F. P. ANDERSON.

SASH CONTROL MECHANISM.

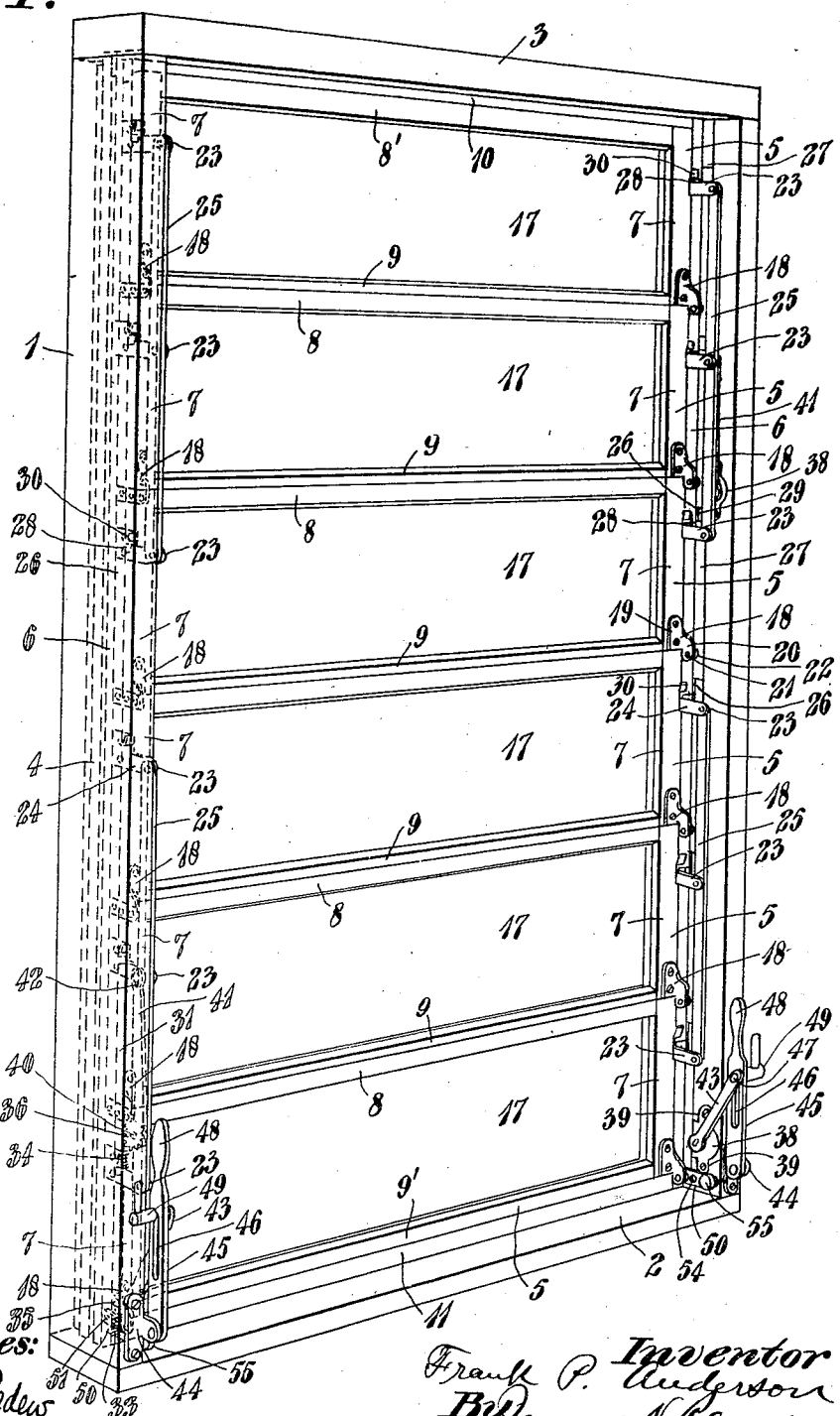
APPLICATION FILED AUG. 5, 1918.

1,319,317.

Patented Oct. 21, 1919.

3 SHEETS-SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

Fig. 3.

