Jan. 9, 1923.

1,441,673.

R. FIOLA.

WINDOW.

ORIGINAL FILED NOV. 17, 1919.

2 SHEETS—SHEET 1.

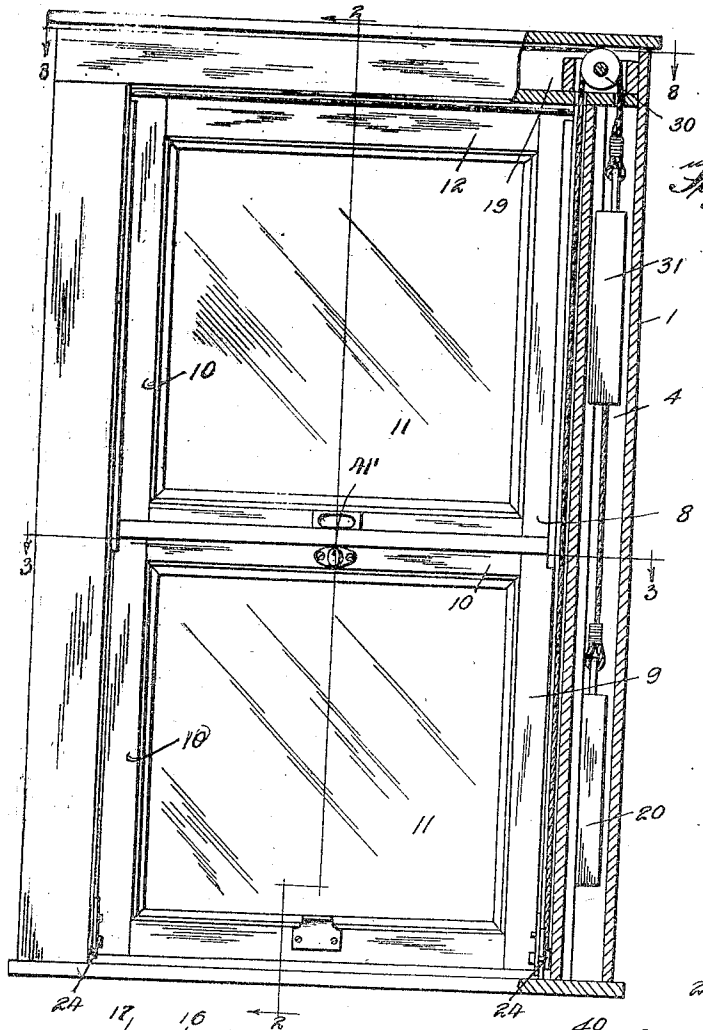


Fig 1.

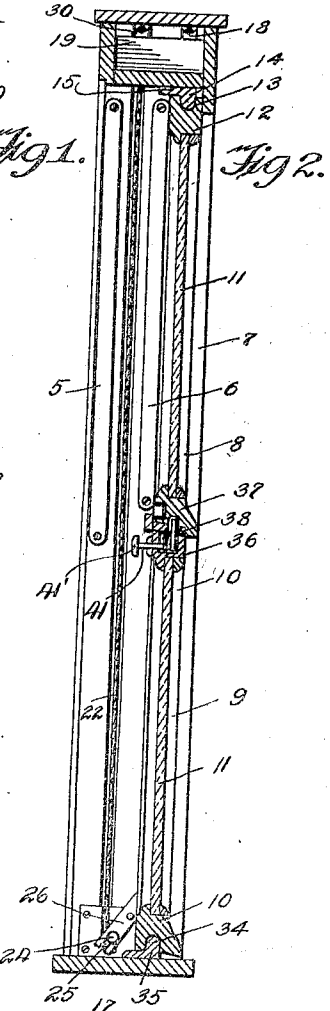


Fig 2.

