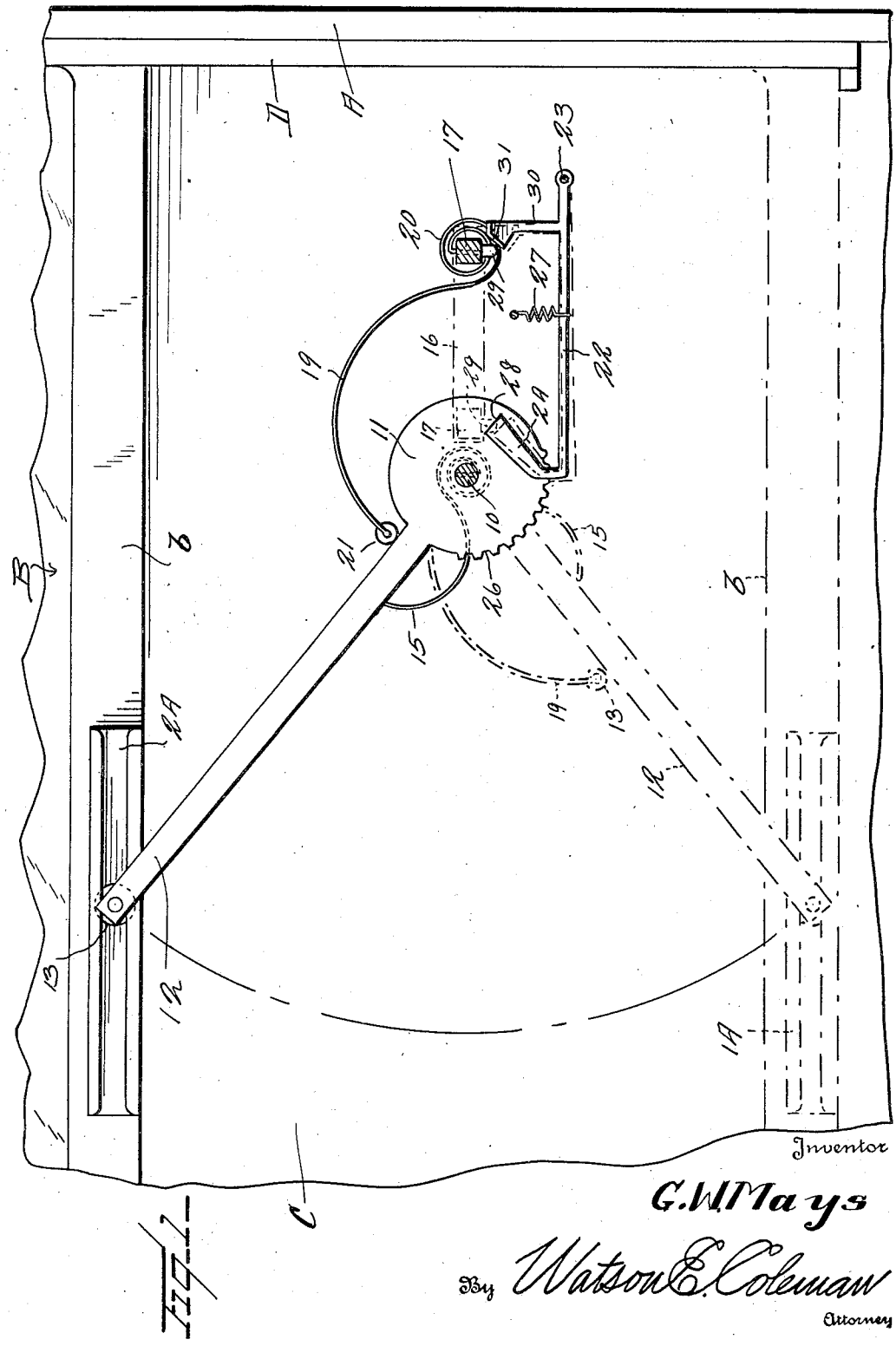
June 23, 1936. G. W. MAYS 2,045,195

WINDOW OPERATING MECHANISM

Filed March 12, 1936 3 Sheets-Sheet 1



