

Feb. 2, 1954

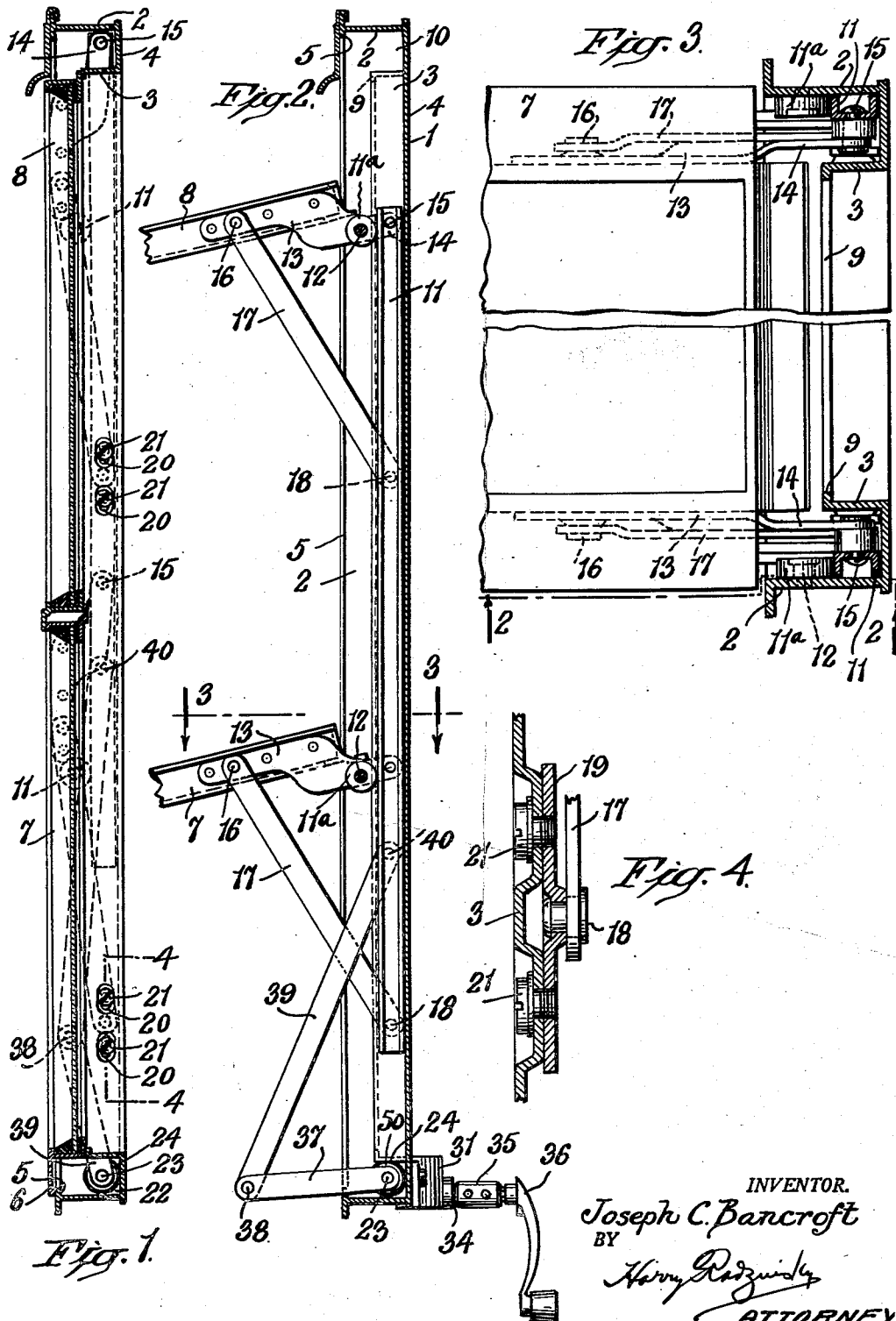
J. C. BANCROFT

2,667,950

AWNING TYPE WINDOW

Filed Oct. 28, 1949

2 Sheets-Sheet 1



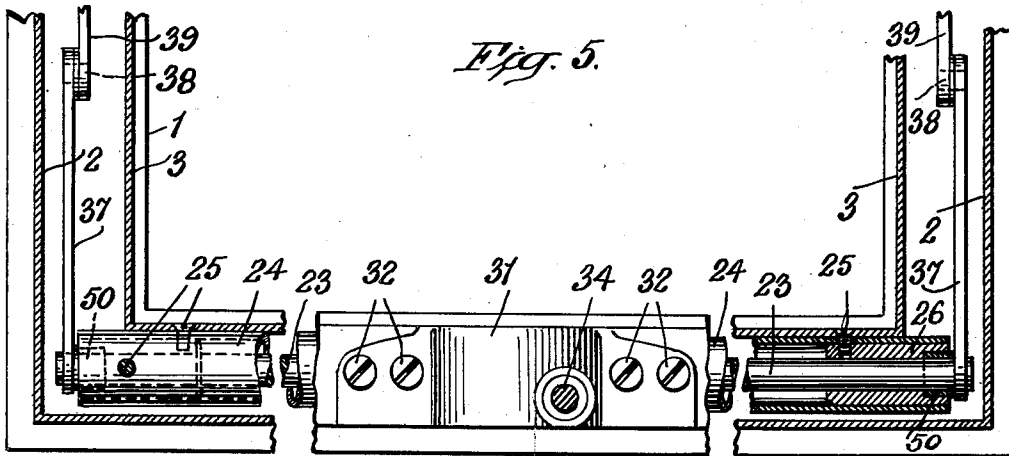
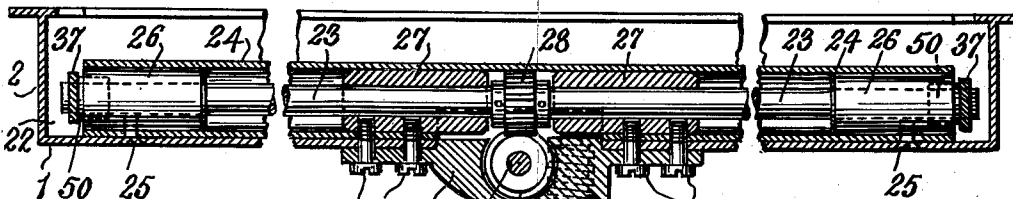
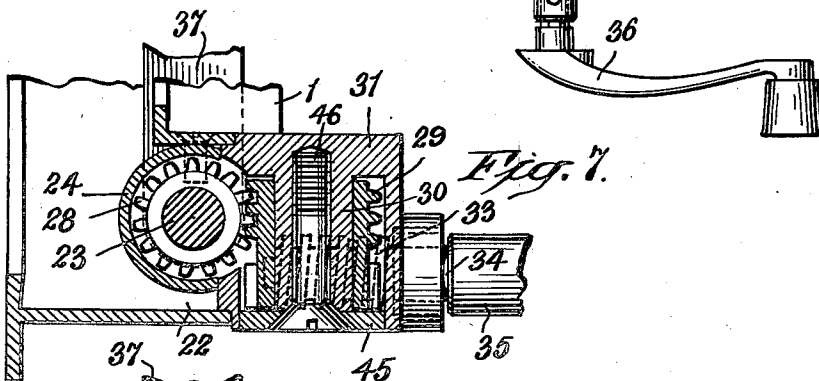
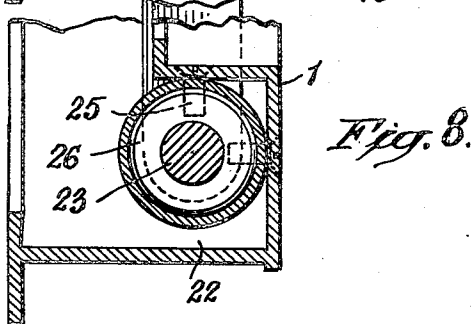
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2 Sheets-Sheet 2



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2,667,950

AWNING TYPE WINDOW

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Application October 28, 1949, Serial No. 124,054

9 Claims. (Cl. 189—67)

1

This invention relates to windows of the so-called "awning" type, wherein a plurality of sashes are pivotally mounted one above the other and are coupled together in such a manner that an opening or closing movement of one of the sashes, controlled by a suitable operating means, will simultaneously open or close the other sashes.

The invention has for its primary object, the provision of a simplified structure in which the various operating parts are housed and protected in the window frame and by the manipulation of a hand-operated crank, the several sashes will be simultaneously opened or closed.

The invention further contemplates the provision of improved sash-operating means occupying but little space and centrally located on the window frame; it contemplates the provision of means by which balanced operation of the window is attained, and it results in the securing of operating results superior to those resulting from other structures known in this art.

With these and other objects to be hereinafter set forth in view, I have devised the particular arrangement of parts hereinafter set forth and more particularly pointed out in the claims appended hereto.

