Oct. 17, 1939. B. S. FLORADAY 2,176,049

WINDOW REGULATOR CLUTCH

Filed June 17, 1936

FIG. 1.

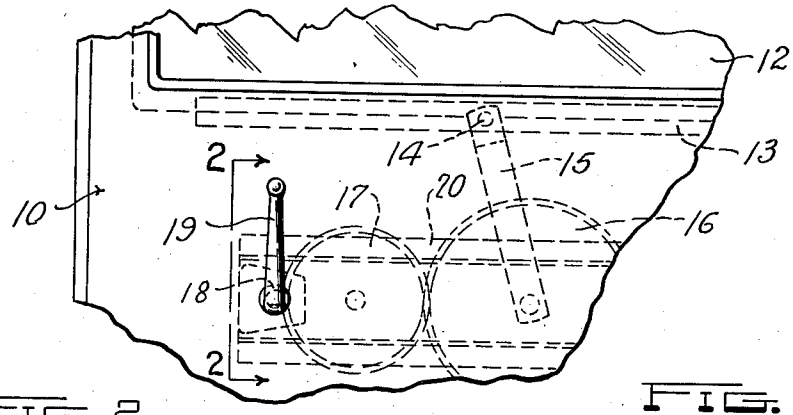


FIG. 2.

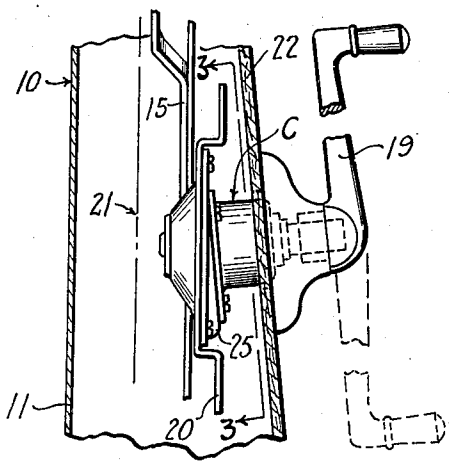


FIG. 3.

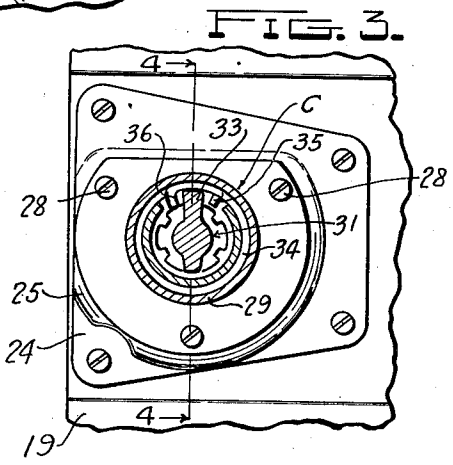


FIG. 4

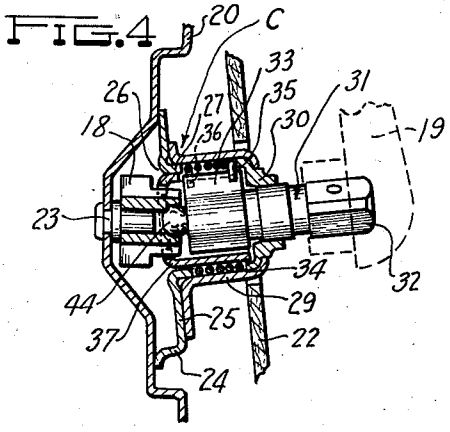
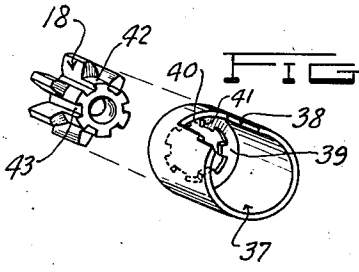


FIG. 5.



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WINDOW REGULATOR CLUTCH

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Application June 17, 1936, Serial No. 85,693

10 Claims. (Cl. 192—8)

This invention relates to window regulators, but more particularly to clutches for window regulators.

An object is to produce a simple and efficient clutch of this character which can be disposed at an angle other than a right angle with respect to the regulator mounting plate, so that the axis of the operating handle is out of alignment with the axis of the regulator-operating pinion. This is of importance in some automobiles in which the window moves in a plane disposed at such an angle to the trim or upholstery on the inside of the body that the handle, in its usual position with its axis at right angles to the regulator, either rubs against the upholstery or at least is in an awkward appearing position, such that when in one position it is close to but in another position is a considerable distance away from the upholstery.

