May 1, 1956 W. FOCHT, JR., ET AL 2,743,796

AWNING WINDOW STRUCTURE

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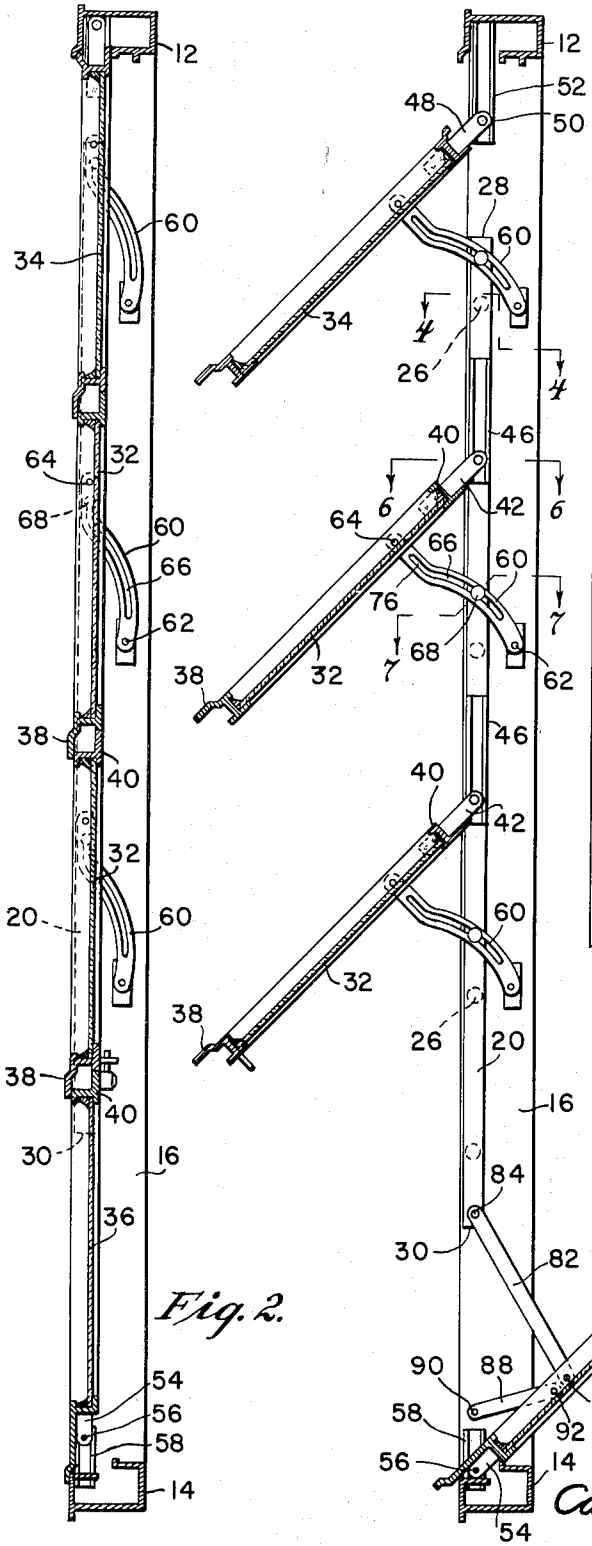


Fig. 2.