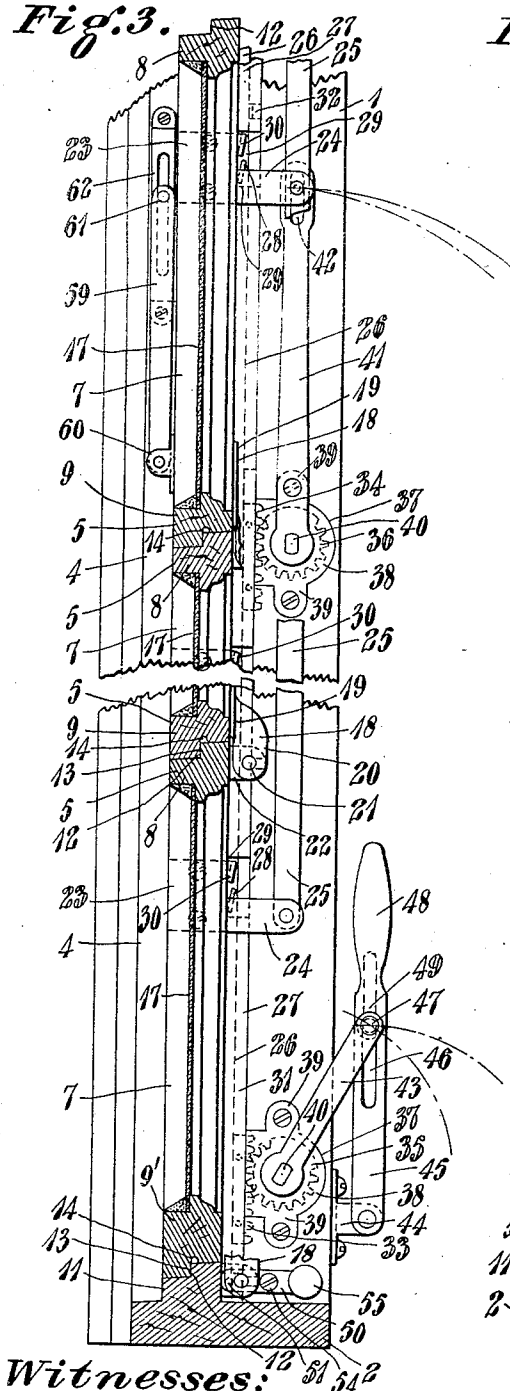
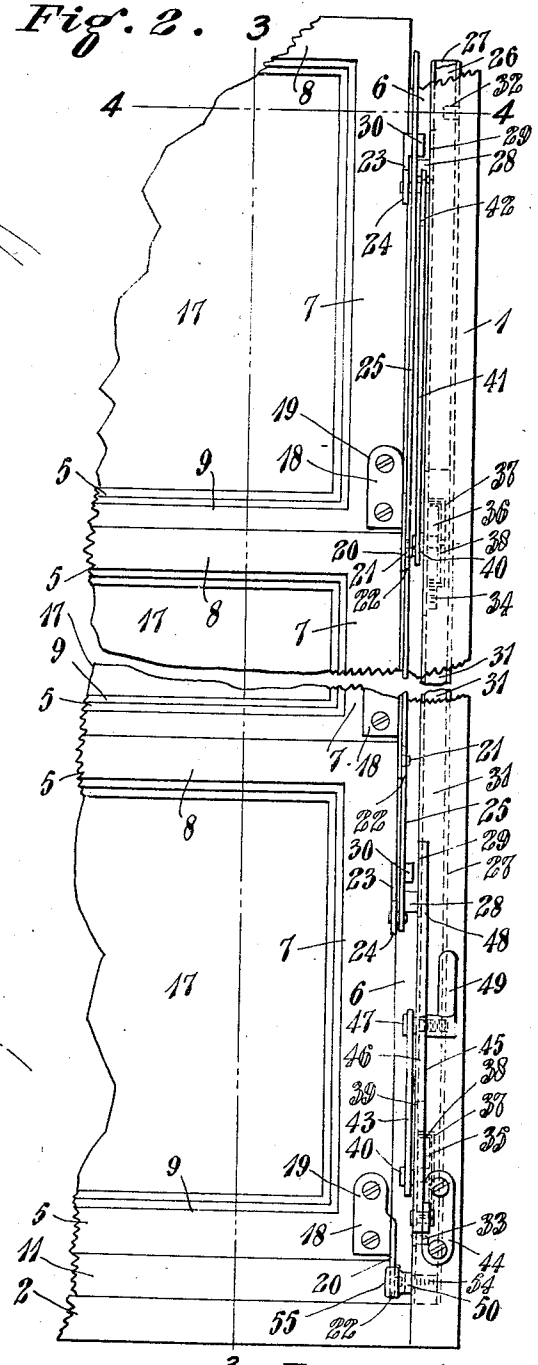


Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 4.

