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CLUTCH FOR WINDOW REGULATORS

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FIG. 1.

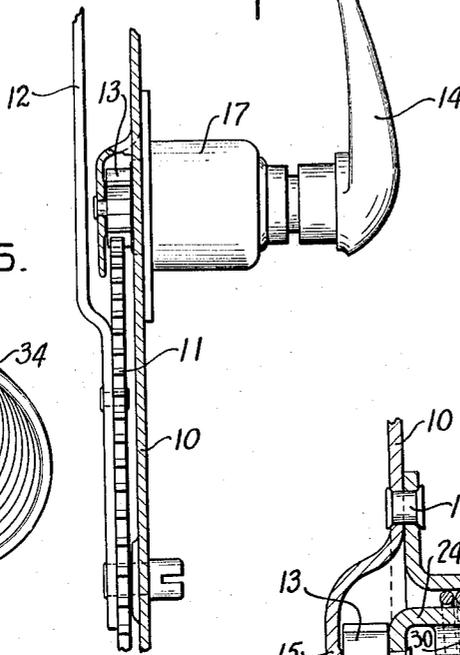


FIG. 5.

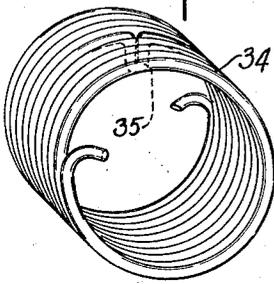


FIG. 2.

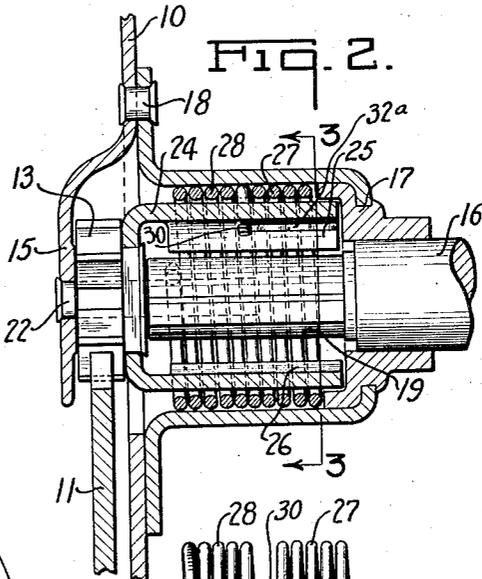


FIG. 3.

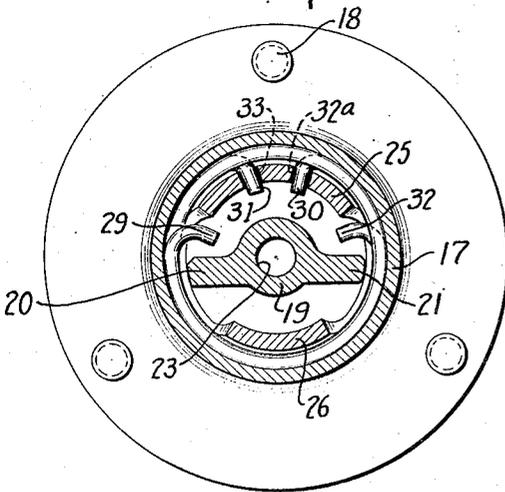
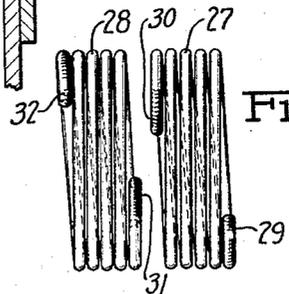


FIG. 4.



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# UNITED STATES PATENT OFFICE

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## CLUTCH FOR WINDOW REGULATORS

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1 Claim. (Cl. 192—8)

This invention relates to regulating mechanism for actuating vehicle windows, but more particularly to clutches or locks for such mechanism.

5 Most vehicle window regulators employ a clutch provided with a helical spring which when the operating handle is turned, is contracted to afford free operating movement, but when the handle is released the window is retained in adjusted position inasmuch as the reverse motion imparted to the spring by the window operates to expand it against the walls of the housing creating sufficient frictional resistance to militate against movement of the window. It is found that, although this form of clutch gives a certain amount of satisfaction, it is not sufficiently positive for all purposes since it affords a certain amount of play or lost motion, particularly in one direction, which is objectionable in connection with vehicle windows, because it enables the window to be pried open far enough to afford access to the inside by a wire or similar instrument.

25 An object is to produce a clutch or lock of this character which overcomes the above objections and is more positive, and effectively resists moving the window in one direction or the other by a force imparted directly against the window.

30 Other objects are to produce a clutch of this character having the new and improved features of construction, arrangement and operation hereinafter described.

For illustrative purposes only the invention is shown on the accompanying drawing, in which:

35 Figure 1 is a vertical sectional elevation of a portion of a window regulator and operating handle therefor;

Figure 2 is an enlarged sectional elevation of the clutch assembly;

40 Figure 3 is a transverse sectional view on the line 3—3 of Figure 2;

Figure 4 is a top plan view of the springs shown in Figure 2 showing the same in spaced relation; and

45 Figure 5 is a perspective view of alternate form of helical spring device embodying a single spring.

The illustrated embodiment of the invention comprises a window regulator having a mounting plate 10 on which is journaled a gear sector 11, to which is fixed an arm 12 which is operatively connected to the vehicle window (not shown) for actuating the same as by imparting raising and lowering movements thereto. Meshing with the sector 11 is a pinion 13 which

is operated by a handle 14 disposed in an accessible position on the inside of the vehicle door in any suitable or well known manner. In this instance the pinion 13 is held in the desired relation by a flange 15 forming a part of the mounting plate 10.

