Nov. 22, 1938. A. C. THOMPSON 2,137,426

WINDOW CONSTRUCTION

Filed Jan. 8, 1937 3 Sheets-Sheet 1

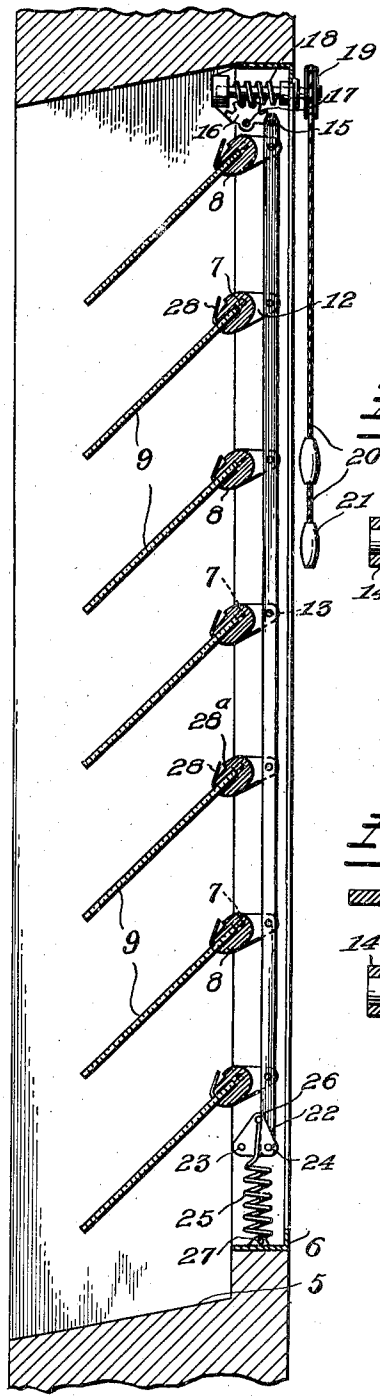


Fig. 1.

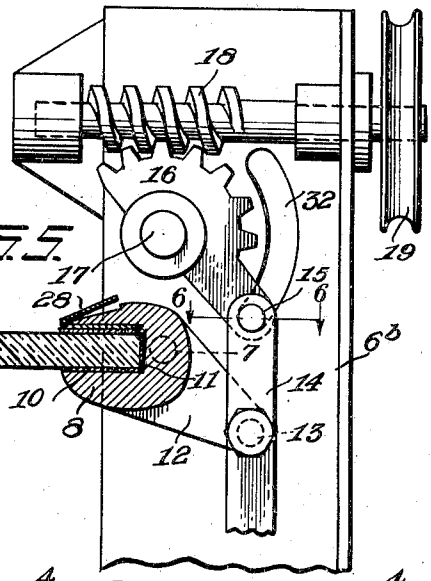


Fig. 5.

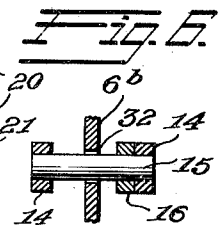


Fig. 6.

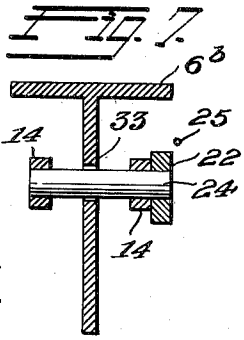
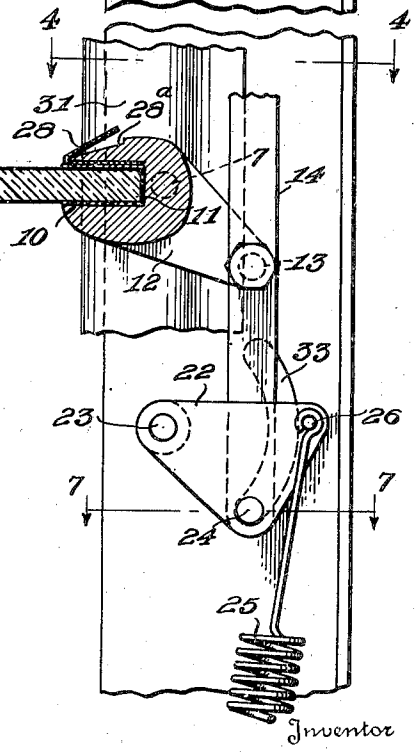


Fig. 7.