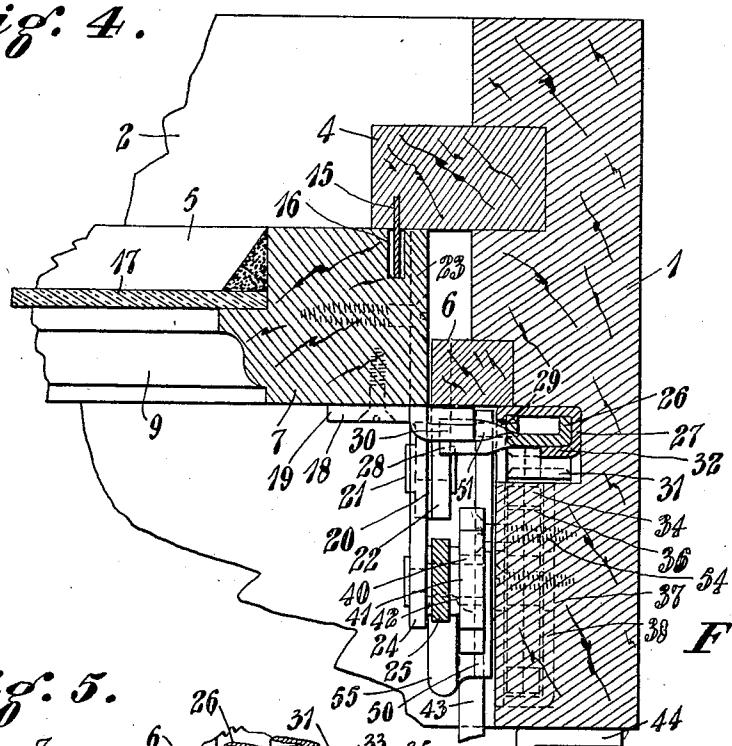
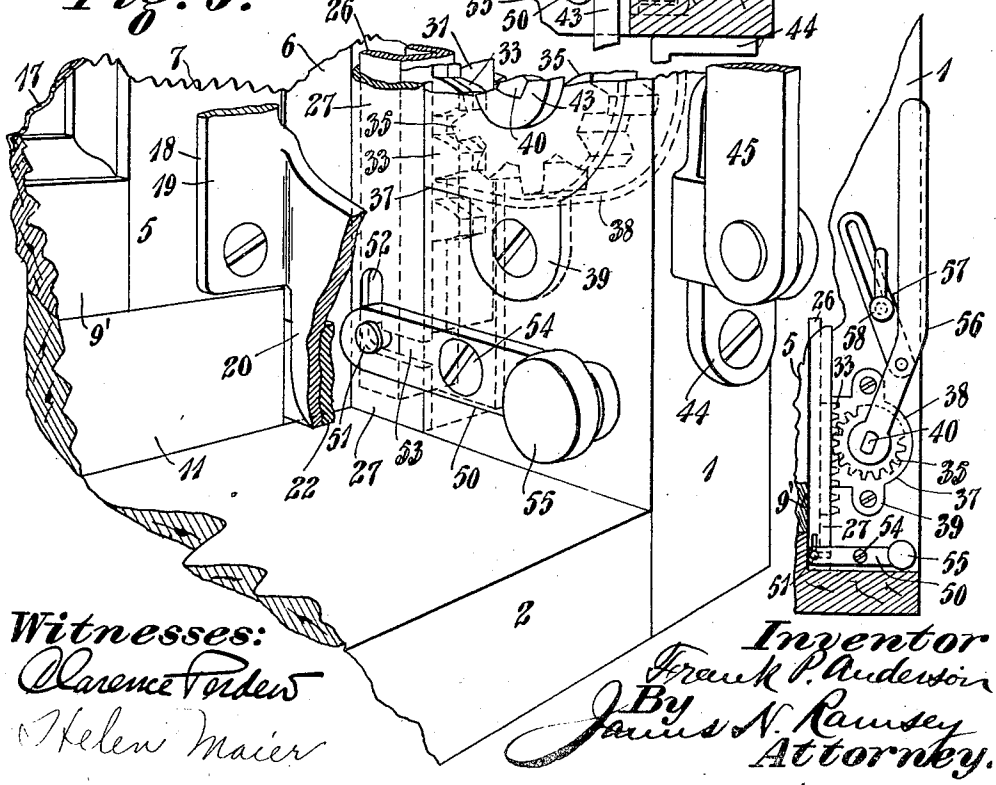


Fig. 6.

