

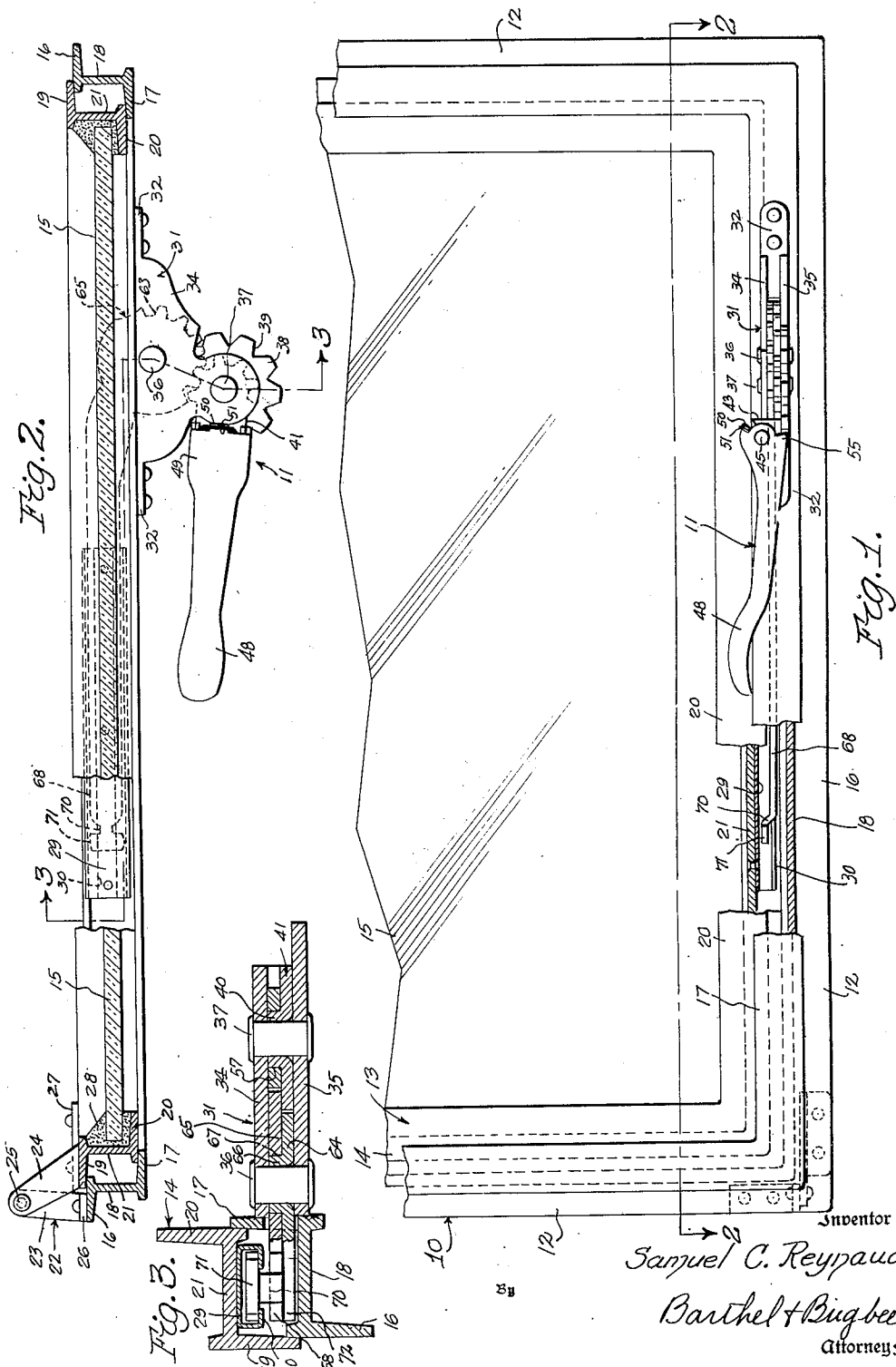
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S. C. REYNAUD
CASEMENT WINDOW OPERATOR