Inventor

G. W. Mays

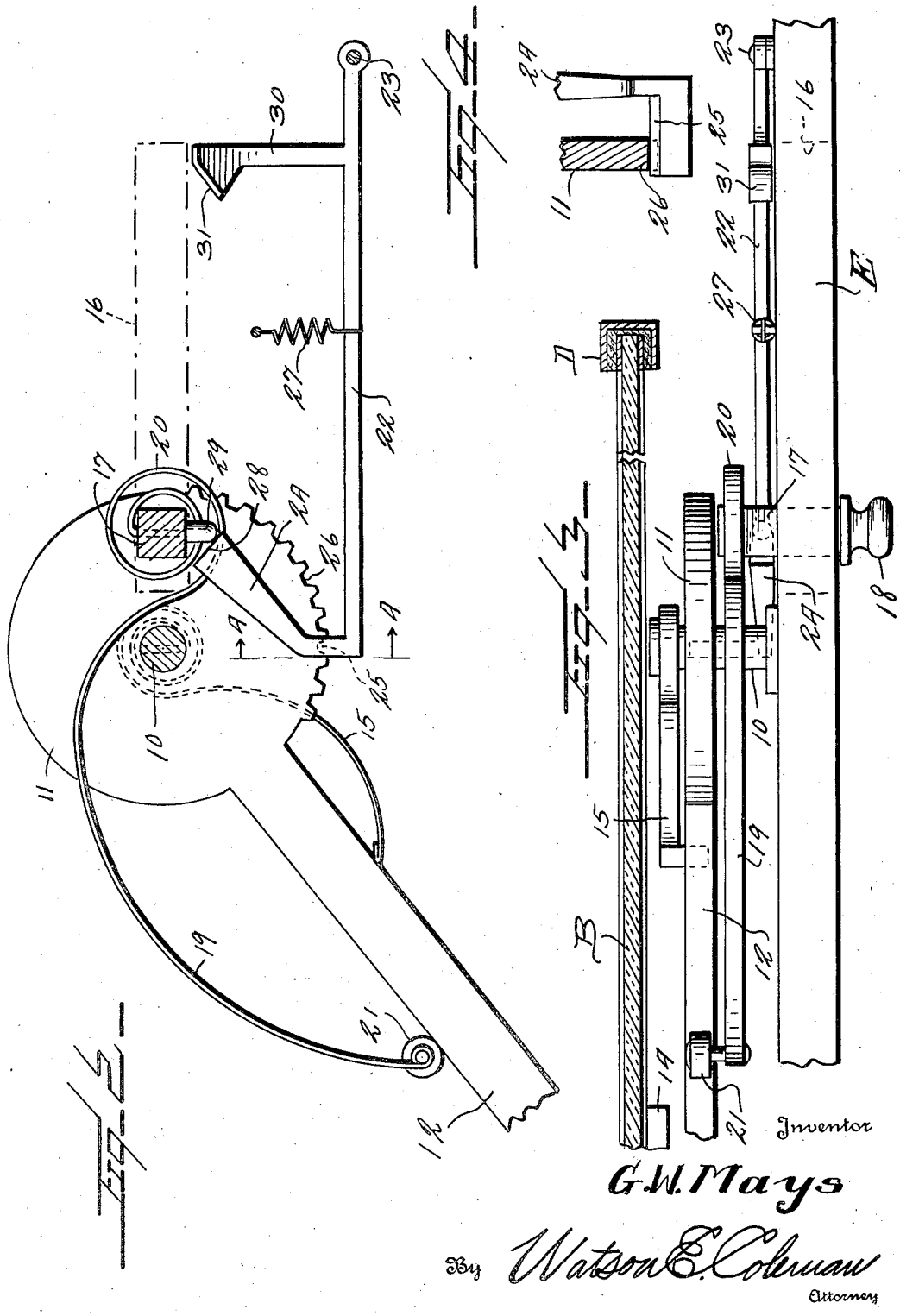
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Fig. 5