Fig. 5.



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SASH-CONTROL MECHANISM.

1,319,317. Specification of Letters Patent. Patented Oct. 21, 1919.

Application filed August 5, 1918. Serial No. 248,393.

To all whom it may concern:

Be it known that I, FRANK P, ANDERSON, a subject of the King of Denmark, and a resident of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Sash-Control Mechanism, of which the following is a specification.

My invention relates to sash hardware, and its object is to conveniently operate one or more sashes and to securely hold the sash or sashes in closed position.

My invention consists in the combination of parts and in the details of construction and arrangement of parts as will hereinafter be more fully described and claimed.

In the drawings:

Figure 1 is a general perspective view of the interior side of a sectional window equipped with a device embodying my invention;

Fig. 2 is a partial interior elevation of the window of Fig. 1 on a larger scale showing the concealed details by dotted lines and parts being broken away for lack of space;

Fig. 3 is a vertical section on a plane corresponding to the line 3—3 of Fig. 2;

Fig. 4 is a sectional plan view, the section being on a plane corresponding to the line 4—4 of Fig. 2;

Fig. 5 is a partial perspective view of the lower part of the window corresponding to that of Fig. 1, but on a much larger scale; and

Fig. 6 is a partial view similar to Fig. 3 showing a modified lever mechanism.

My present invention is especially applicable to sectional casement windows constructed according to my invention as disclosed and claimed in my co-pending application, Serial No. 159,981, filed April 5, 1917. I have, therefore, chosen to exemplify my invention in connection with such a window, which, in the present example, is of a design adapted to be constructed of wood; although my invention also comprehends the construction of such windows either wholly or partially of metal.

In the present example, the window frame comprises the jambs 1 at the sides, the sill 2 at the bottom and the head 3 at the top very much as in ordinary window construction. Also, the jambs 1 have the stop-rails 4 let into them from top to bottom of the window, against which rails 4 the sash sections 5 abut when closed.

Inwardly from the stop-rails 4, cheek-rails 6 are also set into the respective jambs 1 from top to bottom of the window and extending out from the inner sides or cheeks of the jambs considerably less than do the stop-rails 4. Preferably, the jambs 1 are thinner inwardly from these cheek-rails 6, so that the major portion of the width of each rail 6 is exposed interiorly of the window.

As here shown, there are six of the sash sections 5 each extending across from one cheek-rail 6 to the other, with just sufficient space between the stiles 7 of the sash sections 5 and the rails 6 to permit the sections 5 to swing freely out between the rails 6 against the stop-rails 4. All of the sash sections 5 have their top and bottom rails 8 and 9, respectively, in the form of meeting rails, somewhat similar to the ordinary meeting-rails of sliding sashes where the top rail of the lower sash meets the bottom rail of the upper sash in ordinary window construction; but these meeting-rails approach each other approximately horizontally, whereas the ordinary ones generally approach each other vertically. To coöperate with the top rail 8′ of the uppermost section 5, the head 3 has a depending meeting-rail 10, and to coöperate with the lower rail 9′ of the lowermost section 5, the sill 2 has an upwardly extending meeting-rail 11; these rails 10 and 11 running the entire width of the window between the cheek-rails 6. The rails 8 and 9, or 8′ and 10 or 9′ and 11, as the case may be, have their contacting surfaces inclined so that they wedge together upon their horizontal approach and these surfaces are offset vertically so as to leave an inner higher surface and an outer lower surface, in each instance, between which are vertical surfaces 12 and 13 on the upper and lower rails 8 and 9, respectively. Also, preferably, in a very simple and inexpensive manner one of the rails is provided with a groove immediately adjacent to its vertical surface from one end of the rail to the other across the window. As here shown, these grooves 14 are provided in the lower rails 9 and 9′ (Fig. 3) and it will be understood that the rail 10 that depends from the head 3 would also be similarly grooved. This leaves an

air space inclosed in the wedged-together meeting-rails to afford a more effective insulation between the interior and exterior of the window.

Where the sash sections 5 abut the stop-rails 4, these rails 4 have thin metal strips 15 (Fig. 4), preferably zinc, let into them from top to bottom and extending inwardly of the window; and the sash stiles 7 have narrow deep grooves 16 in their outer sides into which the strips 15 extend when the sash sections are closed. As shown in Fig. 4, the inner edge of the strip 15 engages with the bottom of the grooves 16, which is preferable; but whether this engagement is perfect throughout or not, there is an effective barrier against the passage of cold air or moisture because of the sinuous path which these must follow around the strip 15 thus projecting into the groove 16.