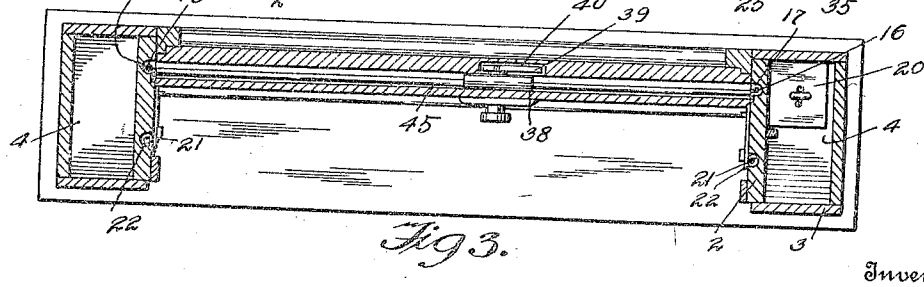


Fig 3.

Witness

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2 SHEETS—SHEET 2.

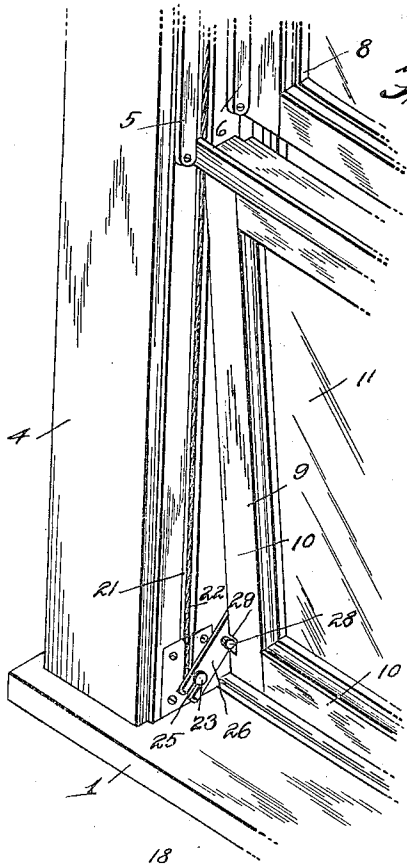


Fig 4.

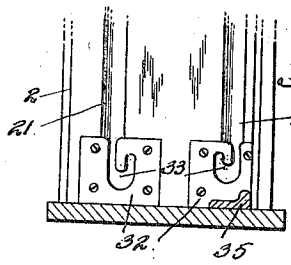


Fig 5.

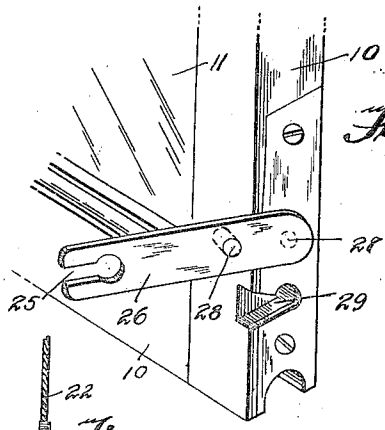


Fig 6.



Fig 7.

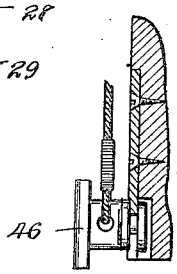


Fig 10.

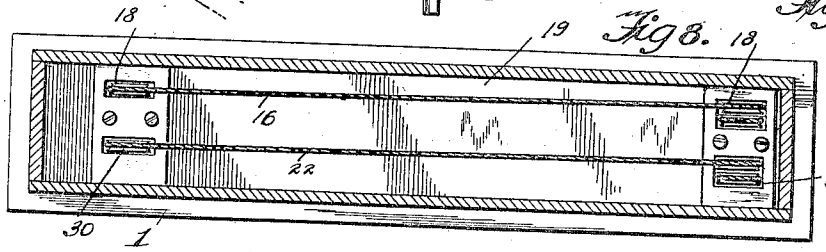


Fig 8.

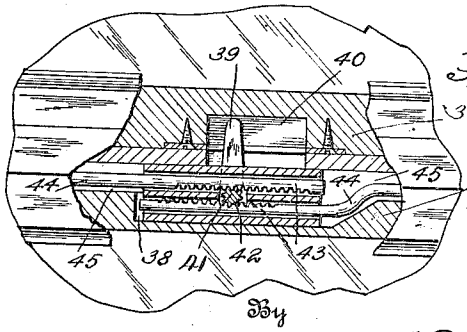


Fig 9.

