April 27, 1943. P. H. KUYPER 2,317,686

WINDOW STRUCTURE

Filed Oct. 12, 1942

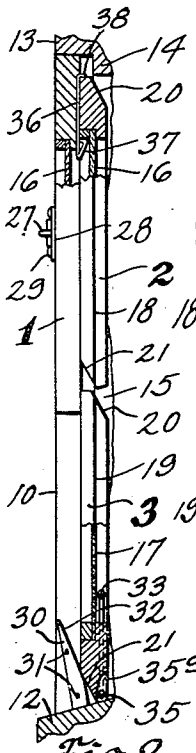


Fig. 2.

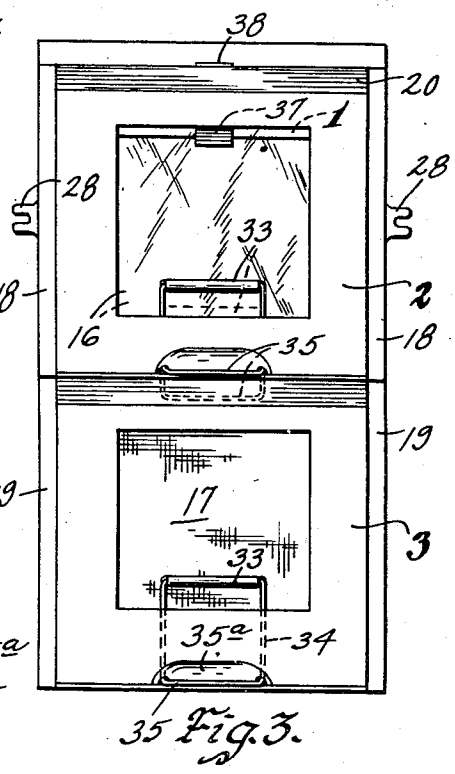


Fig. 3.

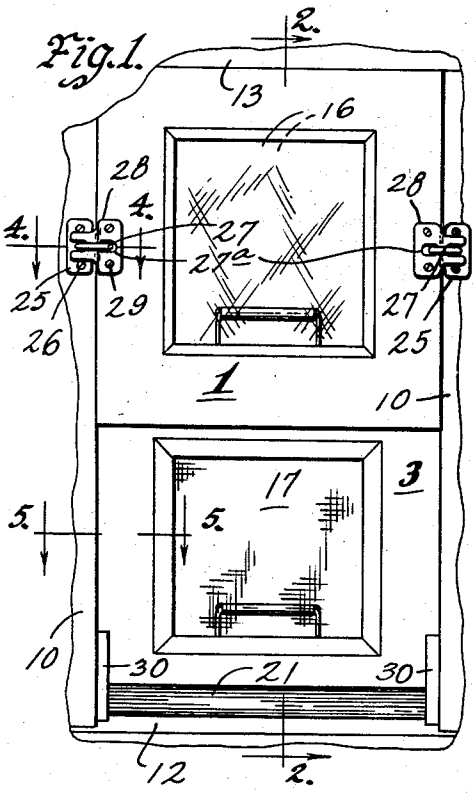


Fig. 1.

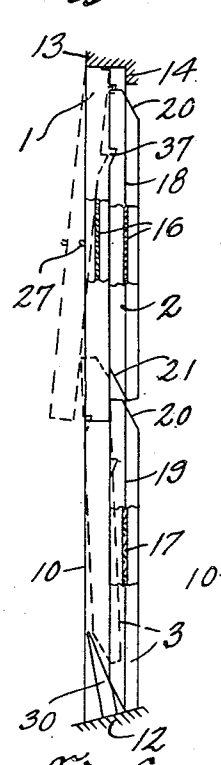


Fig. 6.

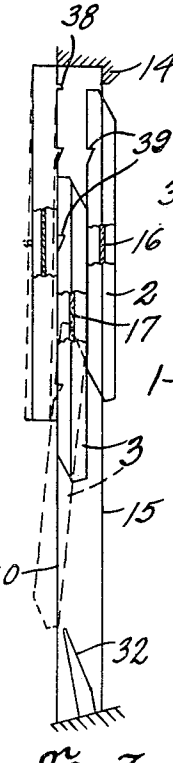


Fig. 7.