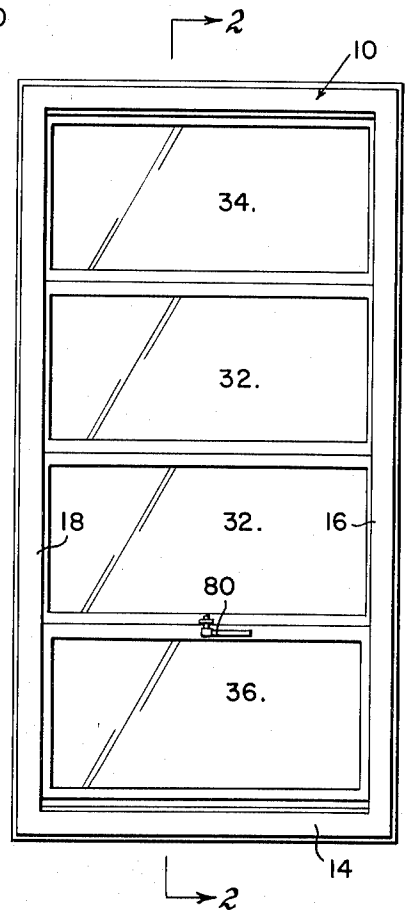


Fig. 1.



Fig. 3.

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Fig. 4.

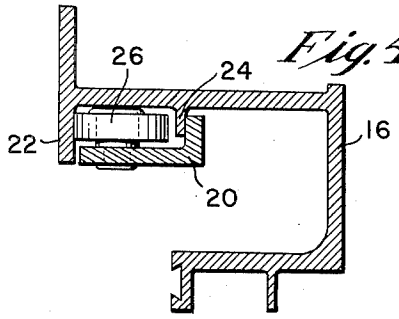


Fig. 5.

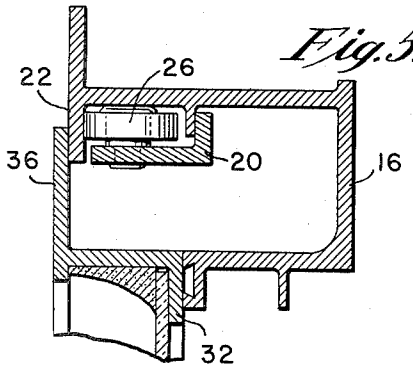


Fig. 6.

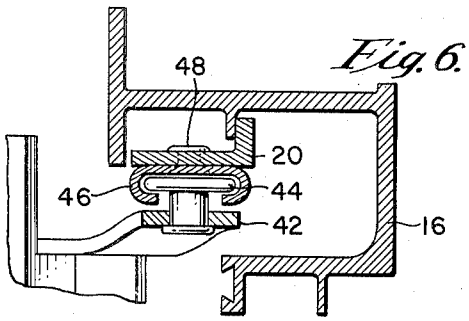
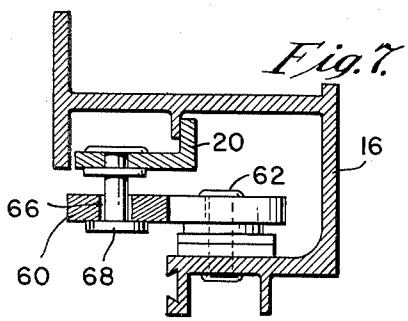


Fig. 7.



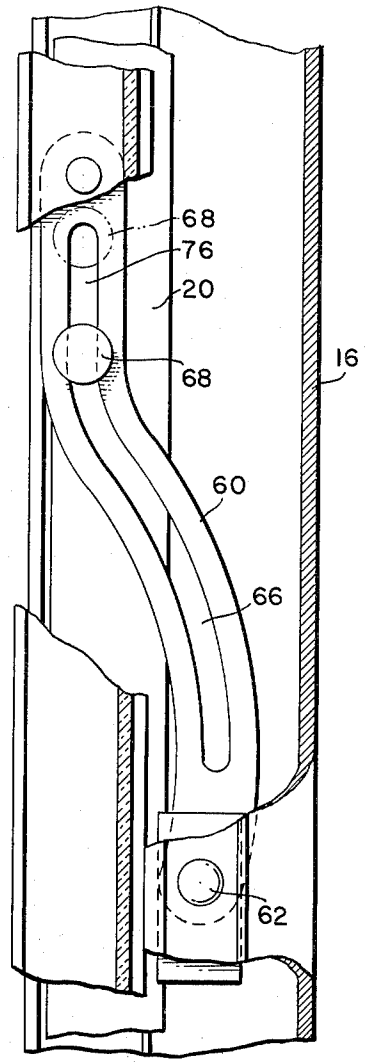


Fig. 8.

