Nov. 17, 1925. 1,561,749

E. G. SIMPSON

WINDOW REGULATOR

Filed July 17, 1922 2 Sheets-Sheet 1

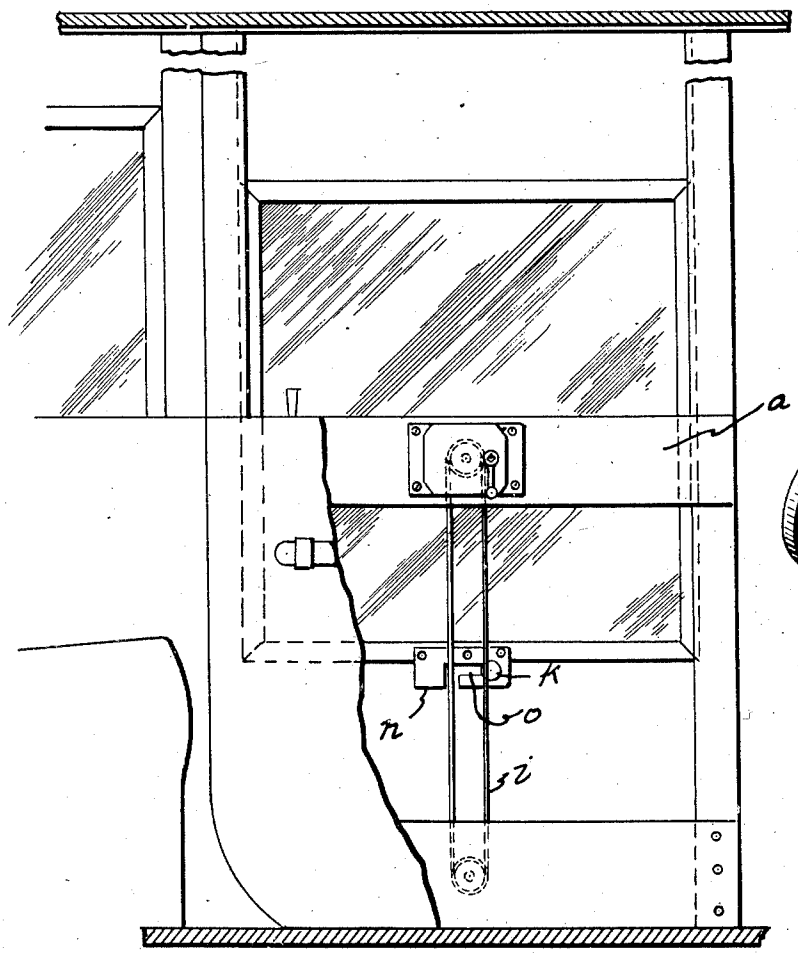


Fig. 1

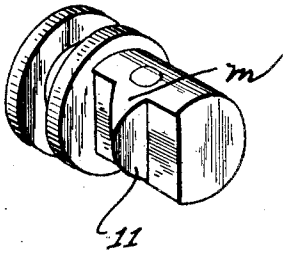


Fig. 6

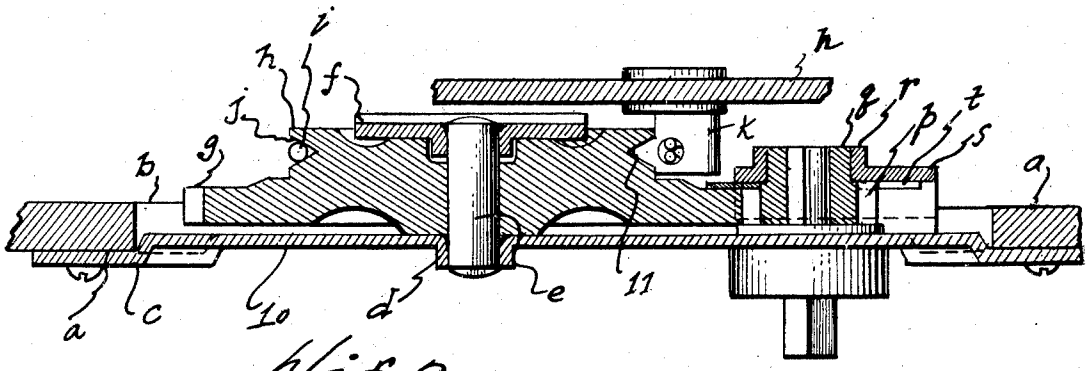


Fig. 2

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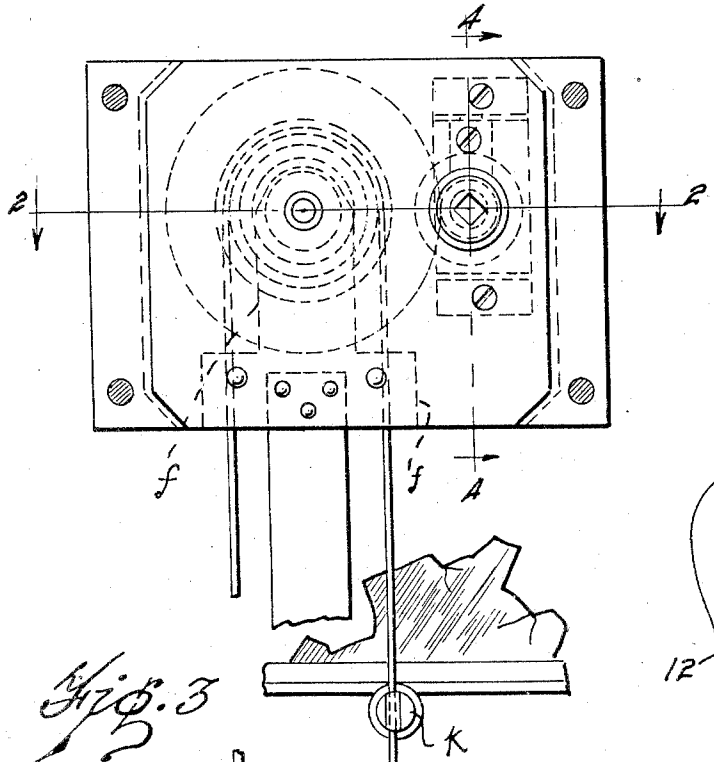


Fig. 3

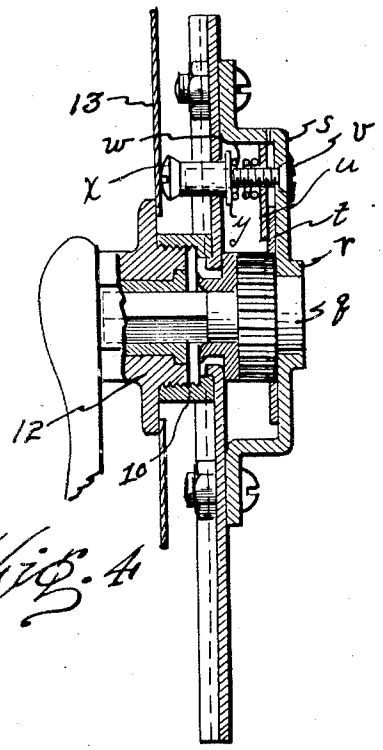


Fig. 4

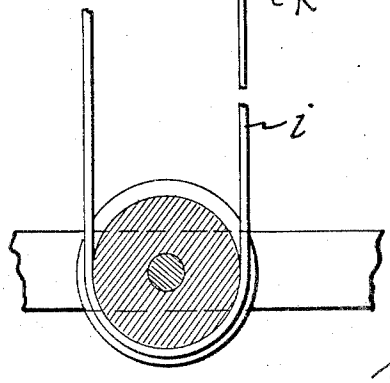
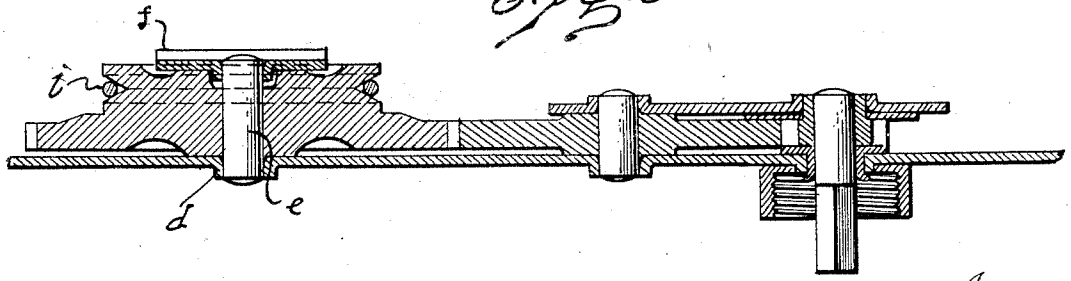


Fig. 5



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Patented Nov. 17, 1925. 1,561,749

UNITED STATES PATENT OFFICE.

EMORY GLENN SIMPSON, OF DETROIT, MICHIGAN, ASSIGNOR TO FISHER BODY CORPORATION, OF DETROIT, MICHIGAN, A CORPORATION OF NEW YORK.

WINDOW REGULATOR.

Application filed July 17, 1922. Serial No. 575,460.

To all whom it may concern:

Be it known that I, EMORY GLENN SIMPSON, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Window Regulators, of which the following is a specification.

This invention relates to window regulators and has for its object an effective but cheap construction in window regulators which will enable a regulator to be used on a cheaper class of cars. Regulators heretofore have not been used on the cheaper grade of automobiles because of their cost, the chain and clutch construction used in ordinary regulators being such an expense as has disinclined manufacturers of low priced cars to adopt window regulators as standard equipment.

It is the object of the present invention to provide a window regulator that can be manufactured much cheaper than the standard regulator now used on cars and which in a measure embodies all the main features incorporated in the expensive regulators.

The regulator is provided with a cable in place of a chain for carrying the window and is provided with a special lifting pin and pulley construction which firmly locks the window against side play when the lifting pin engages with the pulley.