Other objects of the invention will hereinafter appear and an embodiment of the invention is shown in the accompanying drawing, in which:

Figure 1 is a fragmentary side elevation of a portion of the inside of an automobile door showing part of the regulator mechanism in dotted lines;

Figure 2 is an enlarged sectional elevation of the line 2—2 of Figure 1;

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

Figure 4 is a sectional elevation on the line 4—4 of Figure 3;

Figure 5 is a perspective view of the regulator-operating pinion and the driven member of the clutch with which it operatively engages.

The illustrated embodiment of the invention comprises an automobile door 10, having the usual well 11 into and out of which the window glass 12 is adapted to move. Secured to the lower edge portion of the window 12 is a retainer 13 to receive a stud 14 secured to an arm 15 of the window regulator. The arm 15 may be fixed to a gear sector 16 with which a gear 17 meshes, the latter being actuated by a pinion 18 forming a part of a clutch C to which the operating handle 19, disposed on the inside of the door, is operatively connected. The regulator mechanism forms no part of the present invention and it will be understood that the above description is given merely by way of illustration. It will be noted that the gear sector arrangement is carried by a mounting plate 20 which is suitably secured to the door structure.

The broken line 21 in Figure 2 designates the movement of the window 12, the latter being guided in its vertical movements by channels or guide ways in the usual manner. The upholstery or trim 22 for the inside of the door is disposed at an angle to the glass movement, or as designated by the line 21, instead of being parallel thereto as has been customary heretofore. Consequently it is necessary that the handle 19 be mounted so that it can rotate on an axis substantially at right angles to the trim or upholstery 22. Obviously if the axis of the handle 19 were at substantially right angles to the line 21, it would rub against the upholstery when in its lower position. Even if it did not rub against the upholstery it would present a very awkward appearance because when in its lower position it would be close to the upholstery and when in its upper position it would be spaced a considerable distance away from the upholstery.

In accordance with this invention the clutch C is so constructed and arranged that the handle 19 can be turned free of the upholstery and spaced an equal distance therefrom in all positions and at the same time have its axis disposed at an angle other than a right angle with respect to the glass travel 21.

It will be noted that the regulator plate 20 is embossed to receive the pinion 18, a pin 23 fastened to the embossed portion and projecting inwardly therefrom provides a bearing for the pinion. This embossed portion also provides a tongue (not shown) which fits over the upper portion of the gear 17 and assists in holding it in place. Fastened to the inside of the regulator plate 20 is a subplate 24 which may be suitably secured thereto as by riveting or welding. The lower portion of the sub-plate 24 is embossed outwardly as indicated at 25 and provided at the upper portion of the plate 24 is an opening 26 which is surrounded by an inturned flange 27.

Between the plane of the regulator gear 17 and the axis of the opening defined by the flange 27 there is an angularity of the order of five and one-half degrees. Suitably secured to the subplate 24 by screws 28 is a sheet metal cup-shaped clutch housing 29 in the outer end of which is fitted a die cast bearing member 30 to receive a driving member 31. The driving member 31 has a squared outer end 32 to receive the hub of the handle 19 and an integral wing or flange 33 on the inner end which is disposed within the housing 29. Arranged within the housing outside of the driving member 31 is a helical spring 34 having inturned ends 35 and 36, one end being disposed on one side of the flange 33 and the other end being disposed on the other side there-

of. Endwise movement of the spring 34 is prevented by the flange 27 at one end and the bearing member 30 at the opposite end.

Disposed between the inner end of the driving member 31 and the coil spring 34 is a sheet metal sleeve or driven member 37 which has a cut away portion 38 to receive the wing or flange 33 and the inturned spring ends 35 and 36. The sleeve 37 has a bearing in the flange 27 which properly positions it within the clutch housing 29. If desired, the regulator plate 20 could be formed to provide a bearing for the sleeve 37.

One important feature of this invention resides in positioning the driving member 31, driven member 37 and coil spring 34 and housing 29 coaxially with respect to each other, these parts being important operating parts for the clutch. By arranging these parts with their axes coinciding, the wear on the moving parts is reduced to a minimum, thereby enabling the parts to operate freely and satisfactorily with a minimum amount of wear for an extended period.

Formed on the inner end portion of the driven member 37 is an inwardly extending flange 39 which has an annular series of grooves 40, the sides 41 of which taper inwardly toward each other. Fitting the grooves 41 fairly snugly are correspondingly shaped teeth 42 in a lateral axial extension 43 of the pinion 18. The connection between the driven member 37 and the pinion 18 thus provides a multiple splined connection which enables relative tilting within certain limits of one part with respect to the other. Thus the pinion 18 may have its axis at an angle to the common axes of the other clutch parts, and yet the pinion may be readily and conveniently driven. It will be understood that the multiple splined connection between these parts enables one portion to move longitudinally with respect to the other, and to freely tilt in any direction desired, thereby providing substantially a universal connection.