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Fig. 9.

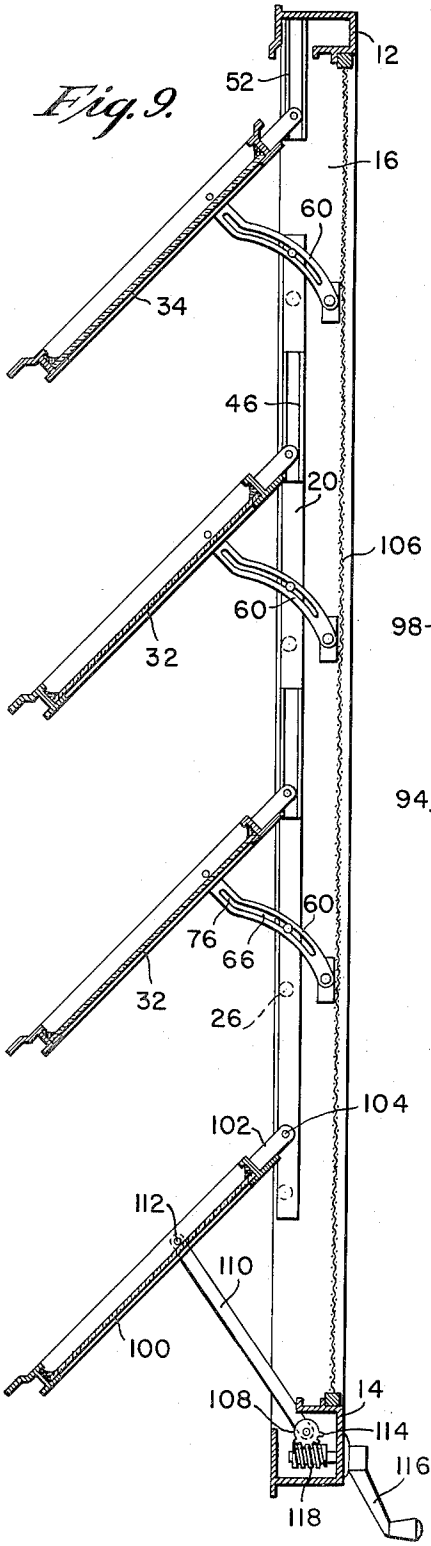
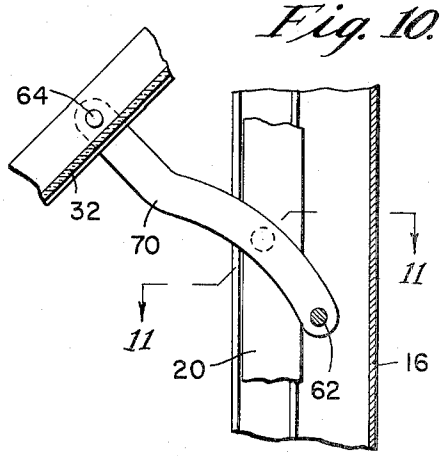


Fig. 10.



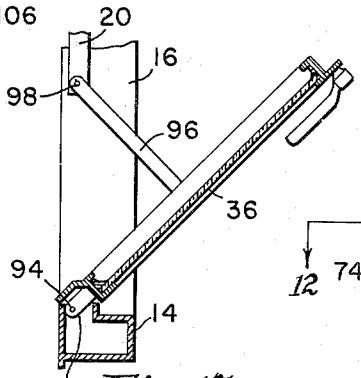
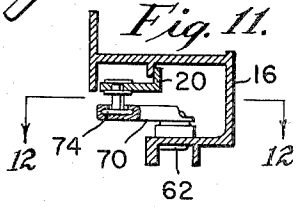


Fig. 13.

Fig. 11.