The inclined and rabbeted formation of the meeting-rails and the air-inclosing grooves 9 therein, together with this weather-strip construction just described, make my improved window especially secure against the entrance of air and moisture; and while these are applicable to the construction in my co-pending application hereinbefore referred to, they are originally disclosed herein and form part of the present invention in conjunction with suitable manipulating and locking or clamping means to insure the tight closing of the sash sections for attaining the maximum advantage from these moisture and air excluding details.

Each sash section 5 inclosing in its stiles and rails a glass plate 17 in the usual manner, has secured to it near its lower corners side hinges 18, each consisting of a base 19 secured to the inner face of the stile 7 and an inwardly and downwardly projecting part 20 close to the edge of the stile, near the lower end of which is fixed a stud 21 projecting over toward the jamb 1. Hinge brackets 22 are secured in suitable gains in the edges of the cheek-rails 6 next to the sash sections and project inwardly and are forked at their inner ends to receive the studs 21 between the prongs of the fork which are then bent together partially around the studs. This forms a secure pivotal mounting for each sash section on which the section may be tilted downwardly and inwardly of the window.

One of the prominent advantages of my improved window is the possibility of securing good ventilation without any direct drafts; this being accomplished by swinging the sash sections inwardly to a greater or less degree according to the amount of ventilation desired, but not swinging the sections so far down as to fail to deflect the incoming air decidedly upwardly; or, where conditions are such that the foul air flows out through the window, this upward inclination of the sections facilitates the outflow of such air from the upper stratas as is desired.

Another advantage of my improved sectional window is the ease with which it may be cleaned. This involves bringing the sash sections to approximately horizontal positions in which both the upper and lower surfaces of their glass plates are reached without difficulty and without the necessity of going outside the window.

It is especially to contribute to these two advantages, while at the same time effectively coöperating with the closure details previously described, that I provide the improved manipulating and fastening details which will now be described.

To insure the proper, as well as convenient, use of my improved sectional window with respect to correct ventilation, as just alluded to, it is desirable that a plurality of the sash sections should be made to swing in unison. In some windows it may be desirable that all of the sections in the window should be so related; but generally it is preferable to be able to open the upper part of the window while leaving the lower part closed, or vice versa. In the present example, the upper three sections 5 form one group so related, and the lower three sections form another similarly related group; and these will be referred to as upper or lower sections as the case may be.

For so relating the sash sections 5 of either group, as herein exemplified, the stiles 7 of each section 5 have let into their sides next to the cheek-rails 6 and considerably nearer to the top than to the bottom of the sash, clips 23 each comprising a lug 24 projecting inwardly of the window. A connecting bar 25 is pivoted to the end parts of the lugs 24 on all three of the sections 5 at one side, and another such connecting bar 25 is similarly pivoted to the lugs 24 of these three sections 5 at the other side. This description applies either to the upper group or to the lower group of sections; the construction of these details preferably being identical in both groups. With these pivotal connections of the sections 5 to the respective connecting bars 25 at the proper uniform distances from the hinge pivots 21 of the respective sections 5, the swinging of any one of the sections in the group will cause all of the others to swing in unison with it. Thus, the moderate opening of the plurality of sections, rather than extreme opening of any one of them contrary to the purpose of the device, is compelled and at the same time facilitated because only such attention need be given as is necessary to open one of the sections.

The sections of the lower group may be manipulated by directly grasping one of the

connecting bars 25; but usually these bars 25 of the upper group are out of convenient reach. For providing a conveniently reached manipulating means for either the lower group or the upper group of sections, and especially of the upper group, I provide an operative connection from the parts, just described as coupling the sections of a group together, down to the lower part of the window; and for holding the sashes in any open position to which they may have been adjusted, I combine with this mechanism suitable clamping means to hold the mechanism stationary after it has been operated to adjust the sash sections.

In the present example, this mechanism comprises a crank arm suitably articulated to one of the connecting mechanisms just described, and having a segment and rack connection with a suitable lever device mounted on the lower part of the window jamb 1. This apparatus for the upper group of sash sections is located at one side of the window and that for the lower sash sections at the other side, as indicated in Fig. 1.

