April 15, 1941. J. W. MILLER 2,238,537

WINDOW OPERATING MECHANISM

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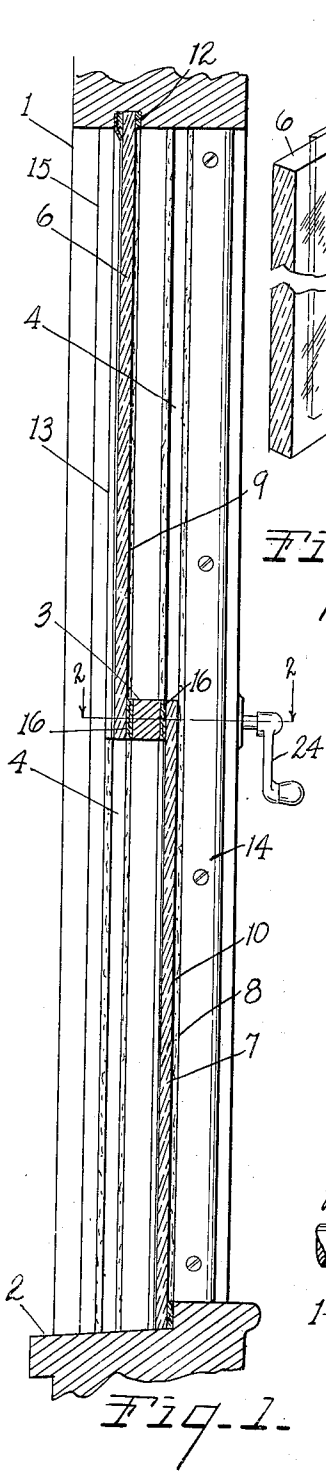

Fig. 1.

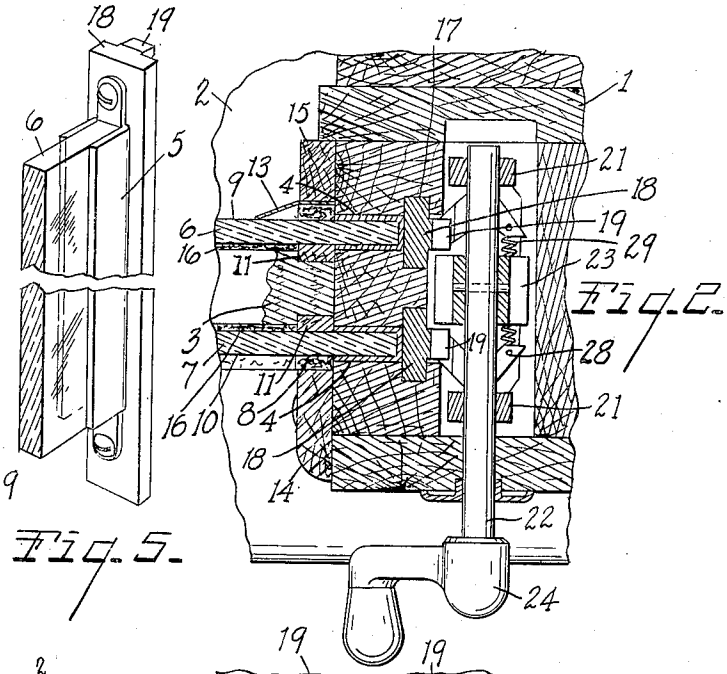

Fig. 2.

Fig. 5.

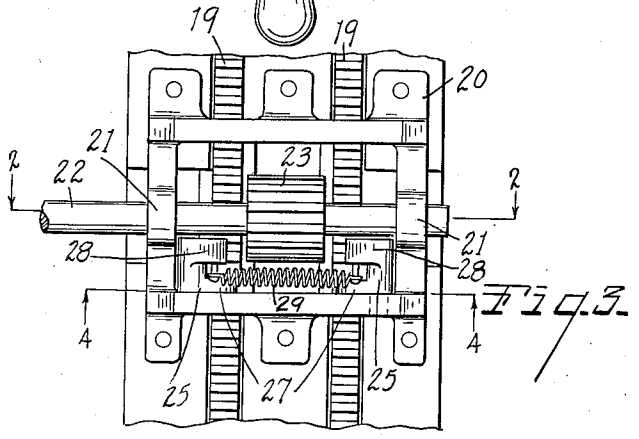

Fig. 3.