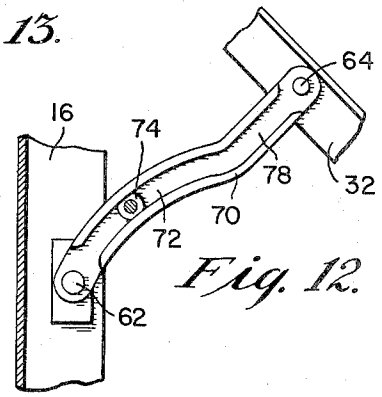


Fig. 12.

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United States Patent Office 2,743,796 Patented May 1, 1956

2,743,796

AWNING WINDOW STRUCTURE

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Application December 1, 1953, Serial No. 395,506

16 Claims. (Cl. 189—67)

This invention relates to an awning window construction of the type in which vertically spaced ventilators are operatively connected to operating bars which are vertically movable within the plane of the window frame, the primary object of which is to provide a construction that develops a mechanical advantage in closing the ventilators. The construction is such that a large movement of the operating bars develops a relatively small movement of the ventilators at the instant of closing.

Another object of the invention is to provide an awning window of the character described in which the upper ends of the ventilators are slidably connected to the operating bars thus minimizing frictional resistance to the operation of the ventilators.

Another object of the invention is to provide an awning window of the character described wherein the uppermost ventilator is slidably connected to the frame instead of the operating bars, thus eliminating the need for a very wide frame head bar.

Another object of the invention is to provide an awning window of the character described in which the means for opening and closing each ventilator comprises a brace bar terminally pivoted to the window frame and to the ventilator at a point removed from the upper or head end thereof and a means slidably connecting the brace bar to the operating bar whereby vertical movement of the operating bar will cause the brace bar to turn about its frame pivot thereby opening and closing the ventilator.

Another object of the invention is to provide an awning window of the character described wherein each brace bar incorporates a means which serves the dual function of allowing the bottom ventilator to open a controllable number of degrees before the upper ventilators begin to open and of maintaining the upper ventilators in a securely locked position until opening is actually desired.

A further object of the invention is to provide an awning window comprising a plurality of upper ventilators opening outwardly of the plane of the frame and a bottom ventilator opening inwardly of the plane of the frame, actuation of the bottom ventilator serving to operate the upper ventilators in unison.

Another object of the invention is to provide an awning window which is easy to operate and which at the same time is superior to the conventional awning windows with respect to the tightness of the ventilators in their closed position.

And yet another object of the invention is to provide an awning window which is superior to the conventional awning windows in that the weight of metal required is reduced and the amount of field adjustment is minimized.

These and other objects of the invention will become more apparent as the following description proceeds in conjunction with the accompanying drawings, wherein:

Figure 1 is an inner face view of the awning window.

Figure 2 is an enlarged sectional view taken on the line 2—2 of Figure 1, certain parts being omitted for purposes of clarity;

Figure 3 is a view similar to Figure 2 and illustrating the open position of the ventilators;

Figure 4 is an enlarged sectional view taken on the line 4—4 of Figure 3;

Figure 5 is a view similar to Figure 4 and illustrating the ventilator in a closed position;

Figure 6 is an enlarged sectional view taken on the line 6—6 of Figure 3;

Figure 7 is an enlarged sectional view taken on the line 7—7 of Figure 3;

Figure 8 is an enlarged broken away vertical sectional view of a portion of a ventilator and frame and illustrating details of construction of the brace bar when the ventilator is in its closed position;

Figure 9 is a view similar to Figure 3 and illustrating a modified form of the invention;

Figure 10 is a fragmentary enlarged vertical sectional view through the ventilator and frame and illustrating a modified form of a brace bar;

Figure 11 is a sectional view taken on the line 11—11 of Figure 10;

Figure 12 is an enlarged sectional view taken on the line 12—12 of Figure 11; and

Figure 13 is a fragmentary enlarged vertical sectional view through the bottom tilt-in ventilator and frame and illustrating a modified way of operatively connecting the ventilator to the operating bar.