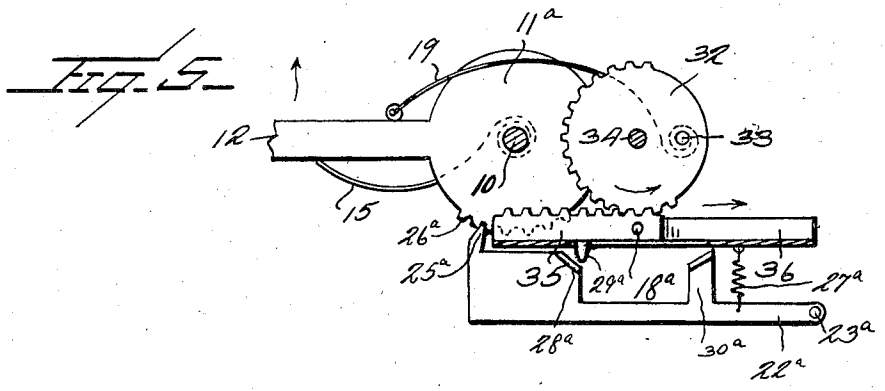


Fig. 6

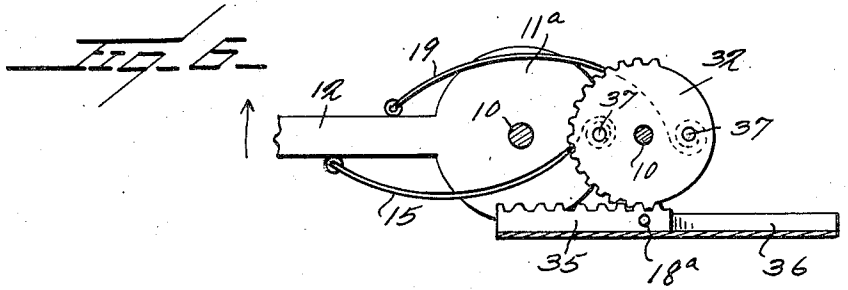


Fig. 7

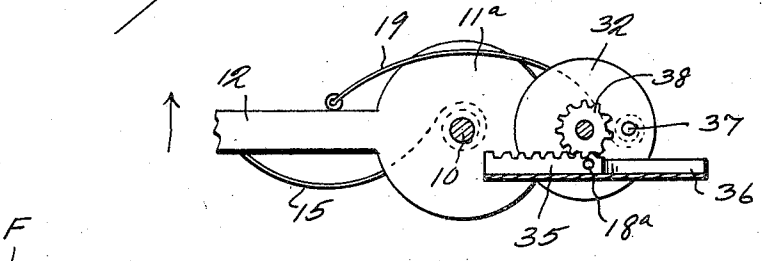
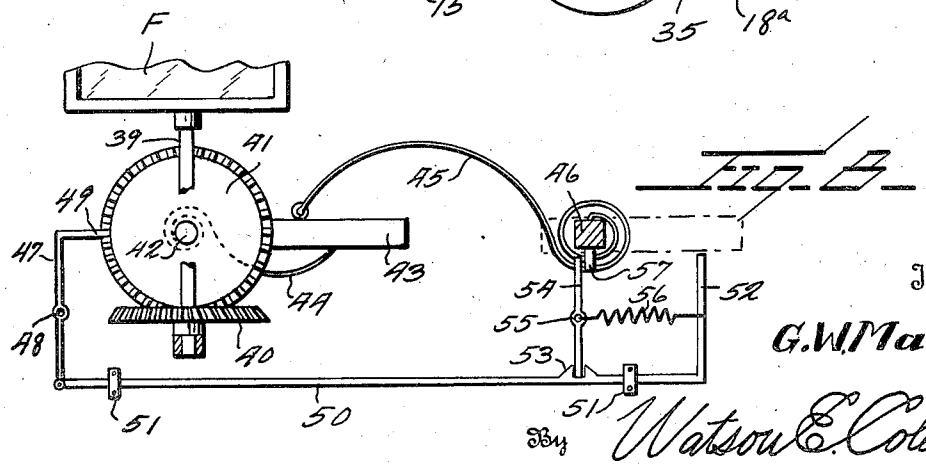


Fig. 8



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UNITED STATES PATENT OFFICE

2,045,195

WINDOW OPERATING MECHANISM

Glenn W. Mays, Midland, Tex.