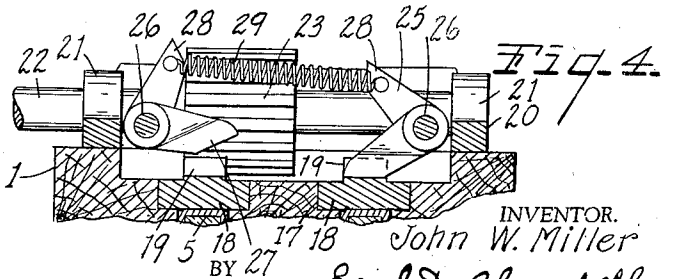

Fig. 4.

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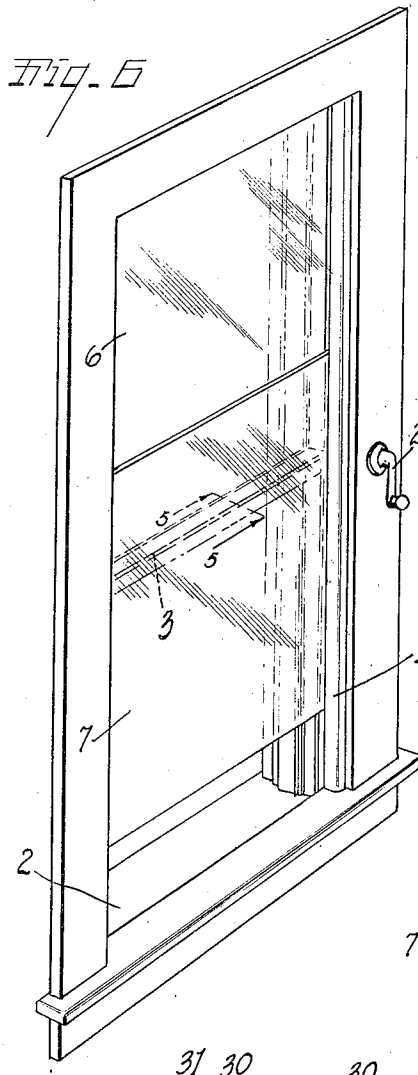
Fig. 6