Specific reference will now be made to the drawings wherein similar reference characters are used for corresponding elements throughout.

The present awning window construction comprises a substantially rectangular frame **10**, preferably fabricated of aluminum, and including an upper transverse member **12**, a lower transverse member **14** and spaced parallel side members **16** and **18**, the frame preferably having a profile in cross-section as shown particularly in Figures 4–7.

Mounted for vertical sliding movement on and in the plane of each side frame member **16** and **18** is an operating bar **20**. The operating bar is preferably L-shaped and the slide mounting is effected by the provision of projecting flanges **22** and **24** forming a vertical channel track receiving vertically spaced rollers **26** carried by the operating bar. The upper and lower ends **28** and **30** of the operating bar terminate a predetermined distance from the upper and lower transverse members **12** and **14** of the frame when the ventilators are in a fully opened position as shown in Figure 3.

As shown in Figures 1–8, a plurality of upper substantially rectangular window pane-carrying ventilators **32** are provided, the uppermost one being designated **34**. The bottom or lowermost ventilator **36** is associated with the frame and other operating members to open inwardly of the plane of the frame, whereas the remaining ventilators **32** and **34** open in an opposite direction outwardly of the plane of the frame. The cross-sectional profiles of the ventilators are such that they each include side flanges **36**, see Figure 5, adapted to abut in their closed position the projecting flanges **22** of the side frame members **16** and **18**. Each ventilator also includes a bottom transverse channel member **38** adapted to abut and partially embrace the upper transverse member **40** of the next lowest ventilator when the ventilators are in a closed position as shown in Figure 2, thus effecting a tight closure.

All of the upper ends of the ventilators may be slidably connected to the operating bars **20**, but preferably only the intermediate ventilators **32** are so connected. This connection is effected by providing an extension **42** at each side of the upper end of the ventilator, which extension carries a suitable headed pin or roller **44** slidably engaged in a channel track **46** mounted as at **48** upon the operating bar **20**. The vertical spacing of the tracks

46 and their length are predetermined in accordance with the dimensions of the ventilators and the necessary length of travel of the rollers 44 in the tracks to effect complete opening and closing of the ventilators.

To eliminate the need for a very wide bar at the head or upper end of the frame the uppermost ventilator 34 is preferably slidably mounted on the frame itself instead of on the operating bar. This is accomplished by providing, as in the construction of the ventilators 32, at each side of the upper end of ventilator 34 an extension 48 carrying a pin or roller 50 slidably engaged in a channel track 52 mounted directly upon each of the side frame members 16 and 18, the tracks 52 terminating at the upper transverse frame member 12 as shown in Figure 3.

The bottom tilt-in ventilator 36 is provided at each side of the lower end thereof with an extension 54 carrying a pin or roller 56 slidably engaged in a channel track 58 mounted upon each side frame member 16 and 18 adjacent the lower transverse frame member 14 and below the lower end 30 of the operating bar 20.

A means is provided for developing a mechanical advantage in closing the ventilators which effects a large movement of the operating bar as compared to a relatively small movement of the ventilators at the instant of closing. This means comprises a brace bar 60 which is pivoted at one end as at 62 to the side frame member 16. At its other end the brace bar is pivoted as at 64 to each ventilator at a predetermined position intermediate the upper and lower ends of the ventilator.

A means is provided for slidably connecting the operating bar to each of the brace bars. As shown in Figures 1–8, this means includes an elongated slot 66 and a headed pin or equivalent projection 68 carried by the operating bar 20 and extending into the slot 66. As shown in Figures 10–12, the brace bar 70 may have mounted on one face thereof or may have integrally formed in one face thereof a channel track or shoe 72 slidably receiving a headed pin 74 carried by the operating bar 20.