Application March 12, 1936, Serial No. 68,515

13 Claims. (Cl. 268—126)

This invention relates to window opening and closing devices and particularly to means for opening and closing the windows of automobiles, either sliding windows or pivoted windows.

The general object of this invention is to provide means whereby springs may be used to shift the windows in either direction and whereby one or the other of said springs may be manually put into operative position to exert its force on the window, thus doing away with the necessity of manually putting down or pushing up on the window or operating a crank to close or open the window.

Another object is to provide a construction of this kind which includes a pivoted arm or lever directly or indirectly engaging the window and two opposed springs bearing against said arm, the springs being manually shiftable along the arm or lever relative to each other so that one spring may be shifted to cause it to engage the lever at a point more or less distant from the fulcrum than the other spring to thus render one or the other of the springs operative.

A further object is to provide a structure of this character which while particularly applicable to sliding windows, is also adapted to be used for pivoted windows.

Other objects will appear in the course of the following description.

My invention is illustrated in the accompanying drawings wherein:

Figure 1 is a fragmentary face view of a portion of a window frame and sliding window such as is used in automobiles, the window being shown as closed in full lines and as lowered to its open position in dotted lines;

Figure 2 is an enlarged elevation of the structure shown in Figure 1, but showing the position of the parts when the window has been opened;

Figure 3 is a top plan view of the structures shown in Figure 2;

Figure 4 is a fragmentary section on the line 4—4 of Figure 2;

Figure 5 is a fragmentary side elevation of a modified form of the structure shown in Figure 1;

Figure 6 is a like view to Figure 5, but showing a still further modification;

Figure 7 is a like view to Figures 5 and 6, but showing a still further modification;

Figure 8 is a side elevation of the means devised by me for operating pivoted windows.

Referring to Figures 1, 2, 3 and 4, A designates a portion of the frame of a sliding window B. This window is illustrated as of that type in which the window slides downward into a pocket in the wall of the casing when it is lowered or opened, and is raised from the pocket C when the window is closed. The window is guided in its vertical movement by the guides D of a suitable or ordinary construction. The pocket is bounded at one side by the inner wall E. Mounted within the pocket C is a transversely extending shaft 10 carrying upon it the sector gear 11 provided with the radially extending arm or lever 12 carrying at its end a roller 13 engaging in a guide 14 mounted upon the lower rail *b* of the window B. It will be obvious that when the arm 12 is depressed to the dotted line position, the window will be lowered, and at the arm 12 is raised to the full line position, the window will be raised. When the window is lowered, it is in open position as before stated.

Illustrated as mounted upon the shaft 10 is an S-shaped leaf spring 15, which bears against the under edge face of the lever 12. Slidingly mounted in a slot shown in dotted lines in Figure 1 and designated 16 is a slide 17 provided with a handle 18 or knob disposed exteriorly of the interior wall E of the pocket, the slot 16 being in this interior wall. This slide 17 carries upon it a spring 19, the spring having a coil 20 connected directly to the slide 17 and then extending upward and forward in a curve and at its extremity extending toward the lever 12 and carrying at its end the roller 21 bearing against the upper edge of the arm or lever 12.

It will be seen that in the position of the parts shown in Figure 1, the roller 21 is nearer to the fulcrum or shaft 10 than the extremity of the spring 15, so that the spring 15 exerts a greater force or has a greater leverage upon the arm 12 than the spring 19, and that thus this spring 15 will urge the arm or lever 12 upward, thus raising the window, but that if the slide 17 be shifted to the position shown in Figure 2, then the end of the spring 19 will be disposed further from the fulcrum 10 than the extremity of the spring 15 and that thus the spring 19 will urge the arm 12 downward to the position shown in Figure 2.

For the purpose of holding the window in either its raised or its lowered position, I provide a latching mechanism. The latch 22 is pivoted, as at 23. The extremity of this latch is formed with an upwardly and rearwardly extending nose 24 and, as shown in Figure 4, with a laterally extending tooth 25 which engages in the teeth 26 formed in the sector gear 11. A spring 27 urges this latch in a direction to carry its tooth 25 into engagement with the teeth 26. The upper end of the nose 24 has an inclined end face 28 disposed in the path of movement of a stud 29 projecting downward from the slide 17, as shown best in Figure 2. A corresponding nose 30 extends outward from the latch bar 22 and is also formed with an inclined face 31 which is reversely inclined to the face 28 of the nose 24.