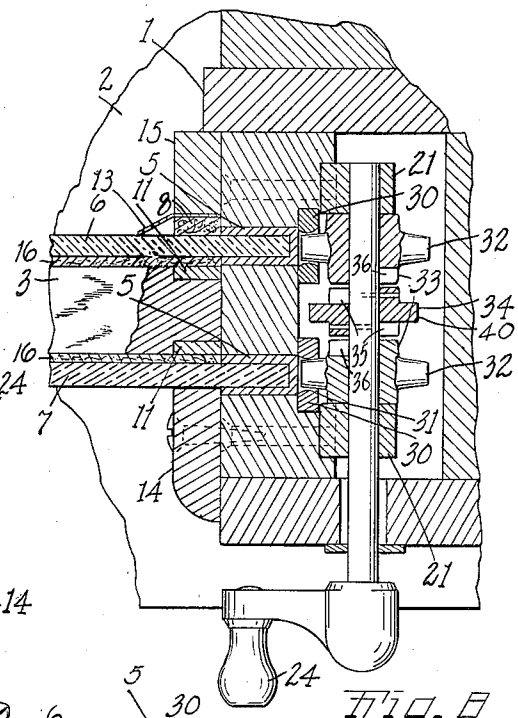


Fig. 8

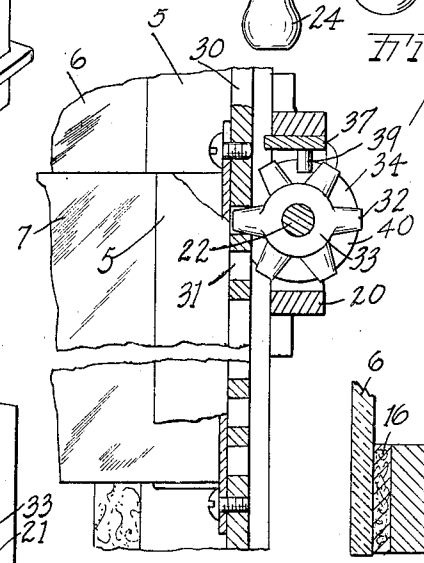


Fig. 7

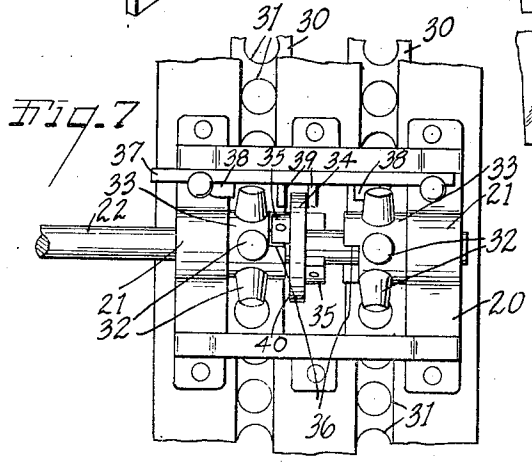


Fig. 9

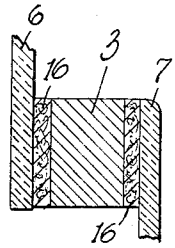


Fig. 10.

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UNITED STATES PATENT OFFICE

2,238,537

WINDOW OPERATING MECHANISM

John W. Miller, Sturgis, Mich., assignor of one-half to Lawrence O. McBride, Sturgis, Mich.

Application January 17, 1938, Serial No. 185,323

4 Claims. (Cl. 268—132)

This invention relates to improvements in window operating mechanisms.

The main objects of my invention are:

First, to provide a sashless window and operating mechanism therefor.

Second, to provide windows of the sliding type which do not require sashes for the panels thereof, in combination with operating mechanisms associated with the windows whereby to raise and lower the same and hold them in desired relative adjusted positions.

Third, to provide operating mechanism for closures of the sliding type, having provision for shifting the closures relative to one another and locking them in desired position.

Further objects relating to details and economies of my invention will definitely appear from the description to follow. The invention is defined in the claims.

A structure embodying the features of my invention is illustrated in the accompanying drawings, wherein:

Fig. 1 is a fragmentary side view in vertical section illustrating the window of my invention and the operative relation of the same to a window frame or casing.

Fig. 2 is an enlarged fragmentary view in section on line 2—2 of Figs. 1 and 3.

Fig. 3 is a fragmentary view in side elevation illustrating the window operating and locking mechanism of my invention.

Fig. 4 is an enlarged fragmentary view in section on line 4—4 of Fig. 3, further illustrating the details of construction of the operating and locking mechanism.

Fig. 5 is a perspective view illustrating the details of construction of the means for connecting the window panels to the operating mechanism therefor.

Fig. 6 is a perspective view illustrating the appearance of the window panes or panels in operative position in the window frame.

Fig. 7 is a fragmentary view in side elevation, illustrating a modified form of my invention.

Fig. 8 is a fragmentary view in horizontal section illustrating details of construction of the modified form.

Fig. 9 is a fragmentary view of the construction of Fig. 8 in vertical section and partially broken away.

Fig. 10 is a fragmentary view in vertical section of the assembled relation of the windows with the frame.

The present invention relates in general to closures of the sliding type having a pair of closure members which are mounted in a frame or casing for sliding movement. More particularly, the invention relates to provisions whereby the closures such as the glass panels illustrated in the accompanying drawings may be slidingly mounted without the use of the conventional frames, and moreover, the invention contemplates means for adjusting said closures vertically relative to one another by a simple and effective mechanism. Still further, the invention includes means for locking the closures in desired adjusted position either open or closed, thus doing away with the usual hand operated latch heretofore available only to lock the closures in closed position.

Referring to the drawings, the reference numeral 1 in general indicates a conventional window frame or casing having the usual sill 2 and, in the case of the present invention, provided with a central transverse bar 3 tenoned into vertically extending side mould strips 11.

In Figs. 1 and 2 I illustrate more particularly the construction of the frame. It will be noted that the same is suitably assembled to provide vertically extending channels 4 adapted to slidingly receive the clips 5 which are secured in any appropriate manner to window panels 6, 7. Interiorly of the frame I provide strips 8 of fibrous packing or sealing material engaging the opposed sides 9, 10 of panels 6, 7 respectively. The adjacent sides of the said panels slidingly engage the sides of central moulding strips 11. The sealing strips 8 extend throughout the entire vertical dimension of the frame and also in the panel receiving groove 12 at the top of the frame and across the rear of the sill 2.