When this manipulating means closes the sash sections, the sections are brought fairly close to the stop-rails 4; especially at the side where the manipulating means for the particular group of sashes is located. But if such manipulating means is not provided at both sides of each group of sashes, the sashes at their sides where this means is not provided will not be held firmly enough against the stop-rail 4 at that side to resist the pressure of the wind; with the consequence that the entire group of sections will rattle and will be pushed inward so as to impair the effectiveness of their weather-tight relation to the stop-rails 4 at both sides of the window. I insure practicable tightness of all of the closed sections by providing at each side of the window a locking means capable of clamping all of the closed sections simultaneously; and which will lock or clamp any sections that may be closed even though other sections may be open at the time.

I also provide for the concealment in the window jambs of the major portion of this manipulating and clamping mechanism, and, at the same time, by this relation to the window jambs, the mechanism is more firmly guided and supported. As shown herein, the locking or clamping bars 26 lie along the bottoms of channels 27 which are let sidewise into grooves in the respective jambs 1 with the bottoms of the channels next to the interior sides of the cheek-rails 6, and with one side of each channel flush with the inner surface or cheek of the respective jamb 1 (Fig. 4.) Each clamping bar 26 has lugs 28 projecting over toward a respective sash section 5; the inclosing channel 27 having a series of recesses 29 through which the lugs 28 project and which are long enough to permit the bar 26 to slide up and down in the channel. Each one of the brackets 23, previously described, has projecting forwardly and over in front of the cheek-rail 6 above the connecting lug 23, a clamping lug 30 which inclines upwardly and inwardly of the window; and the lugs 28 on the clamping bars 26 are similarly inclined and so located along the bars 26 that if either one of the bars 26 is raised, all of its lugs 28 will ride across the clamping lugs 30 of all of the sash sections that are in closed position; and the inclined surfaces of the contacting lugs 28 and 30 will cause a wedging operation.

The channels 27 are deep enough to also inclose the rack bars 31 which lie out against the clamping bars 26 when being manipulated, but which, by engagement with the sides of the grooves in the jamb 1, provide the reaction for the wedging operation just alluded to. These rack bars 31, however, need not extend nearly the full height of the window as do the clamping bars 26; and accordingly suitable guides 32 may be provided in the upper end parts of the channels 27 to support the upper end parts of the clamping bars 26.

Each one of the rack bars 31 just alluded to has, near its lower and upper ends, respectively, short racks 33 and 34, (Fig. 3) projecting in from the rack bars 31 and meshing with segment gears 35 and 36, respectively; these racks and gears being contained in suitable recesses 37 in the jamb 1 and the gears 35 and 36 being inclosed in casings 38 that fit in these recesses 37, have upwardly and downwardly extending ears 39 preferably let into the jambs so that the outer surfaces of the casings 37 lie flush with the cheeks of the jambs and with the adjacent surfaces of the channels 27; and these gears 35 and 36 have short shafts 40 journaled in the casing sides and having flattened parts projecting from the casings. On the shaft 40 of the gear 36 is secured a crank arm 41 which has in its free upper end part a short longitudinal slot 42 receiving a prolongation of the pivot by which the connecting bar 25 is connected to the bracket 23 of the middle sash section 5 of the group. The parts are so proportioned and located that this crank arm 41 swings its slot 42 through an arc approximating that through which said pivot swings; the slot 42 permitting such relative motion as is involved by the difference in location of the shaft 36 and the hinge pivot 21 of the sash section, as clearly indicated by the broken lines in the upper part of Fig. 3.

On the shaft 40 of the lower gear 35 is secured a short lever 43. The gears 35 and 36 are so meshed with their respective racks

33 and 34 that when the sashes of the group are closed, the crank arm 41 stands upright approximately parallel with the connecting bar 25, and the lever 43 extends upwardly and inwardly of the window, past the inner edge of the jamb 1. On this inner edge of the jamb, down near the gear 35, a fulcrum bracket 44 is secured and pivotally supports the lower end of the handle-lever 45 which has, about midway of its length, a short longitudinal slot 46 receiving a stud 47 that is secured in the upper end part of the lever 43. The upper end part of this handle-lever 45, past this connection to the lever 43, is in the form of a convenient handle 48. These parts are so proportioned that when the sashes are closed, the handle-lever 45 stands upright along and close to the edge of the window jamb 1. The stud 47 has a threaded projection past the handle lever 45, on which is screwed a thumb nut 49, which preferably has but a single wing or handle, which stands upright when the nut 49 is screwed over against the handle lever 45 and thus clamps the two levers together, whatever may be the position of the stud and lever 43 along the slot 46 in the lever 45 due to more or less downward and inward swinging of the handle lever for corresponding openings in the sash sections by virtue of the motion communicated to them from the handle lever 45 through the gear 35, rack 33, rack bar 31, rack 34, gear 36 and crank arm 41. Since this mechanism is held immovable by clamping the two levers 43 and 45 together, it will be seen that it is thus possible to hold the sash sections at any desired inclination within the limits of operation of the manipulating mechanism which is so proportioned that the sash sections may be brought down to horizontal position for cleaning, as hereinbefore alluded to.