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Nov. 22, 1938. A. C. THOMPSON 2,137,426

WINDOW CONSTRUCTION

Filed Jan. 8, 1937 3 Sheets-Sheet 2

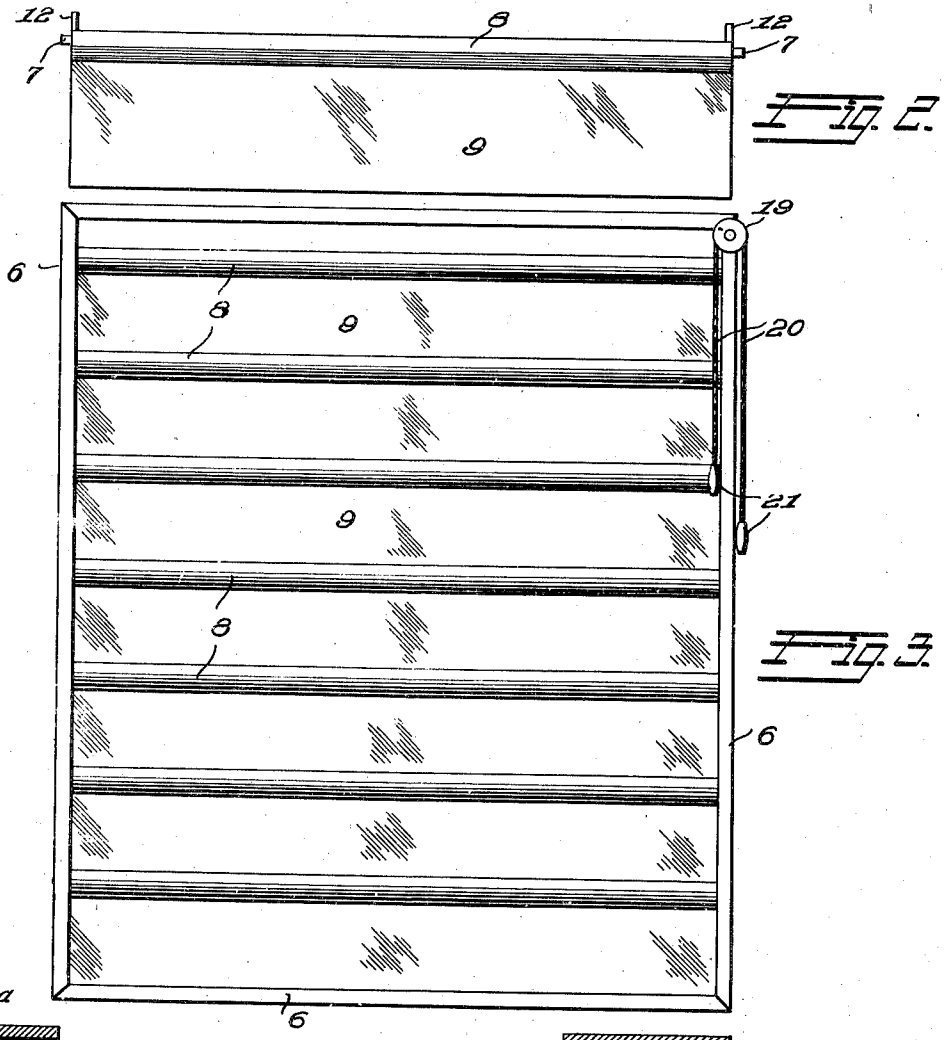


Fig. 2.

Fig. 3.

Fig. 4.