In the operation of this structure, assuming the parts to be in position shown in Figure 1, with the window closed, if it be desired to open the window, the slide 17 is shifted toward the left in Figure 1 to the position shown in Figure 2, until the lug 29 engages the inclined face 28. This shifts the spring 19 relative to the spring 15 until the extremity of the spring bears against the arm or lever 12 at a greater distance from the fulcrum 10 than the extremity of the spring 15. At this time, a further movement of the slide 17 to the left in Figure 2 causes the lug 29 to bear against said inclined face 28 and force the latch down or out of engagement with the teeth 26. It is to be understood that up to this time, the arm 12 is in the position shown in Figure 1, but that as soon as the latch has been depressed by the lug 29, the spring 19 will quickly shift the arm or lever 12 downward, lowering the window into its pocket C. If now the slide 17 be retracted slightly to the position shown in Figure 2, the latch will spring into engagement with the teeth 26 and lock the window in its lowered or opened position. Now if it be desired to raise the window, the slide 17 is retracted toward the right beyond the position shown in Figure 1, and the stud 29, when it reaches the inclined face 31, will again force the latch downward. The spring 19 has been retracted relative to the spring 15 and as a consequence, the spring 15 will exert a greater force than the spring 19, and as soon as the latch is retracted, the spring 15 will force the window up. Again in order to hold the window locked, the slide is retracted somewhat or shifted to the position shown in Figure 1, which permits the latch to spring upward and engage the teeth 26 and hold the window latched in its raised or closed position.

It will be understood that the window need not be fully opened or fully closed and yet may be latched in its partly opened or closed position, for instance, if it be desired to partly open the window, that is, lower it from the position shown in Figure 1, then the slide 17 is shifted toward the left in Figure 1, until the spring has been shifted to the position shown in Figure 2 and the latch engaged with the extremity 28 of the nose 24. The spring 19 then begins to lower the window and as soon as the window has been lowered a sufficient amount, the slide 17 is retracted to the position shown in Figure 2, which immediately latches the window in its partly lowered position. The same is true when it is desired to partly close the window after it has been fully opened. The slide 17 is shifted to the right in Figure 1 to thereby shift the spring 19 to its relatively inoperative position; the spring 15 urges the arm or lever 12 upward, and as soon as the window has been raised a sufficient amount, the slide 17 is manually shifted toward the left in Figure 1 to the position shown in Figure 1, whereupon the latch, under the action of the spring 27 will engage the teeth 26 and lock the window in this partially closed position.

In Figure 5, I have shown a modification of the structure illustrated in Figure 2, wherein the spring 15, as before stated, is mounted upon the shaft 10 and bears against the under edge face of the lever 12. The lever 12 is shown as terminating in a disk 11a but this form might be modified without in any way changing the operation of the device. The spring 19 is illustrated as being mounted upon a sector gear 32 by means of the stud 33. This sector gear is rotatable upon a stub shaft 34 and is oscillated by means of a rack bar 35 slidingly carried in a guide 36, which rack is provided with a handle 18a, as previously described. It will be obvious now that as the slide 36 is shifted toward the right in Figure 5, that the spring 19 will be shifted relative to the spring 15 to carry its extremity a greater distance from the fulcrum 10 than the extremity of spring 15 and that vice versa when the slide 35 is shifted from the last named position toward the left in Figure 5 and to the position in Figure 5, the spring 19 will be retracted relative to the spring 15. When it is desired to stop the movement of the sash or window after the sash or window has moved a desired distance from one direction, the slide is shifted until the springs are balanced, that is, until they exert an equal force upon the lever 12. The lever is thus practically latched in its adjusted position but not positively latched.

In Figure 6 is illustrated a further modification of the structure shown in Figure 5 in that the two springs 15 and 19 are both mounted at their rear ends upon studs 37 projecting from the sector gear 32, these studs being disposed diametrically opposite each other. Otherwise than this, the same construction is used as in Figure 5. With this construction, however, both springs are shifted simultaneously, one being retracted while the other is being projected. In Figure 7 there is shown a further modification of the structure shown in Figure 5, in which the wheel 32 carrying the butt end of the spring 19 is provided with a pinion 38 engaged by the rack 35 carried by the guide 36. In this case, it is the spring 19 alone which is shifted relative to the spring 15.