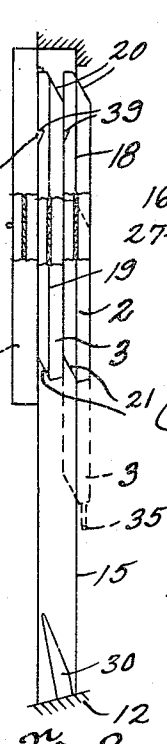


Fig. 8.

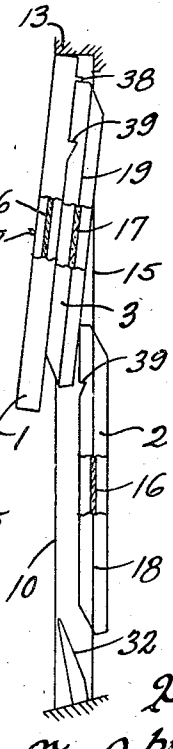


Fig. 9.

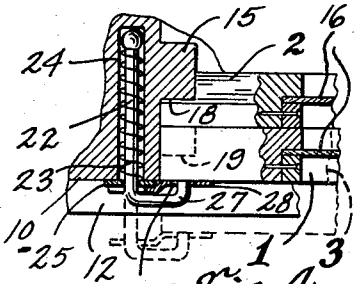


Fig. 4.

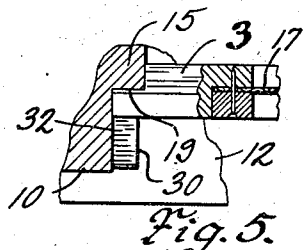


Fig. 5.

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WINDOW STRUCTURE

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Application October 12, 1942, Serial No. 461,717

20 Claims. (Cl. 160—101)

My present invention relates to a window structure, and particularly to an inexpensive, self-stored type of storm sash and screen sash therefor.

One object of the invention is to provide relatively inexpensive and light storm and screen sashes which may be quickly associated with the usual type of window frame and occupy positions against the blind stops thereof.

Another object is to provide an upper storm sash to remain in the upper half of the window frame, and a lower storm sash and a lower screen sash which may be interchangeably positioned for one or the other to form a downward extension of the upper storm sash while the remaining one is stored in a position coincident with the upper storm sash, thus eliminating the problem of providing storage space in a basement or garage for storm sashes in the summertime, and for screen sashes in the wintertime.

Still another object is to provide the sashes so arranged that all three can be stored in raised position if it is undersirable to have either a storm sash or a screen sash across the lower half of the window frame.

A further object is to provide the lower storm sash and the screen sash so designed as to require only the raising of one and the lowering of the other to effect a change from one to the other across the lower half of the window frame, with the remaining sash stored in an inconspicuous position.

Other objects are to provide an upper storm sash which is floatingly mounted and spring-biased in such manner as to hold the lower storm sash or the screen sash in stored position, and to hold it in raised position while the other sash is being lowered, the ends of the sashes being so arranged as to automatically shift the movable sash into proper position by the mere raising of one and the lowering of the other.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my device whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims and illustrated in the accompanying drawing, in which:

Figure 1 is an outside elevation of a window structure embodying my invention, the upper half thereof having a lower storm sash in stored position, and the lower half having a screen sash in lowered position spanning the lower half of the window frame. As to the scale of the drawing, the frames of the sashes have been reduced to about one-fourth size, whereas the over-all height and width of the window frame has been reduced considerably more, so as to conserve space on the drawing, the sashes in actual practice having much narrower frames in proportion to the over-all sizes thereof;

Figure 2 is a vertical sectional view on the line 2—2 of Figure 1;

Figure 3 is an inside elevation of only the three sashes constituting my invention;

Fig. 4 is an enlarged sectional view on the line 4—4 of Figure 1;

Figure 5 is an enlarged sectional view on the line 5—5 of Figure 1; and

Figures 6, 7, 8 and 9 are diagrammatic views somewhat similar to Figure 2 showing different positions of the parts in operation.