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WINDOW CONSTRUCTION

Filed Jan. 8, 1937 3 Sheets-Sheet 3

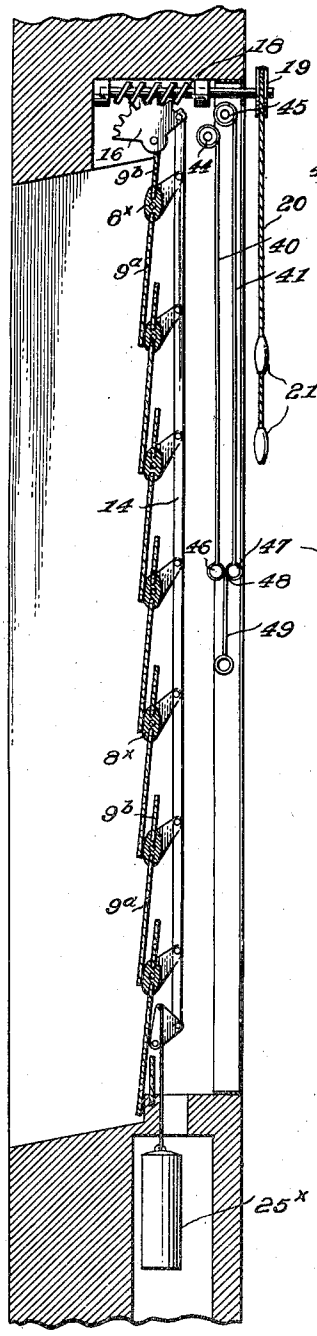


Fig. 8.

Fig. 9.

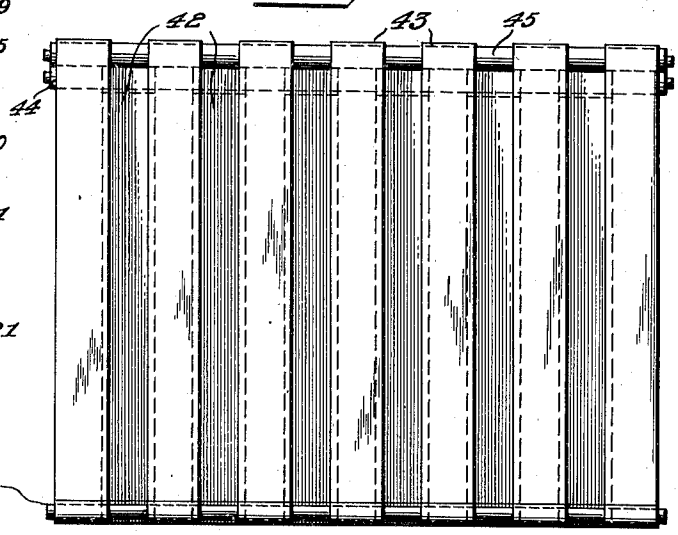
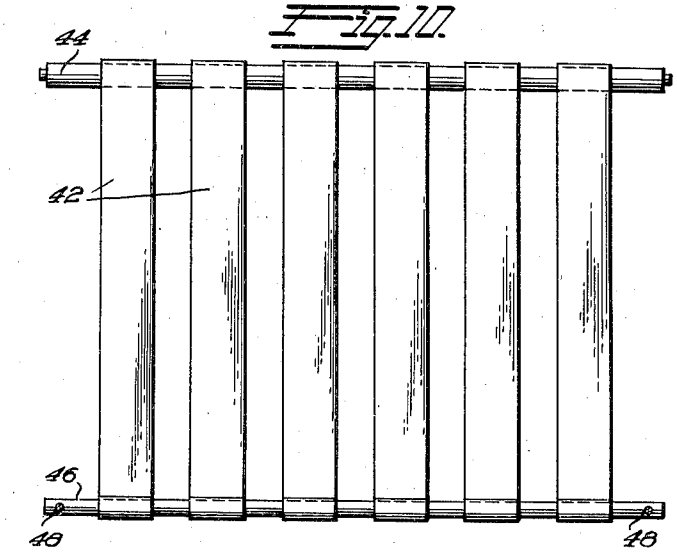


Fig. 10.



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Patented Nov. 22, 1938

2,137,426

UNITED STATES PATENT OFFICE

2,137,426

WINDOW CONSTRUCTION

Andrew C. Thompson, Miami Beach, Fla.

Application January 8, 1937, Serial No. 119,676

14 Claims. (Cl. 189—69)

This invention relates to windows of the general character of those shown in my co-pending applications, Serial No. 103,186, filed September 9, 1936 and Serial No. 115,256, filed December 10, 1936, of which this application is a continuation in part.