Witness
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Patented Jan. 9, 1923.

1,441,673

UNITED STATES PATENT OFFICE.

ROBERT FIOLA, OF DAYTON, OHIO.

WINDOW.

Application filed November 17, 1919, Serial No. 338,474. Renewed November 8, 1922. Serial No. 599,726.

To all whom it may concern:

Be it known that ROBERT FIOLA, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, has invented certain new and useful Improvements in Windows, of which the following is a specification.

This invention relates broadly to windows and has for its primary object to provide an improved window structure wherein the slidable sashes thereof are capable, when closed, of assuming positions in true vertical alignment, so that a neat and finished appearance thereof may be effected, together with utilitarian advantage of providing close registration between the joints of the sashes in order that the weather may be effectively excluded.

The invention accordingly consists in the provision of a window structure wherein the lower sash is provided with an improved pivotal mounting, the same serving, when the sash is in its extreme lowered position, to permit the sash to be laterally shifted, whereby the same is capable of being positioned immediately under and in vertical registration with the upper sash and to prevent undue sliding movement thereof.

Another object of the invention resides in the provision of means for securely locking the sashes in assembled relationship and in the provision of supplemental means for the purpose of preventing unauthorized actuation of the lower sash.

With these and other objects in view, as will appear as the description proceeds, the invention accordingly consists in the novel features of construction, combinations of elements and arrangement of parts, hereinafter to be fully described and to have the scope thereof pointed out in the appended claims.

In the accompanying drawings, forming a part of this specification, and in which similar characters of reference denote like and corresponding parts:

Figure 1 is a front elevation of the improved window structure comprising the present invention, parts being shown in section to disclose the interior construction.

Figure 2 is a vertical transverse sectional view taken along the line 2—2 of Figure 1.

Figure 3 is a horizontal sectional view, the plane of which is disclosed by the line 3—3 of Figure 1.

Figure 4 is a fragmentary perspective view illustrating the lower sash in a position immediately prior to the act of elevating the same.

Figure 5 is a detailed sectional view taken through the lower portion of the window frame and illustrating the catch brackets for retaining the sashes in their lowered positions.

Figure 6 is a detailed perspective view of one corner of the lower sash, and illustrating the pivoted arm support carried thereby.

Figure 7 is a detailed view of one of the cable attaching members with which the pivoted arm supports are connected.

Figure 8 is a detailed horizontal sectional view taken along the line 8—8 of Figure 1.

Figure 9 is a detailed view of the lock mechanism for the sashes, and,

Figure 10 is a detailed sectional view of the structure employed for connecting the weight cables with the upper sash member.

Referring more particularly to the structural details of the invention, use is made of a window frame 1. This frame is constructed to embody vertically extending and spaced side bars 2 with which casings 3 are connected, the interiors of the latter being formed to define weight receiving chambers 4. The bars 2 have connected with the inner faces thereof vertically extending guide strips 5, 6 and 7 which are adapted to slidably receive the upper and lower sash members 8 and 9 respectively of the window. These sash members are formed to embody the usual marginal bars 10, which support the transparent panels 11.

In this instance, the upper sash member is slidably received between the intermediate and outer guide strips 6 and 7 respectively so that the movement thereof may be effected in the customary manner. To seal the joints between the upper sash and the frame 1, said sash has its upper bar 12 longitudinally grooved as at 13, whereby when the sash occupies its extreme upper position, the groove 13 will receive a longitudinally extending bead 14 provided upon a weather

strip 15. This construction merely tends to exclude the entrance of the elements. The side edges of the upper sash member are firmly retained between the guide strips 6 and 7 so that the vertical edges of the sash will also be protected against the undue entrance of weather.