The handle 14 is secured to a stem 16, which bears in a cylinder housing 17. The housing 17 abuts against the mounting plate 10 and is secured thereto by rivets 18. The inner end portion 19 of the stem 16, which is disposed inside of the housing 17, is provided with diametrically opposed longitudinally elongate key portions or ribs 20 and 21, which turn with the handle 14, as will be readily understood.

15 The pinion 13 is mounted for rotation on a pin 22 which extends through the flange 15 into a socket 23 formed in the end portion 19 of the handle stem. Secured to the pinion 13 and movable therewith is a substantially U-shaped bushing 24, which extends outside of the stem extension 19 and in inwardly spaced relation to the walls of the housing 17. As shown, the bushing 24 is provided with elongate arcuate flange portions 25 and 26 disposed in opposed relation, the flange 25 being somewhat wider than the flange 26. Encircling the bushing 24 are two abutting helical springs 27 and 28, the spring 27 having inturned end portions 29 and 30, and the spring 28 having inturned end portions 31 and 32. The inturned ends 30 and 31, which, when the springs are properly assembled, are disposed in juxtaposed relation, extend through slots 32<sup>a</sup> and 33 respectively, formed in the bushing flange 25. The slots 32<sup>a</sup> and 33 extend inwardly from the free end of the bushing flange 25 to approximately the central portion and enable the springs to be assembled in the housing and the bushing inserted in an extremely simple manner. The opposite or outside spring end portions 29 and 32, which are remote from each other, are arranged adjacent the key or flanges 20 and 21 respectively of the handle stem and between these flanges and the opposite side edges of the bushing flange 25.

50 In operation, when the handle 14 is turned in one direction (counter clockwise Figure 3) the key 21 is moved into engagement with the inturned end 32 of the spring 28, and forces this end against the adjacent edge of the bushing flange 25, thereby contracting the spring 28 to prevent frictional engagement between the same and the walls of the housing 17. Upon further movement of the handle stem in this direction, 55

the bushing is turned in a counter clockwise direction (Figure 3) and the inturned end 30 pulls or drags the spring 27 around with the bushing. This action takes place without alteration of the spring 27 so as to enable the parts to move substantially without frictional resistance.

Upon release of the operating handle 14 the weight of the window, or other force imposed tending to turn the pinion 13 in one direction or the other, is resisted effectively by the frictional engagement between the coil spring arrangement and the walls of the housing 17. It will be understood that if a force exerted against the pinion 13 tends to rotate the bushing 25 in a clockwise direction (Figure 3), the pushing force against the inturned end 30 of the spring 27 will expand the spring tightly against the walls of the housing 17. Furthermore, it will be apparent that should a force be exerted against the pinion 13 tending to rotate it in a counter clockwise direction (Figure 3), the inturned end 31 will be pushed causing the spring 28 to expand and frictionally engage the walls of the housing. Thus movement in one direction or the other is prevented by the frictional engagement between one or the other of the springs and the housing 17, and the regulator arm 12 is thus held in the adjusted position, thereby eliminating liability of lost motion and play in the arm.

It will further be understood that actuation of the handle stem in the opposite direction or clockwise direction (Figure 3), effects a reverse of the above conditions, and operates to contract the spring 27 away from housing 17 and drag the spring 28. It is not deemed necessary further to describe the operation of the clutch in this direction of movement since the same will be readily understood by those skilled in this art.

In the alternate form of the invention shown in Figure 5, a single helical spring 34 may be employed instead of two helical springs. In this form an intermediate coil is provided with an inwardly projecting portion 35 formed by bending the wire upon itself and arranging the same to project inside of the coil. This eliminates the

necessity of using the two slots 32<sup>a</sup> and 33 as above described, and necessitates but a single slot to receive the projection 35. It will be apparent that the action of this spring device is similar to that above described, and one or the other end portion of the spring is expanded against the walls of the housing according to the direction in which stress is imposed upon the pinion 13 to lock the pinion against movement except by a force exerted by the handle 14.

From the above description it is apparent that I have provided an exceedingly positive and effective lock, since upon releasing the regulator handle liability of the pinion turning in one direction or the other is effectively resisted by the action of one or the other of the springs 27 and 28, or one or the other end portion of the spring 34, depending upon the direction in which the force is exerted. The term "spring device", as used in the appended claim, is to be understood as covering both a single spring or a multiple spring arrangement, as above described.

It is to be understood that numerous changes in details of construction, arrangement and operation may be effected without departing from the spirit of the invention.

What I claim as new and desire to secure by Letters Patent is:

In a clutch having a cup-shaped housing, a driving member disposed within the housing having diametrically opposed flanged portions, a driven member disposed about said driving member and comprising a substantially U-shaped bushing, a pinion on the outer end of said bushing and rotatable therewith, a pair of helical springs arranged in the space between said bushings and the inner walls of said housing and disposed in end to end relation, said bushings being provided with a pair of elongate slots extending inwardly from the free ends thereof, inturned portions on the adjacent ends of said springs disposed respectively in said slots, and inturned portions on the free ends of said springs disposed between said flange portions of the driving member respectively and the driven member.

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