The structures of the applications aforesaid each comprise a group of horizontally pivoted window sections together with means for shifting said sections upon their pivots to bring them to open or closed position. However, the window sections of these previously filed applications include, in addition to a transparent pane, carrying frames for the same comprising side frame members.

According to the present invention, no side frame members are employed, but upon the contrary, transparent panes of glass or like suitable material are gripped in and wholly supported from rocking transverse bars, and these panes are made of a width materially in excess of the distance between the transverse frame bars, so that there is a distinct overlapping of the window sections when in closed position.

Further, this excess width of the panes gives them such a considerable overhang as to exclude rain effectively even when the windows are open. Further, the elimination of the side frame members makes it possible to get a snug fit and close contact between the pane of one section and the weather strip carried by the transverse bar of the next lower section.

Also, the appearance of the structure as a whole is greatly improved by the elimination of the side frame members. The use of the unobstructed glass panes lends itself to the employment of this arrangement in the highly ornamental stream line and modernistic designs of present day architecture.

The achievement of these advantages in no way interferes with the advantages inherent in the windows of this whole group of applications, namely: that they provide a maximum of ventilation; their members may be moved to such position as to offer substantially no obstruction to the free entry of air; they may be easily adjusted to regulate and control the draft therethrough; they exclude burglars even when the windows are open; they are constructed to permit the operation of a gang of window units in unison with a counterbalanced control which renders it possible to operate the window with very little effort; they are so contructed as to permit easy cleaning of the windows on both sides from within the room; they are so constructed as to permit of the actuation of all of the window sections of two or more banks of windows from a single actuating element; they utilize weather strips in such fashion as to cause them to serve the double function of weather strips and anti-rattling devices, and they are so arranged as to be entirely contained within the thickness of the walls in substantially all positions of adjustment.

In the accompanying drawings:

Figure 1 is a vertical sectional view through a window having the invention applied thereto;

Fig. 2 is a plan view of one of the window sections;

Fig. 3 is a view of the structure of Fig. 1 looking from the inside of the room;

Fig. 4 is a horizontal sectional view illustrating two banks of windows arranged side by side;

Fig. 5 is an enlarged view illustrating two of the window sections and the actuating means therefor;

Fig. 6 is a horizontal sectional view on line 6—6 of Fig. 5;

Fig. 7 is a horizontal sectional view on line 7—7 of Fig. 5;

Fig. 8 is a view like Fig. 1 but showing a modified form of the invention including a ventilating window shade;

Fig. 9 is an inside face view of said shade, and

Fig. 10 is a face view of the rear half of said shade.

Like numerals designate corresponding parts in all of the figures of the drawings.

Referring to the drawings, 5 designates the window opening of a building and 6 an angle iron window frame seated therein. A plurality of window sections are pivoted in the side members of the angle iron frame by pivots 7, said pivots being mounted upon the ends of rocking transverse bars 8. The panes 9, of glass or like suitable transparent material, are gripped in and wholly supported by the transverse bars 8. If it is desired, suitable cushioning material such as felt or the like, indicated at 10, may be disposed in the recesses 11 of the transverse bars, within which the upper edges of the glass panes 9 are received.

Ears 12 project rearwardly from the transverse bars and are pivoted at 13 to the vertical rods 14. The upper end of one of the rods 14 is pivoted at 15 to a segmental worm gear 16. This worm gear is in turn pivoted at 17 and is arranged to be swung upon its pivot by the action of a worm 18. Rotation of the worm 18 is effected by pulley 19 and rope or cable 20 under the influence of the actuation of the handles 21.

The lower ends of the rods 14 may be connected

to any suitable counterbalancing weight or spring. For purposes of illustration I have indicated a triangular plate 22. This plate is pivoted at 23 to the side member of the window frame and at 24 to rod 14. A spring 25 is connected to the plate at point 26 and is connected to the bottom of the window frame 6 as indicated at 27.

There may be one of these plates and springs for each of the rods 14, and they act to counterbalance the weight of the window panes. Further, it may be noted that the nearer the windows approach the horizontal, the nearer the line between pivots 23 and 26 becomes a horizontal one. Thus, the effective action of the springs automatically increases in proportion to the increase in load brought about by the movement of the window panes from vertical to horizontal position.