In Figure 8, I have illustrated the means whereby a pivoted window, such as used in certain makes of automobiles, may be operated. The pivoted window is designated F and is shown as having a shaft 39 which carries upon it the beveled gear wheel 40. Coacting with this gear wheel 40 is a beveled gear wheel 41 mounted upon a shaft 42 which, to a certain extent, is the equivalent of the shaft 10, this shaft carrying an arm 43, which is the equivalent of the arm or lever 12. Mounted upon the shaft 42 is a spring 44, which is the equivalent of spring 15. A spring 45, the equivalent of spring 19, is coiled at its inner end and connected to a slide 46, the equivalent of slide 17. When this slide is shifted to the left in Figure 8, the extremity of the spring 45 is carried inward or nearer to the fulcrum 42 than the extremity of the spring 44, and the spring 44 will therefore exert an upward pressure upon the arm 43 and a turning movement upon the wheel 41. When the slide 46 is drawn to the right in Figure 8, the extremity of the spring 45 will be carried further away from the fulcrum 42 than the extremity of the spring 44, and the spring 45 will exert a downward pressure upon the lever 43.

For the purpose of latching the window in any shifted position, I provide a latch 47 pivoted at 48 and having a detent tooth 49 engaging the teeth of the gear wheel 41. This latch at its end remote from the tooth 49 is pivotally connected to a sliding rod 50 operating in guides 51. This rod at its rear end has an upwardly extending arm or lug 52 and forward of this lug 52 is a fork 53 engaging the lower end of a lever 54 pivoted upon a stationary pivot 55. A spring 56 engages this pivot 55 and engages the arm or lug 52 to urge the member 50 toward the left in Figure 8, and thus urge the tooth 49 into engagement with the teeth of gear wheel 41.

In Figure 8, the window F is supposed to be closed. If it be now desired to open the window by the action of spring 44, the slide 46 is drawn rearward until the lug 57 on the slide contacts with the arm or lug 52. The rearward movement of the slide 46 has carried the spring 45 outward on the lever 43 to a greater distance from the fulcrum than the extremity of the spring 44. As soon as the lug 57 strikes the lug 52, it retracts the rod 50, retracting the tooth 49 from engagement with wheel 41. The spring 45 then exerts its action to shift the arm 43 downward in Figure 8 and rotate the gear wheel 41 to open the window. As soon as the window has been opened to a desired amount, the slide 46 is manually shifted just enough to carry the lug 57 away from the lug 52 and then the spring 56 causes the latch 49 to then latch the window in its partly opened position. If it is desired to further close the window from this partly opened position, the slide 56 is shifted toward the left in Figure 8, carrying the extremity of the spring 45 inward of the extremity of the spring 44 and then the lug 57 strikes the upper end of lever 54, and shifts the lower end of the lever toward the right in Figure 8, retracting the latch bar 50 and retracting the detent 49 from the teeth of wheel 41, causing the spring 44 to be rendered operative to shift the window towards its closed position when the window has been closed fully, that is, shifted towards a closed position the desired amount, the slide 46 is retracted slightly again, permitting the spring 56 to cause the latch bar 50 to shift toward the left and cause the tooth 49 to engage the teeth on the wheel 41. In this construction, I put the gear 40 under gear 41 so that the small glass pane may be raised or lowered if desired.

In Figure 5, I have illustrated a latching device of the same general character as that illustrated in Figures 1 and 2, and comprising a latch bar 22^a pivoted as at 23^a having an upwardly and forwardly extending portion 24^a carrying at its end a laterally extending tooth 25^a which engages with teeth 26^a carried by the disk 11^a. The underside of the rack bar carries upon it a depending lug 29^a which is adapted to engage against the upwardly beveled upper face of the portion 24^a to thus force the forward end of the latch downward and carry the tooth 25^a out of engagement with the teeth 26^a, thus unlocking the disk 11^a for free movement under the action of the projected spring 15, the latch being forced downward against the action of a spring 27^a. The rear end of the latch just forward of the pivot 23^a has an upwardly extending lug 30^a having a beveled upper end adapted to be contacted by the lug 29^a when the member 35 is fully retracted. The operation of this latch is precisely the same as the operation heretofore described for the latch 22 in that it frees the latch from its latching engagement either after the spring 19 has been carried to a point ahead of the spring 15 or when the spring 19 has been carried to a point rearward of the spring 15. This latch, while not shown as applied to the modifications shown in Figures 6 and 7, is obviously capable of use with these modifications. While I have illustrated a latching device of a particular form, it will be understood that I do not wish to be limited to the specific latching device except as stated in the appended claims.