On the accompanying drawing the usual window frame is illustrated, the outer side casings thereof being shown at 10, the sill at 12, and the outer head casing at 13. The usual window frame has a head blind stop 14 and a pair of side blind stops 15. The side blind stops in Figures 6, 7, 8 and 9 are indicated as lines, and the same is true of the outer surfaces of the side casings 10.

My window structure includes first, second and third sashes, indicated as 1, 2 and 3, respectively. The sash 1 is an upper storm sash, more or less permanently mounted in position. The sash 2 is a lower storm sash, and the sash 3 is a screen sash. Each of the sashes has a suitable frame, the sashes 1 and 2 having glass panes 16 therein and the sash 3 having a screen panel 17. The frame for the sash 1 has substantially square edges, whereas the side edges of the sashes 2 and 3 are rabbeted to form shoulders, indicated at 18 and 19, respectively. The upper and lower edges, respectively, of the sashes 2 and 3 are beveled, as indicated at 20 and 21.

For floatingly mounting the upper storm sash 1 I provide spring-biased pins 22. The springs therefor are indicated at 23. These pins enter sockets 24 bored into the sides of the window frame, the springs thereafter being retained in position by plates 25 and wood screws 26. The pins 22 have hooked ends 27, adapted to engage the outer surface of the sash 1. These hooked ends are associated with forked brackets 28 secured by screws 29 to the sash 1.

Secured to the edges of the side casings 10 are retainer elements 30 in the form of small blocks of wood fastened, as by finish nails 31. The retainer elements 30 present inclined surfaces 32 to coact with the sashes 2 and 3, as will hereinafter appear.

To facilitate handling the sashes 2 and 3 I provide a handle 33 for each. The handles 33 pass through holes 34 in the lower rail of each sash 2 and 3, and have lower cross-members 35 positioned in socket-like portions 36 cut into the lower rails. The handles 33 are thereby vertically slidable in the holes 34 to assume either the raised position, shown by solid lines in Figures 1,

2 and 3, or a lowered position, as shown by dotted lines adjacent the center of Figure 3.

Secured to the upper storm sash 1 is a strip of heavy sheet metal 36 forming a catch for retaining either the sash 2 or the sash 3 in a raised position relative to the sash 1. The strip 36 has a catch element 37 and a stop flange 38.

Practical operation

In the operation of my window structure the window is shown adjusted for summertime, in Figures 1, 2 and 3. The lower storm sash 2 is stored in a raised position coincident with the upper storm sash 1, and the screen sash 3 is in lowered position. These positions are also shown by solid lines in Figure 6.

Referring now to the diagrammatic views, the handle 33 of the sash 3 may be used for raising this sash. During the raising operation it will assume the dotted position of Figure 6, with the inclined edge 20 of the sash 3 engaging the inclined edge 21 of the sash 2, and thereby shifting the upper edge of the sash 3 outwardly. This upper edge acts as a wedge to swing the upper sash 1 outwardly against the biasing springs 23, and, at the same time, releases the catch element 37 from the sash 2.

The sash 3, as it is pushed upwardly, will, after about half of its travel, cause the upper sash to assume the full-line position of Figure 7. The sash 3 may then be further raised and its upper edge will pass the catch element 37 and finally be stopped by the stop flange 38. The catch element 37 then assumes a position under the lower edge of the upper rail of the sash 3, and this particular portion of the rail is indicated at 39 in the diagrammatic view. The sashes will then be in the position shown by full lines in Figure 8.

The lower storm sash 2 may now be lowered from its stored position in Figure 8 by pushing its handle 33 downwardly to the dotted position of Figure 3 and grasping the lower cross-member 35 thereof. This sash is shown partially lowered, by dotted lines in Figure 8, and almost completely lowered, by solid lines in Figure 9. It is obvious that the further downward movement of the sash 2 will bring it to the position shown for the sash 3 in Figure 2, and as its upper edge passes the lower edge of the sash 3, the spring-biased pins 22 will swing the upper sash 1 and the screen sash 3 inwardly, toward the blind stops, so that they finally swing into the position shown for the sashes 1 and 2 in Figure 2. This is the final position, and it will be noted that the upper edge of the lowest sash is held with its shoulders 18 or 19, as the case may be, against the blind stops 15 by the lower edge of the sash 1 overlapping the upper edge of the lower sash. At the same time, the lower edge of the lower sash is retained against the blind stops by the weight of the lower sash cooperating with the inclined surfaces 32 of the retainer elements 30, which inclined surfaces tend to shift the lower edge of the lower sash inwardly. Thus, a contact seal is maintained by the upper sash 1 and the retainer elements 30 for the sashes 2 and 3 relative to the blind stops 15. At the same time, the lower sash forms a continuation of the upper sash 1, and contact between their adjacent upper and lower edges, respectively, forms a seal at this point.