The locking or clamping bar 26 is raised, to clamp the sash sections as hereinbefore described, by means of a short lever 50 having a pivotal connection 51 (Fig. 5) with the lower end part of the bar 26, which connection 51 slides up and down in the vertical part 52 of a slot which also comprises a horizontal part 53 opening through the edge of the channel leg to admit the pivotal connection when assembling the parts. This clamping lever 50 is fulcrumed on the window jamb 1 by a screw 54 about midway of the length of the lever, and the free end of this lever 50, near the edge of the jamb, has a knob 55 which is grasped for swinging the lever up or down to lock or unlock the window.

As shown in Fig. 1, the manipulating mechanism of the kind just described is located at the right for the upper group of sections 5 and that for the lower group is at the left and not as distinctly illustrated; but it will be understood that the details of the two are preferably the same, the one for the lower sections differing only in that its rack bar 31 is shorter and its upper segment gear and associated parts are located lower in the window to connect to and cooperate with the middle one of the lower group of sashes in the manner just before described. Likewise, the locking or clamping mechanism at the left side of the window is preferably identical with that of the right side and both of these extend nearly the full height of the window to clamp all of the sash sections.

In the modification shown in Fig. 6, the handle-lever 56 is secured directly on the shaft 40 of the segment gear 35 and inclines upwardly and inwardly and then has a bend so that its upper or handle part stands upright when the window is closed. A short distance up from the shaft 40 a slotted link 57 is pivoted to this lever 56 and lies over against the cheek of the jamb 1 with a thumb screw 58 passing through its slot into the jamb, by which means the parts may be clamped in any desired position within the limits of the length of the slot in the link 57. This thumb screw preferably has its handle or wing similar to that of the thumb nut 49 of the preceding example.

All of the mechanism so far described contributes to the advantage of readily and properly opening and closing the window for correct ventilation and for firmly securing the sash sections when they are closed. For more firmly supporting the sections in their fully opened approximately horizontal positions for cleaning, I prefer to provide (Fig. 3) a link 59 which has its lower end part pivoted to a clip 60 fastened to the outside of the sash stile 7 a substantial distance up from the bottom of the sash. The other end part of this link 59 has a stud 61 sliding in a slotted guide 62 which is fastened upright along the edge of the stop-rail 4 that faces across the window. These parts are so proportioned and located that engagement of the stud 61 with the lower end of the groove in the guide 62 will firmly support in lowered position the sash section to which the link is connected by the clip 60. Since all of the sections of a group are connected together by means of the bars 25, it is sufficient to provide these braces merely for the middle section of the group; and, in many cases, it is sufficient to provide a brace merely at the side of the group opposite to that provided with the manipulating mechanism, since that side may be held by the clamping of the thumb nut 49 or thumb screw 57, as the case may be. When the window is closed, the link 59 slides its stud 61 up or down along the slot in the guide 62, as may be required due to the relative movement of the parts, and

finally occupies the position as illustrated in Fig. 3.

While certain constructional details are deemed preferable in connection with my invention, and I have shown and described these rather specifically in elucidating the construction and use of my invention, as is required, I do not wish to be understood as being limited to such precise showing and description, but having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In combination with a tiltable closure and an adjacent support, said closure having engaging means whereby it is adapted to be engaged to be held in closed position, a clamping bar and an operating bar mounted together on said support substantially parallel to said closure when said closure is closed, means whereby said bars are held to slide lengthwise alongside each other on said closure, a projection on said clamping bar engaging with said engaging means on said closure upon sliding of said bar when said closure is closed, manipulating means connected to said operating bar, and an articulated connection between said operating bar and said closure, whereby said closure is tilted upon sliding of said operating bar.