To raise and lower the upper sash in a convenient manner, the lower corner edges thereof are connected with cables 16, and these cables extend vertically upward in grooves 17 provided in the side bars 2, said cables extending contiguous to the side edges of the upper sash member. The cables 16 are then trained in the usual manner over guide pulleys 18, shown in Figure 8, and the cable on the left of this sash passes horizontally across the window frame in the pulley chamber 19 provided therefor. The free ends of said cables after passing around the pulleys, project downwardly into the chamber 4, and are securely connected with a weight 20 slidably mounted therein. The weight acts in the usual manner to counterbalance the weight of the upper sash member 8, and to permit of its free and convenient actuation. By connecting the cables 16 with the lower corner edges of said sash member, convenience and facility are to be obtained in effecting the sliding movements of the sash member, as the construction merely tends to reduce binding or undue friction between parts.

The lower sash member is similar in construction and operation to the upper sash member and is of such form as to be capable of being positioned in vertical alignment with the upper sash member when both sashes occupy closed positions. To this end, the lower sash member is adapted to be slidably received between the inner and intermediate guide strips 5 and 6 respectively. However, these strips terminate centrally of the window frame, thus permitting said lower sash member to be laterally shifted when the same is lowered. To effect the support and operation of the lower sash member, the side bars 2 are further grooved as at 21, and receive cables 22, which correspond in construction and utility to the upper sash cables 16. In this instance, the cables 22 have their lower ends, as shown in Figure 7, secured to a pair of cable attaching members 23 which are also slidably received within the grooves 21. The attaching members embody headed studs 24 which project toward the lower sash member. These studs are adapted to receive the bifurcated ends 25 of a pair of pivot arms 26, which are pivotally carried as at 27 upon the lower corner edges of the lower sash member. Further, the arms 26 are formed to include rigidly mounted and inwardly extending pins 28, whereby when the lower sash member occupies its position in alignment with the space between strips 5 and 6, said pins 28 will be positioned within recesses or sockets 29, formed in said lower sash member. This construction is clearly disclosed in Figure 6. By virtue thereof, it will be manifest that the weight of the lower sash member is directly received by the arms 26, and that the latter, in turn, are supported and carried by the lower ends of the cables 22. Therefore, said cables serve to support the lower sash member and this support is effected from the lower corner edges thereof. The cables 22 pass vertically upward through the grooves 21, and are trained over pulleys 30 provided in the chamber 19. From these pulleys, the free ends of the cables 22 depend downwardly and are attached to the counterbalancing weight 31, which is slidably received, as is the weight 20, in the chamber 4. By virtue of this construction, the movements of either of the sash members may be quickly and easily accomplished without undue friction or binding.

As shown in Figure 5, the bottoms of the side bars 2 are suitably morticed to receive catch brackets 32. These brackets are provided with substantially U shaped slots 33, the inner of which are designed to receive the shanks of the studs 24. Thus, when the lower sash assumes its closed position, the studs 24 will be positioned in the blind extremities of the slots 33, so that one attempting to raise the window by a direct upward thrust will be frustrated in the attempt. However, to raise the window, it is simply necessary to force the same inwardly so that the studs 24 will be positioned in the open extremities of the slots 33 which are of course located in registration with the grooves 21. In this manner, one having knowledge of the operation of the window may conveniently effect its raising and lowering; however, its surreptitious operation by unauthorized persons is rendered a matter of some complexity.

To register the sash members, the lower sash member is moved laterally by oscillating the arms 26 about their stud pivots 24 so that the lower groove bar 34 of the lower sash member may be placed upon a beaded weather strip 35 carried upon the lower bar of the window frame. Then, by using this latter bar in the capacity of a fulcrum, the upper edge of the lower sash may be oscillated outwardly until the upper bar 36 thereof comes into contact with the lower bar 37 of the upper sash member. This relationship between parts may be maintained by providing the bar 36 with a socket 38, in which is pivotally mounted a catch finger 39. By rotating this finger, the same may be forced into a pocket 40 formed in the bar 37. It will thus be manifest that the finger 39 will serve to prevent lateral separation

of the sash members, so that the latter will be firmly retained in their assembled and registering positions. If desired, the operating shaft 41 of the finger 39 may be provided with a pinion 42, clearly disclosed in Figure 9. This pinion is adapted to engage with a plurality of rack teeth 43 provided upon the ends of locking rods 44. These rods are adapted to be slidably received within grooves 45 formed in the upper bar 36, and the ends of the rods terminate in contiguous relationship with the side bars 2. Obviously, upon rotating the finger 39 so as to position the latter within the pocket 40, said pinion 42 will also be rotated. This rotation of the pinion will cause outward movement on the part of the rods 44, so that the latter will be forced into frictional engagement with the sides of the bars 2, and in this manner the sashes will be firmly locked in position so as to prevent rattling and unauthorized actuation. The rods 44, however, are primarily provided for the purpose of retaining the lower sash member in a secure manner when in its lower position inasmuch as the latter is then without the support of the guide strips 5 and 6. A knob 41′ is provided on the outer end of the shaft 41 to facilitate manipulation of said shaft.