As above mentioned the pin 23 on the regulator plate 20 provides a bearing for the pinion 18. Formed on the inner end of the driving member 31 is a knob-like surface 44 which fits into a correspondingly shaped socket in the outer end of the pinion extension.

From the above description it will be readily apparent that a relatively simple and inexpensive clutch is provided which enables the handle to have its axis disposed at an angle other than a right angle with respect to the movement of the window glass. It will also be understood that the parts are so constructed and arranged in such manner that all of the parts except the pinion have a common axis. This is of outstanding importance in reducing wear and providing a smooth operating structure for an extended period of time.

It is to be understood that changes in details of construction may be effected without departing from the spirit of the invention, especially as defined in the following claims.

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

1. In a window regulator, a clutch having a housing, a locking member, a driving member operatively engaging said locking member, a driven member, said members being disposed within said housing and having a common axis, a driven pinion, and a loose driving connection between said driven member and pinion including a contacting anti-friction surface, whereby to enable the pinion to be disposed at an angle to said common axis, during the rotative movement of said pinion by said driving member.

2. A clutch for a window regulator having a housing, a spring member adapted to be expanded against the housing and having inturned ends, a driving member engageable with one or the other of said ends, a driven member, said members being arranged on a common axis within said housing, a driving pinion actuated by said driven member, and an operative connection between said pinion and driving member enabling axial tilting of the pinion relative to the driving member.

3. A clutch for a window regulator comprising a housing, a spring member adapted to be expanded against the housing, a driving member engageable with one or the other of said spring ends, a cup-shaped sheet metal driven member actuated by said driving member, said members being coaxial and disposed within said housing, a pinion and a tiltable splined driving connection between said pinion and sheet metal driven member.

4. A clutch for a window regulator comprising a housing, a coiled spring member adapted to be expanded against the housing, a driving member engageable with one or the other ends of said spring, a tubular driven member actuated by said driving member, said members being coaxial and disposed within said housing, a knob-like surface on the inner end of said driving member, a pinion having a portion fitting said surface, and a splined driving connection between said pinion and driven member.

5. A clutch for a window regulator having a back plate and a gear sector thereon, comprising a subplate secured to the back plate and provided with a flanged opening the axis of which forms an angle with the plane of the back plate other than a right angle, a housing fitting over said flanged opening, a coiled spring member adapted to be expanded against said housing, a driving member engageable with one or the other ends of said spring, a tubular driven member actuated by said driving member, said members being coaxial and disposed within said housing, a knob-like surface on the inner end of said driving member, a pinion having a portion fitting said surface, and a splined driving connection between said pinion and driven member.

6. A clutch for a window regulator comprising a housing, a coiled spring in said housing, a driving member engageable with one or the other ends of said spring, a driven member actuated by said driving member, said members being coaxial and arranged substantially within said housing, a pinion, a connection between an axial portion of said pinion and driving member enabling tilting movement of the pinion, and a relatively loose driving connection between said pinion and driven member for imparting turning movements to said pinion when out of axial alignment with the driven member.

7. In a clutch for a window regulator having a housing, a coiled spring expansible against said housing, driving and driven members within said spring, a pinion, a bearing connection between one end of said pinion and said driving member, a driving connection between said pinion and said driven member enabling tilting of one relative to the other, and a support for the opposite end portion of said pinion.

8. A clutch for a window regulator including a housing, an expansible coil spring member having free ends and adapted to be expanded against

the interior of the housing, a driving member engageable with one or the other of said spring ends, a tubular driven member disposed within the spring member and actuated by said driving member, said tubular driven member being provided with inwardly projecting circumferentially spaced parts, and a pinion, said pinion having a part formed for engagement with the inwardly projecting circumferentially spaced parts of the driven member to be driven by the latter and to permit axial sliding and tilting movements between said pinion and driven member.

9. In a window regulator, a clutch having a housing, a locking member, a driving member operatively engaging said locking member, a driven member, said members being disposed within said housing and having a common axis, a driven pinion, and a loose driving connection between said driven member and pinion including a ball and socket, whereby to enable the pinion to be disposed at an angle to said common axis.

10. In a window regulator, a clutch having a housing, a locking member, a driving member operatively engaging said locking member, a driven member, said members being disposed within said housing and having a common axis, a driven pinion, and a loose driving connection between said driven member and pinion including an anti-friction bearing formed to permit the pinion to be disposed at an angle to said common axis of said members.

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