

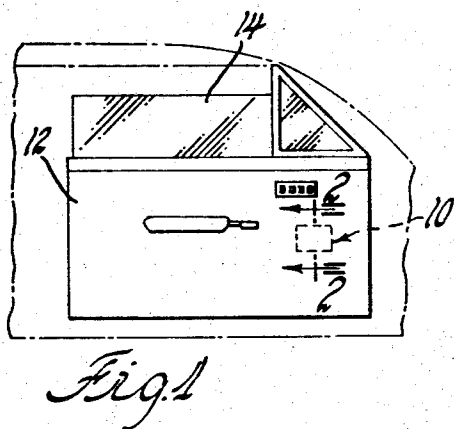
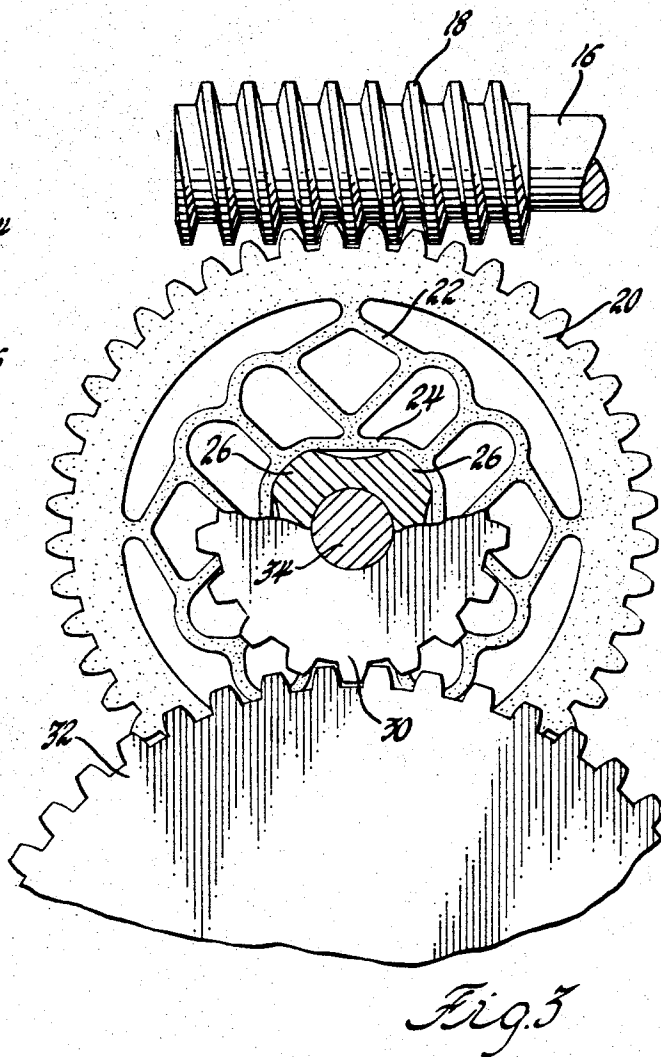
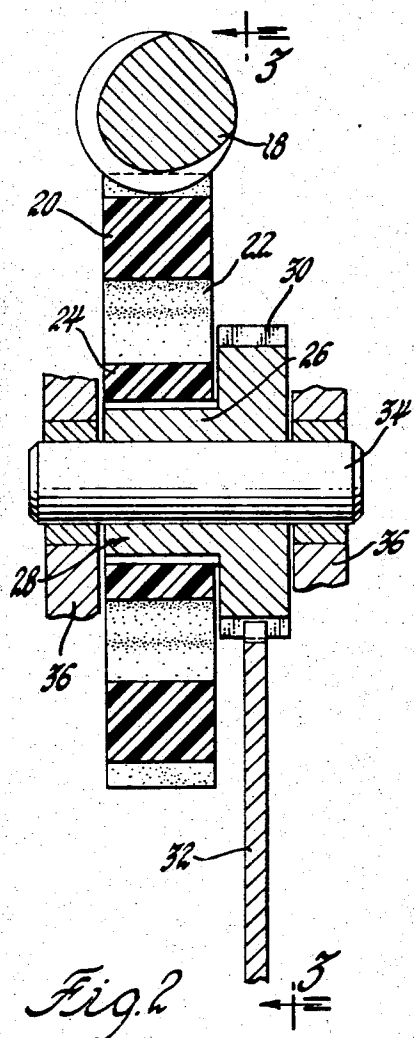
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DRIVE MECHANISM HAVING OVERLOAD RELEASE MEANS

Filed Jan. 30, 1967



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DRIVE MECHANISM HAVING OVERLOAD RELEASE MEANS

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ABSTRACT OF THE DISCLOSURE

In a preferred form, this disclosure relates to a clutch arrangement which includes a gear having a deformable center portion that is resilient which frictionally engages an output member to act as a direct drive until a predetermined load force is exceeded when a clutching action takes place.

This invention relates to drive mechanisms and more particularly to a drive mechanism for an automobile window regulator having a clutching arrangement.

Electric regulators for vehicles require that their operation cease when the window travel has reached predetermined limits. These limits can be sensed by limit switches used to cut off drive motor operation or can be sensed by stalling an electric drive motor at either limit of travel. The latter method has certain inherent economies so this disclosure relates to that method.

It is an object of the present invention to provide an improved drive mechanism for electric window lift motors that will allow slippage between the drive motor and the driven mechanism when limits of travel of the driven mechanism are reached.