In Figure 7 I have shown a dotted position which the lower sash may assume when it is desirable to remove the sashes 2 and 3 for cleaning purposes. The dotted lower sash in this figure obviously can now be swung outwardly through the window frame and brought back through the lower half of the frame, after which the other lower sash may be similarly removed. This removal facilitates cleaning or painting of the sashes, and the upper sash 1 may also be removed, if desired. This is accomplished by pulling outwardly on the spring pins 22, as to the dotted position shown in Figure 4, and then swinging the hooks a half turn so that the forked brackets 28 may be readily disassociated therefrom. In replacing the sashes the operations just outlined are reversed.

In the foregoing specification it will be obvious that I have provided for the storage of screen and storm sashes within the usual type of window frame, thus eliminating the necessity of some other storage space and much handling of the screen sash and storm sash when changing for the winter or summer season. Furthermore, a change from storm sash to screen sash is so simple that the change may readily be made for only a few days when the weather changes often. The installation problem is very simple, involving merely the boring of two holes 24, the attachment of two plates 25 and the attachment of two retainer elements 30. After once installed, the storing operation of the sash 2 or the sash 3 is automatically performed by the mere raising of one of these sashes and the lowering of the other one. Either sash may be moved to a partially raised position, if that is desirable, and will be retained frictionally in that position by the spring-biased pins 22.

Some changes may be made in the construction and arrangement of the parts of my device without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims any modified forms of structure or use of mechanical equivalents which may be reasonably included within their scope without sacrificing any of the advantages thereof.

I claim as my invention:

1. In a window structure, an upper storm sash, a lower storm sash and a lower screen sash, means for supporting said upper storm sash in a window frame and biasing it toward the blind stops thereof, one of the remaining sashes being confined by said biasing means between said upper storm sash and said blind stops, the other of said remaining sashes being in contact with said blind stops and forming a downward continuation of said upper storm sash, said upper storm sash overlapping the upper edge of said other remaining sash whereby said biasing means is effective to hold the upper end thereof in contact with said blind stops, and retaining means adjacent the bottom of said other remaining sash presenting inclined surfaces engaged by the lower end thereof to retain said lower end in contact with said blind stops.

2. In a window structure, an upper storm sash, a lower storm sash and a lower screen sash, means for supporting said upper storm sash in a window frame and biasing it toward the blind stops thereof, one of the remaining sashes being confined by said biasing means between said upper storm sash and said blind stops, the other of said remaining sashes being in contact with said blind stops and forming a downward continuation of said upper storm sash.

3. In a window structure, an upper storm sash, a lower storm sash and a lower screen

sash, means for supporting said upper storm sash in a window frame with one of the remaining sashes confined between said upper storm sash and said window frame, the other of said remaining sashes forming a continuation of said upper storm sash, said upper storm sash overlapping the upper edge of said other remaining sash, and said remaining sashes being interchangeable in position relative to each other.

4. In a window structure, an upper storm sash, a lower storm sash and a lower screen sash, means for supporting said upper storm sash in a window frame with one of the remaining sashes confined between said upper storm sash and said window frame, the other of said remaining sashes forming a continuation of said upper storm sash, and said remaining sashes being interchangeable in position relative to each other.

5. A window structure comprising three sashes, means for supporting one of said sashes in a window frame and biasing it toward the blind stops thereof, one of said two sashes being confined by said biasing means between said first sash and said blind stops, the other of said two sashes being in contact with said blind stops and forming a continuation of said first sash, said first sash overlapping the upper edge of said last sash whereby said biasing means is effective to hold the upper end of said last sash in contact with said blind stops, and retaining means adjacent the bottom of said last sash presenting inclined surfaces engaged by the lower end thereof to retain said lower end in contact with said blind stops.