It will be understood that the knob 18 is to be held, in Figures 1, 2 and 8, until the window has been shifted to the desired position, and then the knob 18 is manually shifted to cause the latching of the window in this position and that in Figures 5, 6 and 7, the knob 18 is manually shifted to cause the closing or opening of the window and then retracted, when the window has been opened or closed to a sufficient degree, to bring the latch into operative position.

While I have illustrated leaf springs 15 and 19 as being the means whereby the operating lever 12 is shifted in one direction or the other, it is to be understood that upper and lower relatively shiftable elements may be used engaging the upper and lower edge faces of the arm 12, and that the upper element might be urged downward by any suitable form of spring and the lower element urged upward by any suitable form of spring as, for instance, coil springs, and that by the term "spring actuated element" or "resiliently actuated element" as used in the claims, I mean to include not only the springs 15 and 19 but elements bearing against the arm 12, not springs in themselves, but urged in the proper direction by springs of any suitable type such as coil springs.

While I have illustrated certain details of construction and certain arrangements of parts which I believe to be thoroughly effective for the purpose intended, I do not wish to be limited to these details except as defined in the appended claims.

What is claimed is:—

1. A window and means for opening or closing it, including a lever operatively engaged with the window, opposed springs bearing against opposite sides of the lever and manually shiftable means for shifting the springs relative to each other to carry one or the other of the springs nearer to or further from the fulcrum of the lever relative to the other spring.

2. A window and means for opening or closing it, including a lever operatively engaged with the window, opposed springs bearing against opposite sides of the lever, manually shiftable means for shifting the springs relative to each other to carry one or the other of the springs nearer to or further from the fulcrum of the lever relative to the other spring, and means for holding the lever in its shifted position.

3. A window and means for opening or closing it, including a lever operatively engaged with the window, opposed springs bearing against opposite sides of the lever, manually shiftable means for shifting the springs relative to each other to carry one or the other of the springs nearer to or further from the fulcrum of the lever relative to the other spring, and means actuated by the manually shiftable means for positively locking the lever in any shifted position.

4. A window and means for opening or closing it, including a lever operatively engaged with the window, opposed springs bearing against opposite sides of the lever, a manually shiftable slide and carrying at least one of said springs, the slide when shifted shifting the springs relatively to each other to carry the extremity of one or the other of the springs nearer to or further from the fulcrum of the lever, and means controlled by said slide to hold the lever from further movement after a desired opening or closing movement of the window has been secured.

5. A window and means for opening or closing it, including a lever operatively engaged with the window, opposed leaf springs bearing against opposite sides of the lever, one of said springs being fixed from movement toward or from the fulcrum

of the lever, manually operable means supporting the butt end of the other leaf spring and shiftable to carry the free end of the second named spring nearer to or further from the fulcrum than the free end of the other spring.

6. A window and means for opening or closing it, including a lever operatively engaged with the window, opposed leaf springs bearing against opposite sides of the lever, one of said springs being fixed from movement toward or from the fulcrum of the lever, manually operable means supporting the butt end of the other leaf spring and shiftable to carry the free end of the second named spring nearer to or further from the fulcrum than the free end of the other spring, and means controlled by said slide for latching the lever in any position to which it is shifted by said springs.