In operation, when it is desired to elevate the lower sash member, the shaft 41 is rotated so that the finger 39 will be released from engagement with the upper sash member, and this action also simultaneously results in the release of the rods 44 from their locking cooperation with the bars 2. When this release is effected, the upper edge of the lower sash member is oscillated in an inward direction, or in other words, away from the upper sash member, this movement taking place with the weather strip 35 as a pivot, and this inward movement of the lower sash member is limited by the contacting of its upper edge, as shown in Figure 4, with the inner strips 5. Then, to release the lower edge of the sash member 9, the latter is slightly elevated so that the same will be clear of the strip 35. This slight elevation is permitted by virtue of the relative play between the links 26 and the attaching members 23. Obviously, when clear of the weather strip 35, the lower sash member as a whole may be bodily moved so as to align itself with the guides formed between the strips 5 and 6. It will of course be appreciated that during this latter movement, the lower sash member is pivotally supported upon the studs 24 and its movement is guided thereby. Then, to limit the inward movement of the member 9, the pins 28 will contact with the inner walls of the recesses 29 so that further outward movement will be prevented. Then, by lowering the member 9, the studs 24 may be forced out of engagement with the blind ends of the slots 33 and positioned in the open extremities thereof, so that by the application of upward pressure, said sash member 9 may be caused to travel in its ordinary manner between the guide strips 5 and 6. This operation is of course reversible when it is desired to locate the lower sash member in vertical alignment and positive engagement with the upper sash member. The outer of the brackets 32 are slotted in a manner similar to the inner brackets. These outer brackets are adapted to receive studs 46 formed upon the lower corner edges of the upper sash member and with which the lower ends of the cables 16 are attached. Obviously, when the upper sash member assumes its extreme lower position, the studs 46 will project into the U shaped slots of the outer brackets 32 and will have a tendency to lie in the blind extremities thereof. This construction prevents the raising of the upper sash member by direct pull and therefore necessitates a lateral thrust so as to clear the studs 46 of the blind extremities of said slots and to position the same in the open extremities. When this is accomplished, the direct upward thrust will then result in the raising of the window. In other words, the provision of the outer brackets provides an automatic lock for the upper sash member when the latter is in its lowered position.

From the foregoing description, taken in conjunction with the accompanying sheets of drawing, it will be apparent that the present invention provides an improved sash structure wherein the sashes are capable of being brought and maintained in vertical alignment and registration, so that a neat and attractive appearance will be secured and the entrance of weather effectively precluded. The invention also combines the improved pivotal mounting for effecting the support of the lower sash member, said mounting permitting of a lateral movement on the part of the lower sash member when the latter assumes its closed position. By connecting the cables with the lower ends of the sash members, facility is to be had in the raising and lowering and the element of binding wholly eliminated.

I claim:

1. In a window structure, a frame, a pair of sash members slidably received within said frame, means whereby the lower of said sash members may be brought into and out of vertical registration with the upper of said sash members, comprising a pair of pivot arms pivotally carried by the side edges of said lower sash member, studs connected with said arms opposite to the points of connection of the latter with said lower sash member, said studs constituting pivot supports for said arms, a weight carrying

cable structure connected with said studs, and slotted bracket means on said frame arranged to retain said studs against movement exercised by the influence of the cable structure thereon during the vertical registration of said sash members.

2. The structure as specified in claim 1, in combination with fixed projections carried by said arms and arranged to engage with recesses formed in said sash member to control the extent of inwardly oscillating movement thereof.

In testimony whereof I affix my signature.

ROBERT FIOLA.