2,576,536

Filed Oct. 30, 1947

2 SHEETS—SHEET 1



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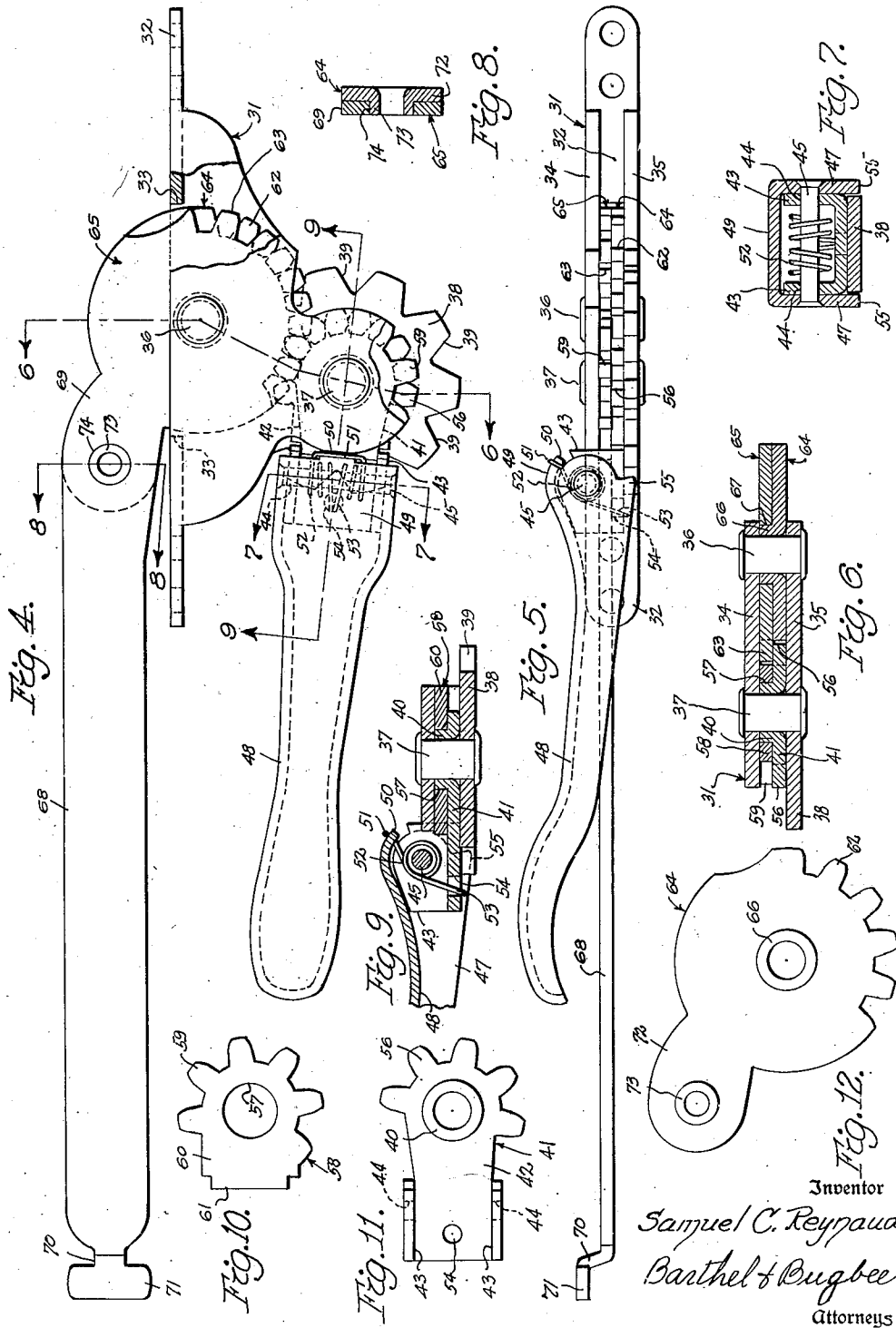
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2 SHEETS—SHEET 2



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CASEMENT WINDOW OPERATOR

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2 Claims. (Cl. 268—118)

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This invention relates to window operating devices and in particular to casement window operators.

One object of this invention is to provide a casement window operator which imparts a considerably greater leverage or mechanical advantage to the window, thereby greatly facilitating opening the window.

Another object is to provide a casement window operator which is actuated by a handle directed toward the center of the window when the window is in its closed position, so that the handle is easily grasped and is not interfered with by curtains, Venetian blinds or the like, and does not itself interfere with such curtains or blinds.

Another object is to provide a casement window operator which is actuated by axially-spaced gears with their teeth staggered relatively to one another so that more than two teeth are always in engagement, thereby distributing the strain of opening the window over several teeth and reducing the breakage hitherto caused by the excessive strain on the single pair of teeth in engagement when a single pair of gears has been used.

Another object is to provide a casement window operator having a swinging arm with a T-head on the outer end thereof engaging a guide channel extending along one edge of the window, this construction still further facilitating the opening of the window.