It is another object of the present invention to carry out the aforementioned object and providing an audible sound indicating that a slippage is taking place.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein a preferred embodiment of the present invention is clearly shown.

In the drawings:

FIGURE 1 is an elevational view of a vehicle door with the subject mechanism shown in its operative environment;

FIGURE 2 is a sectional view taken along line 2-2 of FIGURE 1;

FIGURE 3 is a sectional view taken along line 3-3 of FIGURE 2.

Referring to FIGURE 1, the drive mechanism, generally designated by the numeral 10, is illustrated as being mounted on the interior portion of a vehicle door 12 driving window 14 up and down between predetermined limits of travel.

Referring to FIGURE 3, an electric motor, not shown, has an output shaft 16 carrying worm gear 18. Worm gear 18 is adapted to rotationally drive rotatable means or gear 20. Gear 20 is composed of any wear-resistant resilient plastic and is integrally formed with a symmetrical center web arrangement 22 which includes a center deformable portion 24.

Referring to FIGURE 2, portion 24 is carried around four lobes 26 of drive means 28 with the lobes press fit into portion 24. Drive means 28 is integrally formed with gear 30 normally meshed with drive gear 32 utilized to raise and lower the vehicle window 14. Drive means 28 is carried on shaft 34 rotatably mounted in support members 36.

In operation, when it is desired to raise or lower window 14, the motor, not shown, is appropriately rotationally controlled to drive worm gear 18 through shaft 16 in

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the desired direction. Gear 20 rotates in response to worm gear 18 which rotation is transmitted through lobes 26 to gear 30 and on to drive gear 32. Depending on the direction of rotation of drive gear 32, the window is lowered or raised. When the predetermined limit of movement of window 14 is reached, drive gear 32 will stop, causing gear 24 and lobes 26 to also stop. The rotation of worm gear 18 induced by the motor and the responding rotation of gear 20 will continue. Portion 24 will slip relative to lobes 26 causing a noise audible to the vehicle operator. This noise signals that the mechanism has reached the extreme of desired movement and alerts the vehicle operator to release the switch bringing power to the electric motor. The same cycle of events takes place regardless of the direction of rotation of shaft 16, thereby providing a limiting means for the movement of the vehicle window.

Gear 20, along with web arrangement 22 and center portion 24, must necessarily be composed of a friction-resistant material, such as nylon, and the webs 22 must be of sufficient rigidity as matched to the electric motor to allow force transmission from the motor to gear 20 under given load conditions by allowing slipping between portion 24 and lobes 26 when a predetermined loading of the mechanism is experienced. Therefore, it becomes clear that the physical dimension of the gear 20 and web arrangement 22 are critical and must be matched to the motor used in a given installation. Too much resistance to relative movement between the lobes 26 and portion 24 could result in motor damage or damage to the drive mechanisms of the window lift arrangement. Therefore, the physical dimensions of gear 20 and webs 22 must be tailored to a particular installation.

While the embodiment of the present invention, as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted.

What is claimed is:

1. Drive mechanism comprising: a source of power; rotatable means driven by said source of power, said rotatable means having a nonrigid center driven portion; and drive means resiliently carried and frictionally held in an operative position by said rotatable means and responding to rotation thereof to move a force operated device between extremes of movement.

2. Drive mechanism according to claim 1 wherein said nonrigid center driven portion of said rotatable means resiliently grips said drive means and maintains said rotatable means and said drive means rotating in unison until a predetermined load force on said drive means is exceeded.

3. Drive mechanism according to claim 1 wherein said drive means includes a lobed portion frictionally engaging said nonrigid center driven portion to provide a power transfer link for said source of power to said drive means when a load on said drive means remains below predetermined limits, said lobed portion slipping relative to said nonrigid center drive portion and creating an audible sound when load on said drive means exceeds predetermined limits.

4. A drive mechanism for operating a window regulator mechanism for raising and lowering a window of an automotive vehicle comprising: a first gear which is adapted to be driven by an electric motor; a second gear in meshed engagement with said first gear and which is driven by the latter; and a drive means adapted to be connected with a window regulator mechanism, said second gear including a deformable center portion provided with a generally central opening therein and said drive means having a portion received within said opening but which is frictionally engaged by said deformable center portion, said frictional engagement between said deformable center portion and said portion of said drive means being such that said second gear is effective to rotate said

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drive means when the load imposed on the latter by the window regulator mechanism is less than a predetermined value and said second gear slipping and rotating relative to said portion of said drive means and emitting an audible sound when the load imposed on the drive means exceeds said predetermined value.

5 5. A drive mechanism as defined in claim 4 wherein said opening in said center portion of said second gear is noncircular and wherein said portion of said drive means is noncircular.

10 6. A drive mechanism according to claim 4 wherein said second gear is a unitary plastic member having resilient center support ribs formed in a net pattern around a deformable bearing portion which frictionally engages said portion of said drive means.

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PATENT OFFICE

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**UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION**

Patent No. 3,406,583

October 22, 1968

John P. Baier

It is certified that error appears in the above identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 23, after "Electric" insert -- window --.

Signed and sealed this 3rd day of March 1970.

(SEAL)

Attest:

Edward M. Fletcher, Jr.

Attesting Officer

WILLIAM E. SCHUYLER, JR.

Commissioner of Patents