For ease of operation, the slot 66 or track or shoe 72 is preferably generally arcuate. Both the slot 66 and the shoe 72 include portions 76 and 78 respectively of predetermined length adjacent the ventilator pivots 66. Each of these portions is straight as compared to the remaining arcuate portion of the slot 66 or the shoe 72. Note should be taken of the fact that the brace bars 60 and 70 may be formed of the desired shape with an arcuate lower portion and a straight upper portion and the slot 66 or shoe 72 will follow the contour of the brace bar. In the event that a straight brace bar is used, the slot or shoe provided therein will not be arcuate but will have an upper portion of predetermined length which is upwardly inclined relative to the longitudinal axis of the lower portion of said slot or shoe in the same manner as the straight upper portions 76 or 78 are generally upwardly inclined relative to the arc of curvature of the lower portions of the slot 66 or shoe 72.

The upwardly inclined or straight portion 76 or 78 serves a very important lost motion function as shown in Figure 8. The overall length of the slot 66 and the length of the straight portion 76 relative thereto and the location of the pivots 62, 64 and the pin 68 are such that when the operating bar 20 moves upwardly the brace bar turns around its frame pivot 62 and moves the ventilators in unison towards a closed position, the upper ends of the ventilators moving upwardly in the channel tracks 46 and 52. When the ventilators are initially closed, the pin 68 begins to enter the straight portion 76 of the slot 66 as shown in solid lines in Figure 8. The final firm locking of the ventilators is accomplished by further upward movement of the operating bar 20 to the point where the pin 68 approaches the end of the straight portion 76 of the slot as shown in dotted lines in Figure 8. Since, as will be described hereinafter, the bottom ventilator 36 is linked directly to the bottom of the operating bar 20, it is manifest that the bottom ventilator can be opened an amount equivalent to the length of the straight portion 76 of the slot before the upper ventilators 32 and 34 begin to open. The same operation applies to construction of brace bar 70, shoe 72 and straight portion 78 shown in Figures 10–12. The ventilators can be retained in the locked position by any suitable latch and keeper 80.

It should be further noted at this point that curving the brace bars 60 and 70 or the slot 66 and shoe 72 associated therewith serves as a means to vary the relative motion among the ventilators.

Various means may be used to reciprocate the vertically movable operating bar 20. In the construction employing the bottom tilt-in ventilator 36, the same is a portion of this means. As shown in Figures 2 and 3, the lower end of the tilt-in ventilator is slidably mounted as at 54, 56 and 58 upon the frame. Each side of the ventilator includes a longer link 82 which is terminally pivoted as at 84 and 86 to the bottom of the operating bar 20 and to the ventilator at a point intermediate the upper and lower ends thereof. A shorter link 88 is provided which is terminally pivoted as at 90 and 92 to the frame side member 16 below the operating bar and above the channel track 58 and to the ventilator at a predetermined joint just below the pivot point 86.

Another such means is shown in Figure 13. This comprises pivotally instead of slidably connecting each extension 54 of the bottom tilt-in ventilator 36 to the frame side member 16 as at 94. A single link 96 is terminally pivoted to each side of the ventilator intermediate its upper and lower ends and to the bottom of the operating bar 20 as at 98.

And yet another such means is shown in Figure 9. In this construction all of the ventilators, including the bottom one 100, tilt outwardly of the plane of the frame in the same direction. Each side of the upper end of the bottom ventilator 100 carries an extension 102 which is not slidably but directly pivoted as at 104 to the operating bar 20.

Rotatably mounted within the lower transverse member 14 of the frame 10, here shown supporting a conventional screen 106, is a torque bar 108. Secured to each end of the torque bar is a link 110 which is in turn pivoted at its upper end as at 112 to the bottom ventilator at a point intermediate the upper and lower ends thereof. A portion of the torque bar carries gear teeth 114. An operating handle or crank arm 116 is rotatably mounted on the transverse frame member 14 and includes a worm 118 which engages the gear teeth 114 of the torque bar.

