July 27, 1937. A. W. SUSOR 2,088,098

WINDOW REGULATOR

Filed Aug. 10, 1936 2 Sheets-Sheet 1

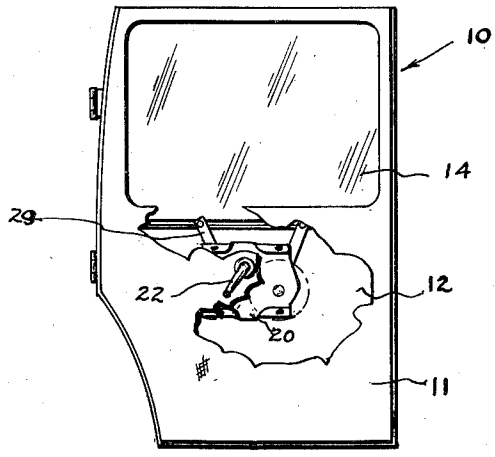


Fig. 1

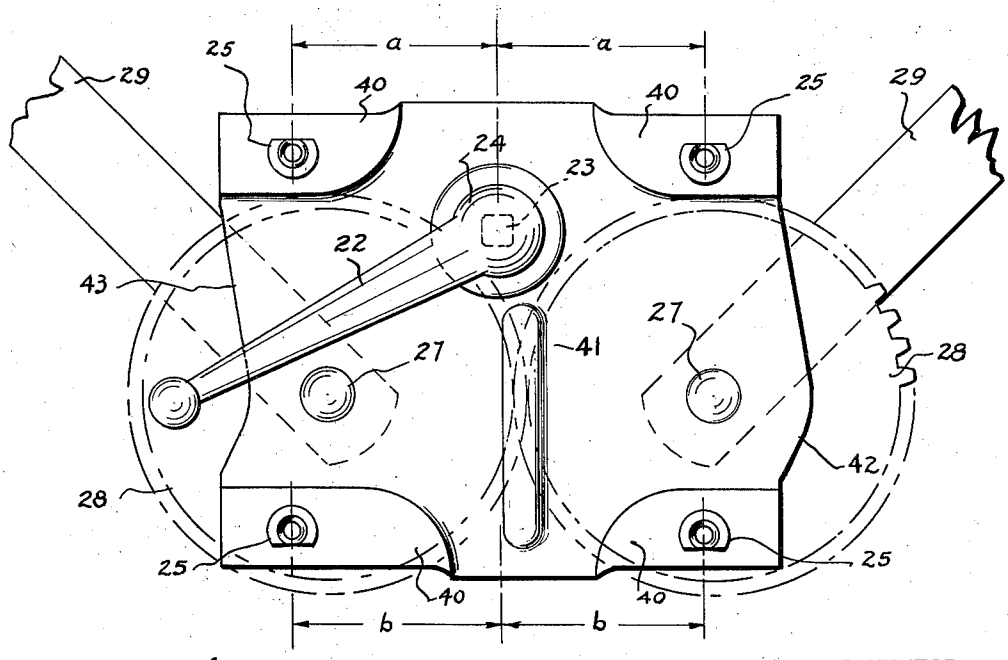


Fig. 2

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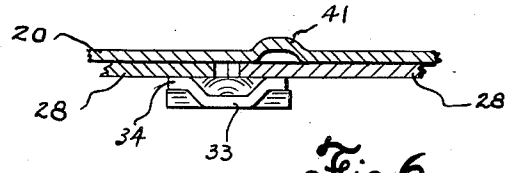