The said sealing and moulding strips slidingly support panels 6, 7 in the channels in an obvious manner and serve to effectively seal the edges of the panels to prevent leakage of air, dust, moisture, etc. at that point. It will also be noted that I provide a metal shield 13 extending around the top and sides of each panel and slidingly engaging the outer surface of the same to supplement the action of the strips in excluding air, moisture, and dust. These shields 13 may be secured to the frame by any appropriate means such as the inner mould strip 14 screwed to the frame and coacting with outer mould strips 15 to complete the frame assembly.

Cross bar 3 is provided with side strips or facings 16 of fibrous sealing material coacting with the window panels to prevent leakage at that point. See Figs. 1 and 10.

Reference being had to Figs. 2 and 5, it will be seen that the frame is provided with vertically

extending rack receiving channels 17 in communication with the vertically extending panel receiving channels 4, the said channels 17 furnishing tracks slidably receiving rack members 18 to which are secured the clips 5. The rack members 18 are provided with teeth 19 adapted to be engaged by actuating means in the form of gear or pinion members to be hereinafter described, and it will be apparent that movement of the racks upwardly and downwardly in channels 17 serves to adjust panels 6, 7 in the frame. This action is accomplished in a structure wherein the conventional sashes mounting the panels are entirely eliminated and it will be seen that the appearance of the resultant assembly is considerably improved. Furthermore, this is accomplished without detracting from the effective sealing of the window, due to the provisions above described.

Referring to Figs. 3 and 4, I illustrate a bracket generally indicated by the reference numeral 20 which is fixedly secured to frame 1. Said bracket has spaced bearings 21 journaling a spindle 22 upon which is mounted a pinion 23 having a comparatively wide face. In Fig. 3 I illustrate the pinion in neutral position between racks 19, wherein the pinion is out of engagement with both of the racks. Spindle 22 is capable of free longitudinal or axial movement in bracket 20 and may be manipulated through handle 24 on one end thereof to shift the same from the neutral intermediate position of Fig. 3 into the position illustrated in Fig. 4 wherein the pinion engages the teeth of one of the racks. In such position, rotation of the spindle results in vertical movement of the rack and panel. Shifting of the spindle to the opposite extreme of its endwise movement obviously engages pinion 23 with the other rack.

My invention contemplates improved means for locking the panels in position as adjusted by the rack and pinion arrangement above described. Such locking means consists of a pair of facing dogs 25 each pivotally mounted on bracket 20 at 26. The said dogs are in the form of bell crank levers having a tooth portion 27 adapted for locking engagement with the rack teeth adjacent the same. The arrangement of the parts is clearly illustrated in Figs. 3 and 4.

Extensions 28 on the dogs are connected by a coil tension spring 29 serving to urge dogs 27 in a direction to engage the respective racks. However, as illustrated in Fig. 3, the extensions 28 are positioned so as to be struck by the side face of pinion 23 when the same is shifted longitudinally, with the result that when pinion 23 is shifted into engagement with the left hand rack, as illustrated in Figs. 3 and 4, the dog 27 adjacent said rack is pivoted in counterclockwise direction to disengage the same from that rack and unlock the same. At this time, the dog engaging the right hand rack is in locking engagement therewith, see Fig. 4, and it follows that when one of the panels is being actuated, the other is positively locked against any movement.

When the pinion is shifted in the opposite direction or to the right in Figs. 3, 4, it is evident that dog 27 adjacent the left hand rack will pivot reversely into locking engagement with that rack so that in neutral position of the pinion, as illustrated in Fig. 3, both dogs 27 lockingly engage their respective racks so that no movement of either panel is possible. Moreover, it will be noticed that each dog 27 passes into locking engagement with the rack teeth adjacent the same before the pinion 23 passes out of engagement with the said teeth. Likewise, when the pinion moves into driving engagement with a rack, it must be fully shifted in the proper direction before the corresponding locking dog disengages that rack, so that the panels are at all times either locked or under the control of the operator.

In Figs. 7, 8, and 9 I illustrate a modified embodiment of my invention similar in most respects to that of Figs. 2, 3, and 4 and differing therefrom in that the panel carrying clips 5 are secured to bars 30, each of which is provided with a series of uniformly spaced vertically extending apertures 31. These apertures are adapted to be engaged by uniformly spaced radial lugs 32 on sleeves 33, the said sleeves being freely rotatable relative to a spindle 22. As in the case of Figs. 2, 3, and 4, spindle 22 is longitudinally shiftable in bracket 20 and is provided with a clutch member 34 between sleeves 33. The clutch member is fixedly secured to the spindle and carries integral clutch elements 35 adapted for clutching engagement with clutch faces 36 on the sleeves when the spindle is shifted to right or left into or out of engagement with the said sleeves.