As in the case of the tilt-in bottom ventilator 36, operation of the handle 116 in this construction will produce the same mechanical advantage of a large movement of the operating bar and a relatively small movement of the ventilators at the instant of closing. Thus when the ventilators are closed, operation of the handle 116 will raise the lower ventilator 100 a distance equivalent to the length of the straight portion 76 of the slot 66 of the brace bar 60 without effecting any opening of the remaining upper ventilators 32 and 34. Thereafter, continued operation of the handle 116 will further open the lower ventilator 100 and will cause the remaining upper ventilators to open in unison.

While preferred embodiments of the invention have been shown and described hereabove minor variations thereof may be made by skilled artisans without departing from the spirit of the invention and the scope of the appended claims.

We claim:

1. An awning window construction comprising a substantially rectangular frame having vertical side members, an elongated operating bar mounted for vertical sliding movement on and in the plane of each side member, means for raising and lowering said operating bars, vertically spaced ventilators, means slidably connecting the upper ends of said ventilators to said operating bars, brace bars terminally pivoted to said frame side members

and to said ventilators intermediate the upper and lower ends thereof, and ventilator-actuating means slidably connecting said brace bars to said operating bars whereby raising and lowering said operating bars will close and open said ventilators in unison.

2. An awning window construction comprising a substantially rectangular frame having vertical side members, an elongated operating bar mounted for vertical sliding movement on and in the plane of each side member, vertically spaced ventilators, means slidably connecting the upper ends of said ventilators to said operating bars, brace bars terminally pivoted to said frame side members and to said ventilators intermediate the upper and lower ends thereof, ventilator-actuating means slidably connecting said brace bars to said operating bars whereby raising and lowering said operating bars will close and open said ventilators in unison, and means for raising and lowering said operating bars, said means including a further ventilator pivoted at its lower end to the frame side members below said operating bars, and linkage operatively connecting said further ventilator to the bottoms of said operating bars whereby opening of said further ventilator inwardly of the frame will move the operating bars downwardly and cause the remaining ventilators to open outwardly of the frame.

3. An awning window construction comprising a substantially rectangular frame having vertical side members, an elongated operating bar mounted for vertical sliding movement on and in the plane of each side member, vertically spaced ventilators, means slidably connecting the upper ends of said ventilators to said operating bars, brace bars terminally pivoted to said frame side members and to said ventilators intermediate the upper and lower ends thereof, ventilator-actuating means slidably connecting said brace bars to said operating bars whereby raising and lowering said operating bars will close and open said ventilators in unison, and means for raising and lowering said operating bars, said means including a further ventilator mounted for vertical sliding movement at its lower end to the frame side members below said operating bars, and linkage operatively connecting said further ventilator to the bottoms of said operating bars whereby opening of said further ventilator inwardly of the frame will move the operating bars downwardly and cause the remaining ventilators to open outwardly of the frame.

4. An awning window construction comprising a substantially rectangular frame having vertical side members, an elongated operating bar mounted for vertical sliding movement on and in the plane of each side member, vertically spaced ventilators, means slidably connecting the upper ends of said ventilators to said operating bars, brace bars terminally pivoted to said frame side members and to said ventilators intermediate the upper and lower ends thereof, ventilator-actuating means slidably connecting said brace bars to said operating bars whereby raising and lowering said operating bars will close and open said ventilators in unison, and means for raising and lowering said operating bars, said means including a transverse torque bar rotatably mounted on the frame side members adjacent their lower ends, links pivoted at their outer ends to the lowermost ventilator intermediate the upper and lower ends thereof, the inner ends of said links being secured to said torque bar, gear teeth on a portion of said torque bar, a crank rotatably mounted on the frame, and a worm carried by said crank and engaging the gear teeth on said torque bar.