6. A window structure comprising three sashes, means for supporting one of said sashes in a window frame, one of said two sashes forming a continuation of said first sash and the other of said two sashes being supported between said first sash and the window frame, said two sashes being interchangeably related to each other.

7. In a window structure, an upper sash, a pair of interchangeable lower sashes, means for supporting said upper sash in a window frame and biasing it toward the blind stops thereof, one of said lower sashes being supported by said upper sash against said blind stops, the other of said lower sashes being held by said upper sash in contact with said blind stops and forming a continuation of said upper sash, said upper sash overlapping the upper edge of said last sash whereby said biasing means is effective to hold the upper end thereof in contact with said blind stops, and retaining means adjacent the bottom of said last sash to retain the lower end thereof in contact with said blind stops.

8. In a window structure, an upper sash, a pair of interchangeable lower sashes, means for supporting said upper sash in a window frame, one of said lower sashes being supported by said upper sash, the other of said lower sashes forming a continuation of said upper sash.

9. In a window structure, an upper sash, a pair of interchangeable lower sashes, means for supporting said upper sash in a window frame and biasing it toward the blind stops thereof, one of said lower sashes being supported by said upper sash against said blind stops, the other of said lower sashes being held by said upper sash in contact with said blind stops and forming a continuation of said upper sash.

10. In a window structure, first, second and third sashes, means for supporting the first sash in a window frame and biasing it toward the blind stops thereof, said second sash being confined between said first sash and said blind stops by said biasing means, said third sash forming a downwardly extending continuation of said first sash and having its upper edge in overlapping relation thereto whereby said biasing means is effective to hold said upper edge in contact with said blind stops, means for retaining the lower edge of said third sash in contact with said blind stops, said means comprising elements secured to said window frame and having edges for the lower end of said third sash to engage, said edges being inclined to bias said third sash toward said blind stops when the weight of the third sash moves it downwardly along said inclined surfaces, the upper and lower ends of said second and third sashes being beveled to effect wedging of said third sash between said first and second sashes when the third sash is raised, and to likewise effect wedging of said second sash between said first and third sashes when the second sash is raised, and catch means for retaining said second or third sash in raised position relative to said first sash after raising of the second or third sash, whereupon the other of said second and third sashes may be lowered to form a downward continuation of said first sash.

11. In a window structure, first, second and third sashes, means for supporting the first sash in a window frame, said second sash being positioned between said first sash and said window frame, said third sash forming a downwardly extending continuation of said first sash, the upper and lower ends of said second and third sashes being beveled to effect wedging of said third sash between said first and second sashes when the third sash is raised, and to likewise effect wedging of said second sash between said first and third sashes when the second sash is raised, and catch means for retaining said second or third sash in raised position relative to said first sash after raising of the second or third sash, whereupon the other of said second and third sashes may be lowered to form a downward continuation of said first sash.

12. In a window structure, first, second and third sashes, means for supporting the first sash in a window frame and biasing it toward the blind stops thereof, said second sash being confined between said first sash and said blind stops by said biasing means, said third sash forming a downwardly extending continuation of said first sash and having its upper edge in overlapping relation thereto whereby said biasing means is effective to hold said upper edge in contact with said blind stops, means for retaining the lower edge of said third sash in contact with said blind stops, the upper and lower ends of said second and third sashes being beveled to effect wedging of said third sash between said first and second sashes when the third sash is raised, and to likewise effect wedging of said second sash between said first and third sashes when the second sash is raised.

13. In a window structure, an upper sash and a pair of lower sashes, means for supporting said upper sash in a window frame and biasing it toward the blind stops thereof, one of said lower sashes being confined between said upper sash and said blind stops by said biasing means, the other lower sash forming a downward continuation of said upper sash and having its upper edge

in overlapping relation thereto whereby said biasing means is effective to hold said upper edge in contact with said blind stops, means for retaining the lower edge of said third sash in contact with said blind stops, the upper and lower ends of said lower sashes being beveled to effect wedging of the lower one between said upper sash and the other lower sash when the third sash is raised, and means for retaining the upper one of said lower sashes in raised position relative to said upper sash after raising thereof, whereupon the other of said lower sashes may be lowered to form a downward continuation of said upper sash.