In place of the ordinary positive locking clutch a friction clutch is used in combination with a driving pinion having a high ratio of speed reduction with the driven gear. This provides a lock suitable for most conditions.

In the drawings,—

Fig. 1 is an inside elevation showing the door with the upholstering broken away.

Fig. 2 is a section taken on the line 2—2 of Fig. 3.

Fig. 3 is an elevation of a regulator.

Fig. 4 is a vertical section taken on the line 4—4 of Fig. 3.

Fig. 5 is a horizontal cross section similar to Fig. 2 showing a modified form of the invention in which an extra gear is interposed to provide a handle further offset from the vertical center line of the door.

Fig. 6 is a perspective detail of the lifting pin.

The reference character *a* designates the lock board of the door which is suitably mortised or recessed at *b* to let the regulator parts through. A supporting plate *c* is provided with a pressed in center portion 10 having the pressed out bearing *d* to support the shaft *e*. This shaft is supported at its other end by a housing plate *f*. A driven gear is cast upon the shaft and on its side is provided with a pulley wheel *h* which is an integral part of the wheel and which is provided with an annular V groove *j* on which winds the cable *i*. This cable *i* has a lifting pin *k* soldered thereto by a hard solder. The pin is shaped to form a projection *m* in the form of a V-like anchoring lug 11, which serves to securely anchor the pin in the pulley wheel groove when the pin is drawn over the pulley wheel. This prevents any side play of the window.

The window bracket is designated *n* and is provided with the usual cross slot *o* to allow the lifting pin to travel across the bracket as it is drawn over the pulley wheel *h*.

The driven gear *g* is driven by a small pinion *p* which has a large speed reduction ratio (preferably about 5½ to 1) with the driven gear for two purposes,—one to secure leverage in pulling the window up or down and the other to aid in preventing the window from dropping down when it is raised. By soldering the head of the screw *v* into the housing *r*, this screw is made fast to prevent turning. Hence by simply turning the barrel nut *x* the compression of the spring may be altered to change the clutch plate pressure. This makes a very convenient adjustment as the barrel nut is located directly at the side of the escutcheon plate which is fastened to the socket 10. Hence by removing the escutcheon plate and pulling the trimming 13 slightly out of the way the barrel nut may be reached by a screw-driver inserted through the hole left in the trimming material for the escutcheon plate.

The driving pinion is provided with a hub *q* set in the bearing *r*, pressed out of the housing plate *s*. Splined on to the teeth of this gear is a friction plate or clutch plate *t*. This is pressed against the inside of the housing *s* by means of a clutch plate *u* which

is engaged by the coiled spring w coiled about the screw v which is threaded into the barrel nut x. The washer y is used on the end of the barrel nut x as a spring abutment. The clutch plates comprise two plates,—the non-rotatable plate u and the inside of the housing s, and one rotating plate, namely the ring t that is splined to the pinion. The friction afforded by these clutch plates in connection with the adverse leverage existing between the driven gear and the driving pinion serve to hold the window up under all ordinary load and consequently will, in a measure, do the work of a positive locking clutch which is much more expensive and complicated.

The cable i is a strong cotton center tinned air-craft cable. The ends of the cable are spread and soldered to the lifting pin by a hard solder. The cable is much cheaper construction than the ordinary chain. I am aware that cables have been used heretofore in connection with window lifters but as far as I know no one has combined an endless wire cable and lifting pin so arranged with the pulley wheel that the window is securely locked and anchored from shifting sidewise on the pulley wheel.

I am also aware that it is old to use a friction clutch with a suitable releasing device which releases the clutch parts on the initial movement of the actuating handle. However so far as I am aware it is new to arrange a constant friction device with suitably proportioned driving pinion and driven gear whereby the clutch and the gear cooperate to interpose ample resistance to the descent of the window, but provide such a large leverage that the friction does not seriously interfere with the raising of the window when the same is raised by a rotation of the handle.

What I claim is:

1. In a window regulator, the combination of a supporting member, a relatively large rotatable driven member, connections therewith for lifting the window, a relatively small rotatable driving member having a driving relation with the driven member to reduce the rotations of the driven member considerably with relation to the rotations of the driving member, and a multiple plate friction clutch for interposing resistance to the operation of the regulator parts by forces coming from the window in conjunction with the resistance achieved by the adverse leverage existing through the proportions of the driving and the driven members.

2. In a window regulator, the combination of a pulley wheel having a groove therein of defined cross section, a draft member running over said pulley wheel and engaging in said groove, and a lifting pin secured to the draft member and for lifting the window and having projecting therefrom a projection of a cross section corresponding to the defined cross section of the groove of the pulley wheel to anchor the pin securely on the pulley wheel when the same is being drawn over the pulley wire.

3. In a window regulator, the combination of a pulley wheel having a groove of V-cross section, a draft member running over the pulley wheel and engaging in the said groove, and a lifting member secured to the draft member and having a part with a V-like configuration complementary to the cross section of the said groove whereby the lifting member is locked against lateral movement as it runs over the pulley wire.

In testimony whereof I affix my signature.

EMORY GLENN SIMPSON.