5. An awning window construction comprising a substantially rectangular frame having vertical side members, an elongated operating bar mounted for vertical sliding movement on and in the plane of each side member, vertically spaced ventilators, means connecting the upper ends of said ventilators to said operating bars, and means for raising and lowering said operating bars, said means including a further ventilator operatively connected at its lower end to said frame below said operating bars and linkage connecting said further ventilator to the bottoms of said operating bars whereby opening said further ventilator inwardly of the frame will move the operating bars downwardly to open the remaining ventilators in unison outwardly of the frame.

6. An awning window construction comprising a substantially rectangular frame having vertical side members, an elongated operating bar mounted for vertical sliding movement on and in the plane of each side member, means for raising and lowering said operating bars, vertically spaced ventilators, means slidably connecting the upper ends of said ventilators to said operating bars, and means operatively connecting each of said operating bars to each of said ventilators at a position intermediate the upper and lower ends of each ventilator whereby a large movement of said operating bars will effect a relatively small movement of the ventilators at the instant of their closing.

7. The combination of claim 6 wherein said last-named means includes brace bars each pivoted at one of its ends to one of said frame side members and at its other end to one of said ventilators intermediate the upper and lower ends thereof, and means slidably connecting each brace bar to one of said operating bars, said latter means including an elongated slot in each brace bar and a pin carried by one of said operating bars and slidably engaged in said slot.

8. The combination of claim 7 wherein said slot includes an upwardly inclined portion adjacent the end of the brace bar which is pivoted to the ventilator, said inclined portion of the slot receiving the pin just prior to the final closing of the ventilator to retain the ventilator in a firmly closed position.

9. The combination of claim 8 wherein said slot is arcuate and said inclined portion is straight.

10. The combination of claim 6 wherein said last-named means includes brace bars each pivoted at one of its ends to one of said frame side members and at its other end to one of said ventilators intermediate the upper and lower ends thereof and means slidably connecting each brace bar to one of said operating bars, said latter means including a channel shoe carried by each brace bar and a roller carried by one of said operating bars and slidably engaged in said shoe.

11. The combination of claim 10 wherein said shoe includes an upwardly inclined portion adjacent the end of the brace bar which is pivoted to the ventilator, said inclined portion receiving the roller just prior to the final closing of the ventilator to retain the ventilator in a firmly closed position.

12. The combination of claim 11 wherein said shoe is arcuate and said inclined portion is straight.

13. An awning window construction comprising a substantially rectangular frame having vertical side members, an elongated operating bar mounted for vertical sliding movement on and in the plane of each side member, means for raising and lowering said operating bars, vertically spaced ventilators, means slidably connecting the upper ends of all but the uppermost ventilators to said operating bars, means slidably connecting the upper end of said uppermost ventilator to the frame side members above said operating bar, brace bars terminally pivoted to said frame side members and to said ventilators intermediate the upper and lower ends thereof, and ventilator-actuating means slidably connecting said brace bars to said operating bars whereby raising and lowering said operating bars will close and open said ventilators in unison.

14. The combination of claim 13 wherein said means slidably connecting the upper ends of said ventilators to said operating bars includes vertically spaced elongated channels mounted on said operating bars and rollers carried by said ventilators and slidably engaged in said channels.

15. The combination of claim 13 wherein said means

slidably connecting the upper end of the uppermost ventilator to said frame includes channels mounted on the side members of said frame adjacent their upper ends and rollers carried by said uppermost ventilator and slidably engaged in said channels.

16. An awning window construction comprising a substantially rectangular frame having vertical side members, an elongated operating bar mounted for vertical sliding movement on and in the plane of each side member, means for raising and lowering said operating bars, vertically spaced ventilators, means slidably connecting the upper ends of all but the bottom ventilator to said operating bars, the bottom ventilator being pivotally but non-slidably connected to said operating bars, brace bars each terminally pivoted to said frame and to each of the upper ventilators below the upper end thereof, and means slidably connecting said brace bars to said operating bars and including a lost motion means whereby the bottom ventilator can be opened a predetermined amount before the upper ventilators begin to open in unison.

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