14. In a window structure, an upper sash and a pair of lower sashes, means for supporting said upper sash in a window frame, one of said lower sashes being confined between said upper sash and said window frame, the other lower sash forming a downward continuation of said upper sash, the upper and lower ends of said lower sashes being beveled to effect wedging of the lower one between said upper sash and the other lower sash when the third sash is raised.

15. In a window structure, first, second and third sashes, means for supporting the first sash on a window frame and biasing it toward the blind stops thereof, said second sash being confined between said first sash and said blind stops by said biasing means, said third sash forming a downwardly extending continuation of said first sash and having its upper edge in overlapping relation thereto whereby said biasing means is effective to hold said upper edge in contact with said blind stops, means for retaining the lower edge of said third sash in contact with said blind stops, the upper and lower ends of said second and third sashes being beveled to effect wedging of said third sash between said first and second sashes when the third sash is raised, and to likewise effect wedging of said second sash between said first and third sashes when the second sash is raised, and coactible means between said upper sash and said second and third sashes to retain them in raised position relative to said first sash after raising of either thereof, whereupon the other of said second and third sashes may be lowered to form a downward continuation of said first sash.

16. In a window structure, an upper sash, spring biased pins extending from a window frame and coacting with said upper sash to support it in a position spaced from and biased toward the blind stops of the window frame, a second sash confined between said first sash and said blind stops by said spring biased pins, said first sash being disconnectable with relation to said pins, catch means for normally retaining said second sash adjacent said first sash, a third sash engaging said blind stops and having its upper end in overlapping relation to the lower end of said first sash and retained thereby against said blind stops, inclined surface means for effecting engagement of the lower end of said second sash against said blind stops, the upper and lower ends of said second and third sashes being beveled to permit the third sash to force the first sash outwardly away from said second sash as the third sash is raised and final positioning of said third sash between the first and second sashes with said catch means retaining the third sash in such position, said second sash being thereupon movable downwardly to assume the initial position of the third sash whereupon said spring pins effect movement of said first sash inwardly to cause said third sash to assume the initial position of the second sash, said second and third sashes being swingable outwardly to clear said inclined surface means whereby they may be removed from the window frame, said second and third sashes having handles, said handles being vertically slidable relative thereto to facilitate manipulation of the sashes.

17. In a window structure, an upper sash, spring biased pins extending from a window frame and coacting with said upper sash to support it in a position spaced from and biased toward the blind stops of the window frame, a second sash confined between said first sash and said blind stops by said spring biased pins, means for normally retaining said second sash adjacent said first sash, a third sash engaging said blind stops and having its upper end in overlapping relation to the lower end of said first sash and retained thereby against said blind stops, inclined surface means for effecting engagement of the lower end of said second sash against said blind stops, said second and third sashes having handles, said handles being vertically slidable relative thereto to facilitate manipulation of the sashes.

18. In a window structure, an upper sash spaced from the blind stops of the window frame, a second sash confined between said first sash and said blind stops, means for normally retaining said second sash adjacent said first sash, a third sash engaging said blind stops, the upper and lower ends of said second and third sashes being beveled to permit the third sash to force the first sash outwardly away from said second sash as the third sash is released and final positioning of said third sash between the first and second sashes, said second sash being thereupon movable downwardly to assume the initial position of the third sash.

19. In a window structure, an upper sash, spring biased pins extending from a window frame and coacting with said upper sash to support it in a position spaced from and biased toward the blind stops of the window frame, a second sash confined between said first sash and said blind stops by said spring biased pins, the upper and lower ends of said second and third sashes being beveled to permit the third sash to force the first sash outwardly away from said second sash as the third sash is raised and final positioning of said third sash between the first and second sashes, said second sash being thereupon movable downwardly to assume the initial position of the third sash.

20. In a window structure, an upper sash, a second sash confined between said first sash and a window frame, a third sash forming a continuation of said first sash, the upper and lower ends of said second and third sashes being beveled to permit the third sash to wedge between the first and second sashes as the third sash is raised and final positioning of said third sash between the first and second sashes, said second sash being thereupon movable to assume the initial position of the third sash.

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