In the drawings:

Figure 1 is an inside front elevation, partly broken away, of a casement window and frame employing a casement window operator, according to a preferred form of the invention;

Figure 2 is a horizontal section, partly broken away, taken along the line 2—2 in Figure 1;

Figure 3 is a partly longitudinal and partly transverse vertical section taken along the zig-zag line 3—3 in Figure 2;

Figure 4 is an enlarged top plan view of the window operator shown in Figures 1 and 2, removed from the window and partly broken away to disclose details thereof;

Figure 5 is a front elevation of the window operator shown in Figure 4;

Figure 6 is a transverse vertical section taken along the line 6—6 in Figure 4;

Figure 7 is a transverse vertical section taken along the line 7—7 in Figure 4;

Figure 8 is a transverse vertical section taken along the line 8—8 in Figure 4;

Figure 9 is a longitudinal vertical section taken along the line 9—9 in Figure 4;

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Figure 10 is a top plan view of the upper sector driving gear for the window operator shown in Figure 4;

Figure 11 is a top plan view of the lower sector driving gear thereof; and

Figure 12 is a top plan view of the lower sector driven gear thereof.

Referring to the drawings in detail, Figure 1 shows a casement window, generally designated 10, equipped with a preferred form of the window operator generally designated 11 of the present invention. The casement window 10 may consist of single or multiple units, but for the purpose of simplicity, it is shown as consisting of a single unit having a stationary metal frame 12 of approximately Z-shaped cross-section and a swinging window or panel 13 having a swinging frame 14 containing a glass pane 15, or if desired, a pair of spaced glass panes (not shown). The stationary window frame 12 (Figure 3) is provided with side flanges 16 and 17 interconnected by a web 18, whereas the swinging frame 14 consists of similar side flanges 19 and 20 interconnected by a web 21.

The frames 12 and 14 are conventional and are hinged to one another by hinges 22. The latter consist of hinge brackets 23 and 24 (Figure 2) pivoted to one another by the hinge pins 25. The hinge brackets 23 and 24 have their free ends flanged as at 26 and 27 and bolted or riveted to the frames 12 and 14 respectively. The window pane 15 is secured in the movable frame 14 by any conventional sealing material 28. Secured to the lower side of the web 21 of the movable frame 14 is a hollow channel guide member 29 having flanged longitudinal edges 30 (Figure 3).

The window operator 11 includes a box-like housing 31 with a vertical base-plate 32 at the rearward end thereof for riveting or bolting the operator 11 to the stationary window frame. The base-plate 32 is provided with an opening 33 through which certain of the operating parts extend, as explained below. Projecting forwardly from the base plate 32 are upper and lower walls 34 and 35 respectively, these being bored to receive spaced pivot pins 36 and 37 respectively. The ends of the pivot pins 36 and 37 are upset in order to hold them in assembly.

The lower wall 35 has an outwardly extending portion forming a toothed locking disc 38 having locking teeth 39 extending partway around its periphery. Mounted on the pivot pin 37 is the tubular hub 40 of a lower sector driving gear 41 (Figure 11) having an arm 42 extending radially therefrom and equipped on its opposite edges

with struck-up wings 43 having aligned holes 44 adapted to receive the opposite ends of a pivot pin or hinge pin 45 (Figure 7). The latter also extends through aligned holes 46 in the side flanges 47 of a handle 48, and is upset at its opposite ends to secure it in position.

The web portion 49 of the handle 48 at its forward end is provided with a forwardly-projecting tongue 50 (Figures 4 and 5) which serves as an anchorage for the central loop 51 of a double coil spring 52 (Figures 7 and 9). The latter encircles the pivot pin 45 and its free ends 53 are anchored by being extended through a hole 54 in the arm 42. The side flanges 47 of the handle 48 are spaced apart from one another by a distance equal approximately to the distance between the outside edges of an adjacent pair of teeth 39, and projections or prongs 55 (Figures 5 and 9) extend downwardly from the side flanges 47 on opposite sides of the paired teeth 39. Thus, when the handle 48 is swung upward around its pivot pin 45, the prongs 55 move upward out of engagement with the teeth 39 of the locking disc 38, unlocking the handle 48 and enabling it and the lower sector driving gear 41 to be swung through an arcuate path around the pivot pin 37.

The tubular hub 40 of the lower sector driving gear 41 has teeth 56 thereon and passes upward through a hole 57 in the upper sector driving gear 58 (Figures 6 and 10), having teeth 59 thereon. The upper sector driving gear 58 is provided with a relatively short arm 60 (Figure 10) with a tongue 61 of reduced width adapted to extend snugly between the side flanges 43 of the lower sector driving gear 41, locking the gears 41 and 58 against rotation relatively to one another. As shown in Figure 4, the teeth 56 and 59 on the lower and upper driving gears 41 and 58 are so located relatively to the longitudinal axes of the arms 42 and 60 that the teeth 56 and 59 are staggered relatively to one another so that the teeth of one gear are aligned axially with the tooth gaps in the other gear.