2. In combination with a window-frame, and a sash tiltably mounted in said frame, said sash swinging past the jamb of said frame closely adjacent to said jamb, and said sash having engaging means adapted to be engaged to hold said sash in closed position, a clamping bar and an operating bar mounted together on said jamb substantially parallel to said closure when said closure is closed, means whereby said bars are held to slide parallel to each other and to said closure when closed, a projection on said clamping bar engaging with said engaging means on said closure upon sliding of said clamping bar when said closure is closed, manipulating means mounted on said jamb and connected to said operating bar, and an articulated connection between said operating bar and said closure.

3. In combination with a window-frame, and a sash tiltably mounted in said frame, said sash swinging past the jamb of said frame closely adjacent to said jamb, a bar mounted on said jamb substantially parallel to said closure when said closure is closed, means holding said bar to slide parallel to said closure when closed, manipulating means mounted on said jamb and connected to said bar, and an articulated connection between said bar and said closure.

4. In combination with a tiltable closure and an adjacent support, a projection on said closure adjacent to said support, a channel embedded in said support substantially parallel with said closure when said closure is closed, and having a lateral recess adjacent to said projection, a clamping bar contained in said channel and slidable longitudinally thereof, a projection on said bar extending through said recess and engaging with said projection on said closure upon sliding of said bar when said closure is closed, a rack bar inclosed in said channel alongside said clamping bar, said channel being open inside said support, rack teeth on said rack bar adjacent to the open part of said channel, a casing embedded in said support with an opening communicating with the open part of said channel, a gear inclosed in and journaled in said casing and meshing with said rack teeth, manipulating means connected to said gear, and an articulated connection between said rack bar and said closure.

5. In combination with a tiltable closure and an adjacent support, a projection on said closure adjacent to said support, a channel embedded in said support substantially parallel with said closure when said closure is closed, and having a lateral recess adjacent to said projection, a clamping bar contained in said channel and slidable longitudinally thereof, a projection on said bar extending through said recess and engaging with said projection on said closure upon sliding of said bar when said closure is closed, a rack bar inclosed in said channel alongside said clamping bar, said channel being open inside said support, rack teeth on said rack bar adjacent to the open part of said channel, a casing embedded in said support with an opening communicating with the open part of said channel, a gear inclosed in and journaled in said casing and meshing with said rack teeth, an articulated connection between said gear and said closure, and manipulating means operatively connected to said rack bar.

6. In combination with a tiltable closure and an adjacent support, a projection on said closure adjacent to said support, a channel embedded in said support substantially parallel with said closure when said closure is closed, and having a lateral recess adjacent to said projection, a clamping bar contained in said channel and slidable longitudinally thereof, a projection on said bar extending through said recess and engaging with said projection on said closure upon sliding of said bar when said closure is closed, a rack bar inclosed in said channel alongside said clamping bar, said channel being open inside said support and said support having recesses communicating with the open part of said channel, casings embedded in the respective recesses and opening into said channel, gears inclosed in and journaled in the respective casings, rack teeth on said rack bar and meshing with said gears, an articulated connection between one of said

gears and said closure, and manipulating means connected to the other one of said gears.

7. In combination with a tiltable closure and an adjacent support, a channel embedded in said support substantially parallel with said closure when said closure is closed, a rack bar inclosed in said channel, said channel being open inside said support, rack teeth on said rack bar adjacent to the open part of said channel, a casing embedded in said support with an opening communicating with the open part of said channel, a gear inclosed in and journaled in said casing and meshing with said rack teeth, manipulating means connected to said gear, and an articulated connection between said rack bar and said closure.

8. In combination with a tiltable closure and an adjacent support, a channel embedded in said support substantially parallel with said closure when said closure is closed, a rack bar inclosed in said channel, said channel being open inside said support, rack teeth on said rack bar adjacent to the open part of said channel, a casing embedded in said support with an opening communicating with the open part of said channel, a gear inclosed in and journaled in said casing and meshing with said rack teeth, an articulated connection between said gear and said closure, and manipulating means operatively connected to said rack bar.

9. In combination with a tiltable closure and an adjacent support, a channel embedded in said support substantially parallel with said closure when said closure is closed, a rack bar inclosed in said channel, said channel being open inside said support and said support having recesses communicating with the open part of said channel, casings embedded in the respective recesses and opening into said channel, gears inclosed in and journaled in the respective casings, rack teeth on said rack bar and meshing with said gears, an articulated connection between one of said gears and said closure, and manipulating means connected to the other one of said gears.

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