7. A window and means for opening or closing it, including a lever operatively engaged with the window, a bowed spring fixedly connected at one end to the fulcrum of said lever, the extremity of the spring bearing against one face of the lever, a slide mounted for movement toward or from the fulcrum of the lever, a second outwardly bowed spring carried by said slide and having its extremity engaging the other face of the lever whereby said springs will exert pressure in opposite directions, the slide being manually movable to carry its spring to a position with its extremity inward of the extremity of the other spring or to a position with its extremity outward of the extremity of the other spring, a latching means constructed and arranged to latch the lever in any shifted position, and a lug on the slide engageable with the latching means to release the latter at the extremities of the movement of the slide, said latching means being released for latching engagement when the slide is moved inward of either of its extreme positions.

8. A window and means for opening or closing it, including a lever having a sector gear at its inner end and mounted upon a shaft for oscillating movement, the lever being operatively connected to the window, a leaf spring connected at its inner end to the shaft, the spring being outwardly bowed and having its extremity engaged with one face of the lever, a manually operable slide movable toward or from the fulcrum of the lever, a second spring mounted at its butt end upon said slide, the spring being outwardly bowed and bearing at its extremity against the opposite face of the lever, the slide when shifted in one direction carrying its spring toward the fulcrum whereby the extremity of the spring is carried outward to a greater distance from the fulcrum than the extremity of the other spring, the slide being shiftable in the opposite direction to carry the extremity of its spring inward or nearer to the fulcrum than the extremity of the opposed spring, a pivoted latch having a detent tooth engageable with the teeth on said sector gear and resiliently urged into such engagement, and opposed lugs on said latch having oppositely inclined faces with which the slide is adapted to engage to depress the latch out of its latching engagement with the teeth of the sector gear when the slide has been shifted to either extreme position, an inward movement of the slide from either extreme position releasing the latch and causing it to engage the sector gear.

9. A window and means for opening or closing it, including a lever, a shaft upon which the lever is pivoted, the lever being operatively connected to the window, an outwardly bowed spring connected at one end to the shaft and bearing at its other end against one face of the lever, a wheel, a second bowed spring attached to the wheel at its butt end, the spring being bowed outward and slidingly engaging the other face of the lever, and a manuually operable slide having a rack engageable with the wheel to rotate the wheel and thus shift its spring in a direction to carry the extremity of the spring outward of or inward of the extremity of the first named spring.

10. A window and means for opening or closing it, including a lever operatively engaged with the window, a shaft upon which the lever is mounted, a second shaft, a toothed wheel mounted upon the second shaft, oppositely disposed bowed springs having their butt ends connected at diametrically opposite points to said toothed wheel, the free ends of the springs bearing against opposite faces of the lever, and means for rotating said wheel to retract one of said springs and project the other spring relative to each other and to the fulcrum of the lever.

11. A pivoted window and means for opening or closing it, including a shaft for the window, a beveled gear wheel mounted upon the shaft, a beveled gear wheel engaging the first named gear wheel and having an arm extending radially therefrom, an outwardly bowed spring attached at its butt end at the axis of said first named gear wheel and bearing at its free end against one face of the lever, a manually shiftable slide movable toward or from the axis of the first named gear wheel, an outwardly bowed spring mounted at its butt end upon said slide and at its free end engaging against said arm on the edge opposite the point of engagement of the first named spring, a pivoted detent engageable with the teeth of one of said gear wheels, a rectilinearly movable connecting rod pivoted to said detent, the rod having an upwardly extending lug and inward of the lug having a fork, a spring urging the rod in a direction to carry the detent into engagement with the teeth of said gear wheel, and a lever engaging said fork, the slide having a lug engageable with the lug when the slide is fully retracted from the axis of the first named gear wheel to thus release the detent or engageable with the lever to release the detent when the slide has been fully shifted toward the axis of the first named gear wheel.

12. A window and means for opening or closing it, including a lever operatively engaged with the window and opposed resiliently actuated elements bearing against opposite sides of the lever and urging it in opposite directions, and manually shiftable means for shifting the elements relative to each other to carry one or the other of the elements nearer to or further from the fulcrum of the lever relative to the other element.

13. A window and means for opening or closing it, including a lever operatively engaged with the window and opposed resiliently actuated elements bearing against opposite sides of the lever and urging it in opposite directions, manually shiftable means for shifting the elements relative to each other to carry one or the other of the elements nearer to or further from the fulcrum of the lever relative to the other element, and means for holding the lever in a shifted position.

GLENN W. MAYS.