Each of the transverse bars 8 is preferably provided with a longitudinally extending spring strip 28 adapted, when the window is closed, to receive the inner lower face portion of the next higher pane, said pane forcing said weather strip toward the seat 28^a provided for it in the face of the transverse bar. These weather strips not only aid in providing a weather tight contact between the panes and the transverse bars, but by virtue of their resilient material, they exert such pressure as to tend to prevent any looseness or rattling of the parts. Weather strips may also be provided between the side members of the window frame 6 and the ends of the transverse bars and the window panes, said weather strips being indicated at 30 and 31 in Fig. 4.

The only difference between the structure illustrated in Fig. 4 and that shown in Fig. 1 is that Fig. 4 shows the structure of Fig. 1 duplicated as to window sections. That is to say, the window sections are arranged in two banks side by side in a window frame which comprises the side frame members 6^a and a central mullion 6^b, said central mullion separating the two banks of window sections from each other.

Under the arrangement shown in Fig. 4, it is possible to actuate both banks of windows simultaneously from the same actuating mechanism by providing the central mullion 6^b (see Fig. 5) with arcuate slots 32 and 33 to permit the passage of the pivot pins 15 and 24 in such fashion that the upper and lower ends of the bars 14 upon the opposite sides of the central mullion are connected to be moved in unison under the influence of the gear 16.

It will be understood that the pivot 15 will travel in the arcuate slot 32 as the gear 16 turns, carrying with it the two bars 14 upon the opposite sides of the central mullion 6^b and that, when more than two windows are ganged and operated in unison, this will be followed by a like movement of pivot 24 in slot 33, said pivot 24 connecting the lower ends of similar bars on opposite sides of the window.

The weather strips 30 and 31 may be of any desired height vertically of the window. They may extend the full height thereof or any part of the height thereof, if desired, to indicate which, one of said strips has been shown broken off in Fig. 5.

In addition to the many advantages for this new arrangement as hereinbefore set forth, it is a fact that it is more economical to construct a window without the side frame members than with the side frame members for the various window sections. The past few years have shown remarkable strides in the manufacture of glass, and under the newly developed methods, glass is no longer necessarily as brittle and fragile as formerly.

Glass is now being made with a considerable degree of flexibility and with a corresponding toughness and resistance to breakage, which renders it wholly feasible to support the glass panes from one edge only, as herein proposed. However, I wish it to be understood that it is within the range of my invention to imbed in the glass, in the process of manufacture, a stiffening wire or like reinforcement, if desired. As a matter of fact, such a reinforcing member, by being arranged in proper contour, could be utilized as a feature of ornamentation.

It is not essential that the transverse bars 8 be disposed exactly at the top of the several window sections. They may be disposed at points intermediate the total width of the transparent portions of the window sections. Such an arrangement is illustrated in Fig. 8, where transverse bars $8^\times$, corresponding to the transverse bars 8 of Fig. 1, carry transparent pane sections 9^a, 9^b, the former lying below the bars and the latter lying above the bars.

Thus, a further overlapping of the glass portions is effected, and this aids in excluding even driving rains with the windows in partially opened position. The actuating mechanism for the sections of Fig. 8 is the same as that illustrated with respect to Fig. 1, except that a weight $25^\times$ has been substituted for the spring 25.

The ventilating shade referred to comprises a rear shade section 40 and a front shade section 41, each of these sections being made up of a plurality of strips 42 and 43 respectively, the strips of a section lying in spaced relation to each other and in staggered relation to the strips of the other section.

The upper ends of the strips 42 of the rear section or half of the shade are received upon a conventional spring wound shade roller 44, while the upper ends of the strips 43 of the front half or section of the shade are received upon a conventional spring wound shade roller 45. Bars 46 and 47 at the lower ends of the halves of the shade are joined as indicated at 48 and are provided with a pull 49.

Thus, it will be seen that, complementally, the strips of the front and rear halves of the shade are so spaced from each other that air may enter freely between them and that the strips of each half are so spaced from each other that air may flow freely through the shade, considered as a whole, while at the same time said shade will exclude the rays of the sun.