In order to lock the panels in adjusted position, this embodiment of my invention contemplates a locking bar 37 slidably mounted in bracket 20 and carrying a pair of locking dogs 38. Bar 37 carries a pair of pins 39 engaging either side of a radial web 40 on clutch member 34, whereby longitudinal shifting movement of the clutch member is accompanied by a corresponding shifting of the locking bar 37 and movement of dogs 38 into and out of locking engagement with lugs 32. As illustrated in Fig. 7, a dog 38 is shown in locking relation to the sleeve 33 on the right with the other sleeve in operative actuating engagement with clutch member 34 to adjust apertured bar 30 and the window panel associated therewith. In Fig. 8, the parts are illustrated in neutral or inoperative position and it will be understood that the locking dogs 38 are in locking engagement with both sleeves in that position to prevent movement of either panel.

I have illustrated and described my improvements in embodiments which are very practical. I have not attempted to illustrate or describe other embodiments or adaptations as it is believed this disclosure will enable those skilled in the art to embody or adapt my improvements as may be desired.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A window of the type described and operating mechanism therefor, said window comprising a pair of glass panels slidable relative to one another in a window frame, clips connected directly to each of said panels, a rack secured to each clip, the racks being in parallel relation to one another, a pinion between said racks and adapted to be selectively engaged therewith, means for slidably mounting said pinion for effecting said engagement, comprising a spindle axially slidable and rotatable in the frame, and means for fixedly connecting the pinion to the spindle, and means for locking said panels in adjusted position, comprising a pair of pivotally mounted dogs mounted adjacent said racks and in the path of axial movement of the pinion, and a spring connecting said dogs and urging the same for locking engagement with the racks whereby in neutral position of the pinion between the racks both of said racks are locked by the

dogs, said pinion engaging one of said dogs upon axial movement of the pinion into driving engagement with the rack adjacent said dogs, thereby disengaging said dog from said rack, the other dog remaining in locking engagement with the other rack.

2. A window of the type described and operating mechanism therefor, said window comprising a pair of panels slidable relative to one another in a window frame, a rack secured to each panel, the racks being in parallel relation to one another, a pinion between said racks and adapted to be selectively engaged therewith, means for slidably mounting said pinion for effecting said engagement, comprising a spindle axially slidable and rotatable in the frame, and means for fixedly connecting the pinion to the spindle, and means for locking said panels in adjusted position, comprising a pair of pivotally mounted dogs mounted adjacent said racks and in the path of axial movement of the pinion, and a spring connecting said dogs and urging the same for locking engagement with the racks whereby in neutral position of the pinion between the racks both of said racks are locked by the dogs, said pinion engaging one of said dogs upon axial movement of the pinion into driving engagement with the rack adjacent said dogs, thereby disengaging said dog from said rack, the other dog remaining in locking engagement with the other rack.

3. In a sliding closure construction of the type described, a pair of relatively slidable closure members, means for adjusting said closure members, comprising rack members connected directly thereto, a fixedly mounted bracket, a spindle rotatable in the bracket, a pinion on said spindle between said rack members and selectively engageable therewith on axial movement of the spindle, and means for preventing movement of one rack member when the pinion is in engagement with the other rack member, comprising a pair of dogs pivotally mounted on said bracket for movement into and out of engagement with said rack members, extensions on said dogs lying in the path of axial movement of the pinion, and a spring connecting said extensions for urging the dogs in opposite directions for engagement with said rack member, said pinion when in mesh with either of said rack members engaging the dog adjacent the same to free the corresponding rack member for movement by the pinion.

4. In a sliding window construction, a pair of relatively slidable window panels, rack members secured to said panels, rotatably mounted actuating means selectively engageable with said members, means for selectively shifting said actuating means into engagement with said members, a pair of dogs pivotally mounted adjacent said rack members, a spring connecting said dogs for opposite pivotal movement and normally urging the dogs in a direction to engage said rack members, said actuating means being engageable with said dogs to pivot the same in opposition to said spring.

JOHN W. MILLER.