Fig. 6

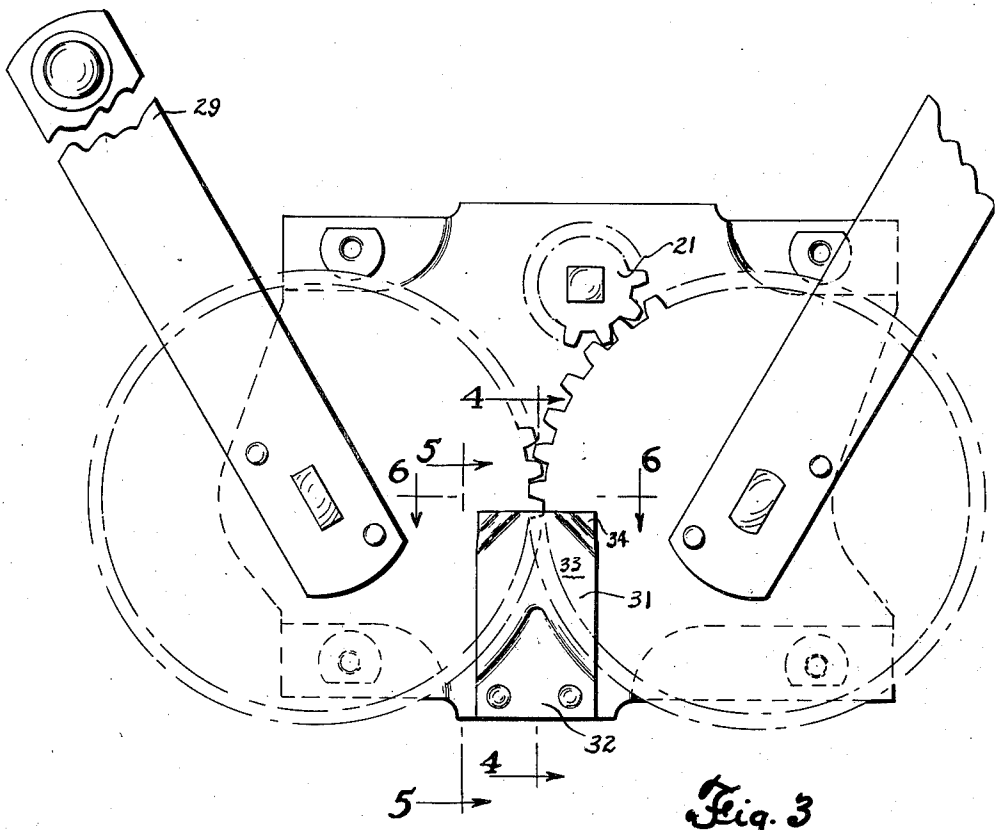


Fig. 3

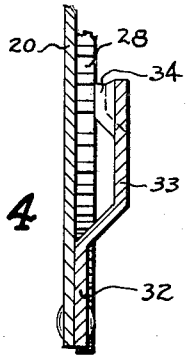


Fig. 4

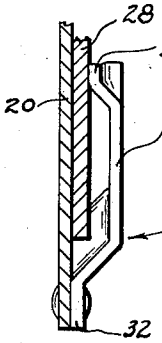


Fig. 5

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Patented July 27, 1937

2,088,098

UNITED STATES PATENT OFFICE

2,088,098

WINDOW REGULATOR

Albert W. Susor, Toledo, Ohio

Application August 10, 1936, Serial No. 95,151

1 Claim. (Cl. 74—421)

This application relates to window regulators and more particularly to regulators for automobile door windows.

A principal object is to provide a regulator which is so designed that it can be mounted on right or left hand doors of an automobile, as desired; this eliminates the present necessity of designing, manufacturing, and stocking separate parts for right hand doors and for left hand doors, with the attendant difficulty of keeping these separate parts in separate stocks.

A further object is a regulator having a novel gear guard for restraining axial shifting of regulator gears with a minimum of friction between the gear guard and the gears.

A further object is a regulator whose mounting plate is so designed that it can be made from strap stock of uniform width and whose ends are complementary in shape, though irregular of outline, so that waste of stock and a multiplicity of end shaping operations are eliminated.

The regulator hereof is shown in the appended drawings. In these drawings,

Fig. 1 shows an automobile door having a surface thereof cut out to expose the regulator;

Fig. 2 shows the regulator per se;

Fig. 3 is an obverse view of Fig. 2;

Figs. 4, 5, and 6 are sections on lines 4—4, 5—5, and 6—6 of Fig. 3.

Fig. 1 shows a door 10 between whose surfaces 11 and 12 is disposed a regulator for raising and lowering the window 14. The regulator includes a mounting plate 20 having a pinion 21 thereon adapted to be operated by the exposed handle 22 and provided with a stub shaft 23 adapted to be received within the socket of a socketed portion 24 of the handle 22, the stub shaft projecting through a hole in the surface 11. Within the door is a frame part (not shown) to which the mounting plate is secured by means of bolts or screws (not shown) threaded into nuts 25 permanently secured to the mounting plate at the corners thereof.

In order to insure the regulator here shown being useful on right hand doors as well as on left hand doors, and vice versa, the nuts 25 on opposite ends of the mounting plate are so positioned that the pinion 23 is centered exactly between them. As indicated, the distances *a*—*a* are identical and the distances *b*—*b* are identical. While in the embodiment illustrated the distances *a*—*a* are identical with the distances *b*—*b*, this is merely a happenstance and not a necessity.

Journalled on bearings 27 of the mounting plate are gears 28 to which are fixed window regulator arms 29 and on which are counterbalance springs (not shown). To restrain axial shifting of the gears 28, there is provided a gear guard in the form of a lug 31 having a portion 32 contiguous to and riveted to the mounting plate 20 and a portion 33 spaced from the mounting plate and between which and the mounting plate are the gears 28; the corners of the portion 33 are bent down as indicated at 34 towards the mounting plate 20 to engage the gears 28 and thus restrain axial shifting thereof, and, because the corners 34 are minute and engage the gears in what amounts to substantially a point contact, the friction on the gears as they rotate, created by the engagement thereof by the corners 34, is a minimum.

The mounting plate 20 is to be made from strap stock and therefore is so designed that its transverse cross sectional area is substantially uniform whether the cross section be through the deformed corners 40 of the mounting plate in which are seated the nuts 25, or through the strengthening rib 41 of the mounting plate, or through any other part of the mounting plate. Though the shape of the cross section varies from end to end of the plate, the area of the cross section is uniform.

In order to provide a bearing for one of the gears 28, without increasing the length of the mounting plate as a whole, the central portion of the end of the mounting plate on which that gear 28 is disposed is extended longitudinally from the termini of its longitudinal edges, resulting in an irregular contour for such end of the mounting plate, which contour is illustrated by the line 42. The other end of the mounting plate is contoured complementary to the contour represented by the line 42, as indicated by the line 43, and therefore the mounting plate may be cut from strap stock in a single cut which shapes the extended end of one mounting plate and the inset end of the next adjacent mounting plate, and by a single cut adjacent edges of two mounting plates are cut without waste.

Now having described the regulator herein shown, reference is had to the claim which follows for a determination of the protection sought herein.

I claim:

In a window regulator, a mounting plate, meshing gears thereon, and a gear guard therefor, the latter comprising a lug separate and independent of the mounting plate but permanently fastened thereto and having a portion contiguous to the mounting plate and a portion spaced from the mounting plate and between which and the mounting plate are the gears, minute parts of the last mentioned portion being bent inwardly towards the gears and engaging them with substantially a point contact to restrain axial shifting thereof.

ALBERT W. SUSOR.