positioned in the recess, a second plate secured to the supporting plate, a member slidably supported by the second plate, a pair of crossed arms having the longer ends thereof swingably connected with the glass or sash and being pivotally supported at the crossing point by the slidable member, a pair of links each respectively pivoted at one end to the shorter ends of the said crossed arms and pivoted at the opposite ends to the second plate, a screw attached to the slidable member opposite the end to which the crossed arms are supported, a nut, a third plate secured to the supporting plate below said second plate and having ears between which the nut is positioned and held from movement longitudinally of the screw, a worm wheel in which the nut is centrally positioned, a worm meshing with the worm wheel, a reversible electric motor having a shaft for the worm, an electric circuit for the said motor, and a switch for controlling the application thereof in one direction or the other to move the slide and raise or lower the sash in respect to the window opening depending upon the direction of rotation of the motor.

2. Mechanism for moving a sash or glass in respect to a window opening in the body of an automotive vehicle having spaced inner and outer walls providing a sash recess below the window opening, a plate secured in the recess intermediate the inner and outer wall thereof and

positioned to permit the sash or glass to pass between the plate and outer wall of the recess, a window regulator mechanism supported on the plate including pivotally associated crossed arms for moving the same, spring means associated with the arm for counterbalancing the sash or glass, means for turning the arms on the pivot comprising a slidable element, a plate secured to the first named plate providing a guide for the slidable element, a screw shaft attached to the slidable element, and means for causing movement of the screw shaft and the slidable element comprising a worm wheel having a nut for the screw shaft whereby rotation of the worm wheel in one direction or the other correspondingly moves the screw shaft and slidable element to turn the arms on the pivot to raise or lower the sash or glass, a worm for the worm wheel, a reversible electric motor mounted on the inner wall of the recess and having a shaft substantially in the plane of the plate to which the worm wheel is attached, a motor circuit, and a manual switching means in the motor circuit to cause rotation of the shaft and worm in one direction or the other to thereby turn the arms on the pivot and correspondingly raise or lower the shaft.

3. In mechanism for moving a glass or sash in respect to a window opening in the body of an automotive vehicle having spaced inner and outer walls providing a sash recess below the window opening, an apertured plate secured in the recess intermediate the inner and outer walls in position to permit the sash or glass to pass between the plate and the outer wall of the recess, a window regulator mechanism supported on the outer face of the plate including crossed arms in pivotal relation and operatively connected with the sash, and means for turning the arms on the pivot to raise or lower the sash or glass, said means including a slidable element relative to which the arms are pivotally associated at the crossed point, and means for sliding the said element in one direction or the other to raise or lower the sash comprising a reversible electric motor mounted on the inner wall of the sash recess and extending through an aperture of the plate, said motor including a shaft, means between the shaft and the sliding element whereby operation of the motor may move the sliding element, a support for the said means carried by the apertured plate, and an electric circuit and switching means therein for causing rotation of the motor in one direction or the other to correspondingly turn the arms on the pivot to move the sash toward or from closed position.

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