It is to be understood that the invention is not limited to the precise construction set forth, but that it includes within its purview changes such changes as may come within either the terms or the spirit of the appended claims.

Having described my invention, what I claim is:

1. A window of the character described comprising a plurality of rocking transverse bars and panes free along three of their edges and supported in said transverse bars wholly along their remaining edge.

2. A window of the character described comprising a plurality of rocking transverse bars and panes free along three of their edges and supported in said transverse bars wholly along their remaining edge, and means for actuating all of the transverse bars in unison.

3. A window of the character described comprising a plurality of rocking transverse bars and panes free along three of their edges and supported in said transverse bars wholly along their remaining edge, and means for actuating all of the transverse bars in unison, said panes being of a width of, or totalling a distance materially greater than the vertical distance between said transverse bars, whereby said panes are caused to overlap the transverse bars when in closed position.

4. A window of the character described comprising a plurality of rocking transverse bars and panes free along three of their edges and supported in said transverse bars wholly along their remaining edge, means for actuating all of the transverse bars in unison, said panes being of a width of, or totalling a distance materially greater than the vertical distance between said transverse bars, whereby said panes are caused to overlap the transverse bars when in closed position, and resilient weather strips carried by the bars, against which said panes bear.

5. A window of the character described comprising a plurality of rocking transverse bars and panes free along three of their edges and supported in said transverse bars wholly along their remaining edge, means for actuating all of the transverse bars in unison, said panes being of a width materially greater than the vertical distance between said transverse bars, whereby said panes are caused to overlap the transverse bars when in closed position, resilient weather strips carried by the bars against which said panes bear, and resilient weather strips at the ends of the panes against which the ends of the transverse bars and the end of said panes bear.

6. A structure as recited in claim 1 in combination with ears extending rearwardly of said transverse bars, and a common actuating member to which all of said ears are pivoted.

7. A structure as recited in claim 1 in combination with ears extending rearwardly of said transverse bars, a common actuating member to which all of said ears are pivoted, and a counterbalancing member for drawing upon said actuating member and tending to move the window sections to open position.

8. In combination, a pair of banks of horizontally pivoted window sections, a supporting frame in which said window sections are pivoted comprising a central divisional member, each of said window sections comprising a transverse member, a glass pane and an actuating ear, a pair of actuating rods, one upon each side of the central divisional member to which all of said ears are pivoted, members connecting the upper and lower ends of said rods and passing through the divisional member, and manually operable means for imparting endwise movement to said rods in unison.

9. In combination, a pair of banks of horizontally pivoted window sections, a supporting frame in which said window sections are pivoted comprising a central divisional member, each of said window sections comprising a transverse member, a glass pane and an actuating ear, a pair of actuating rods one upon each side of the central divisional member to which all of said ears are pivoted, members connecting the upper and lower ends of said rods and passing through the divisional member, a swingingly mounted segmental worm gear, a worm engaging the same, manually operable means for rotating said worm, and a connection between said gear and an end of one of said rods whereby movement of said gear imparts endwise movement to both of said rods in unison.

10. A window of the character described comprising a plurality of horizontally pivoted rocking transverse bars, means for actuating said transverse bars upon their pivots, said transverse bars being longitudinally channeled across their outer faces, and panes free along three of their edges and clamped in the channels of the transverse bars along their remaining edges.

11. A structure as recited in claim 10 in combination with a resilient weather strip comprising a portion lying outwardly of and along the outer face of the corresponding transverse bar, and an integral portion bent inwardly and clamped in the channel of the head frame along with the pane.

12. A window of the character described comprising a plurality of horizontally pivoted rocking transverse bars, means for actuating said transverse bars upon their pivots, said transverse bars being longitudinally channeled across their outer faces, panes free along three of their edges and clamped in the channels of the transverse bars along their remaining edges, and cushioning means for the pane in said channel.

13. A window comprising a plurality of rocking transverse bars and panes comprising transparent sections extending above and below said bars and supported wholly from said bars.

14. A window comprising a plurality of rocking transverse bars and panes comprising transparent sections extending above and below said bars and supported wholly from said bars, and means for actuating all of said bars from a common actuating member.

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