The teeth 56 and 59 of the lower and upper sector driving gears 41 and 58 mesh with correspondingly staggered teeth 62 and 63 upon lower and upper sector driven gears 64 and 65 respectively (Figures 4 and 6). The lower driven gear 64 has a tubular hub 66 which extends upward through a hole 67 in the upper gear 65, the hub 66 being rotatably mounted upon the pivot pin 36. The driving and driven gears are provided with different pitch diameters to impart an increased leverage to the window, a two-to-one gear ratio being found satisfactory in practice. The upper sector driven gear 65 is provided with an elongated arm 68 which extends outward in an approximately tangential direction to the gear 65 and is joined thereto by a neck portion 69 (Figure 4). The outer end of the arm 68 is provided with an upwardly-bent neck portion 70 (Figures 4 and 5) terminating in a cross bar portion 71. The portions 70 and 71 form a T-shaped end for the arm 68 which extends upward into the channel guide member 29, the edge flanges 30 of which are spaced apart a sufficient distance for the passage of the neck portion 70 (Figures 3).

The lower sector driven gear 64 is also provided with a relatively short arm 72 (Figure 12) having a tubular boss or hub 73 projecting upward therefrom and passing through a hole 74 in the neck portion 69 of the arm 68. In order for the teeth 62 and 63 of the driven gears 64

and 65 to mesh properly with the staggered teeth 56 and 59 of the driving gears 41 and 58, the teeth 62 and 63 must also be staggered by the same amount. This staggered arrangement of the teeth of the driving and driven gears brings at least two pairs of teeth simultaneously into engagement at a given time so that the strain is distributed over twice the number of teeth than if a single pair of gears were employed. This arrangement eliminates the frequent shearing off of the gear teeth which occurs when single gears are used.

In the operation of the window operator 11, let it be assumed that the window is closed and that the parts are in the position shown in Figures 1 and 2. To open the window, the operator grasps the handle 48 and swings it upward around the pivot pin 45, withdrawing the locking prongs 55 (Figure 5) from engagement with the edges of the locking teeth 39 on the locking disc 38. With the handle 48 thus raised, he swings the latter toward himself, rotating the driving gears 41 and 58 and consequently rotating the driven gears 64 and 65 which mesh with them. This action swings the arm 68 around the pivot pin 36 and causes the cross-bar 71 on the end thereof to slide along the channel guide member 29 (Figure 3), thereby swinging the window 13 outward around its hinges 22 (Figure 2).

The operator then swings the handle 48 downward, assisted by the double coil spring 52, so that the locking prongs 55 engage the edges of a new pair of teeth 39 on the locking disc 38. The window is thus held open in a locked position at any desired angle and cannot be moved until the handle 48 is again swung upward, as described above.

To close the window, the foregoing procedure is reversed, the arm 48 being lifted and swung clockwise back into the position shown in Figures 2 and 4, at the same time swinging the window 14 backward into its closed position, as the cross-bar 71 travels along the channel guide member 29. The handle 48 is then lowered and the prongs 55 again engage a pair of locking teeth 39 in the closed position of the window. In this closed position, therefore, the handle 48 lies close to the window in a position where it does not interfere with Venetian blinds or curtains and at a comparatively low height. The handle 48 also occupies a position in approximately the center of the window, or toward the center where it is easily grasped without interference with or from the curtain.

What I claim is:

1. A casement window operator comprising a support adapted to be secured to a casement window frame, a casement window arm pivotally mounted on said support, a driven gear connected to said arm, a driving gear meshing with said driven gear and rotatably mounted on said support, said driving gear having a handle arm projecting therefrom, a handle of channel cross-section having downwardly-directed side flanges hingedly connected to said handle arm of the driving gear and having a pair of spaced locking projections extending downwardly and forwardly therefrom, and a toothed locking element connected to said support beneath said handle with its teeth selectively engageable by said locking projections.

2. A casement window operator comprising a support adapted to be secured to a casement window frame, a casement window swinging arm pivotally mounted on said support, a driven gear

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connected to said arm, a driving gear meshing with said driven gear and rotatably mounted on said support, said driving gear having a handle arm projecting therefrom, a handle of channel cross-section having downwardly-directed side flanges hingedly connected to said handle arm of the driving gear and having a pair of spaced locking projections extending downwardly and forwardly from opposite edges thereof and a toothed locking element connected to said support beneath said handle with its teeth selectively engageable by said locking projections, said projections spanning a plurality of teeth of said locking element and engaging the mutually remote edges of the spanned teeth.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,546,418	Stresau	July 21, 1925
1,860,418	Hummert	May 31, 1932
1,982,269	Schaffert et al.	Nov. 27, 1934
2,199,906	Bard	May 7, 1940
2,312,720	Lang	Mar. 2, 1943
2,356,270	Reynaud	Aug. 22, 1944