In the accompanying drawings forming a part hereof, in which an illustrative embodiment of the invention is disclosed, Fig. 1 is a vertical sectional view through a window constructed in accordance with the invention, with the sashes thereof shown in closed position; Fig. 2 is a vertical sectional view through the window with the sashes shown in closed position, the section being taken substantially on the line 2—2 of Fig. 3, looking in the direction of the arrows; Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2, looking in the direction of the arrows; Fig. 4 is a sectional view through one of the anchorage plates for the lower pivot of the sash links, the view being taken on the line 4—4 of Fig. 1; Fig. 5 is a view of the lower part or sill of the window frame, looking at the inner side of the same, with parts broken away, and with other parts in section, to disclose construction; Fig. 6 is a longitudinal sectional view through the sash-operating mechanism; Fig. 7 is a sectional view through the sash-operating gearing and associated parts, and Fig. 8 is a sectional view through the lower member or sill of the window frame and through the torsion sleeve and operating shaft.

Referring to the drawing, I generally indicate the frame of the window, which is preferably the so-called "box" type and is composed of metal. It is of rectangular form and channel shape in

2

cross section and thus includes an outer wall 2 of considerably greater length than an inner wall 3, both walls being connected by the integral rear web 4. The outer wall 2 includes an intumed edge flange 5 against which a flange 6 on the sashes 7 and 8 abuts, as seen, for example, at the lower part of Fig. 1. The inner wall 3 of the frame is also provided with an intumed edge flange 9 against which the inner portion of the sashes abut when the sashes are in closed position, as shown at the top and bottom of Fig. 1.

When the sashes are in their closed position, as seen in Fig. 1, it will be noted that the frame presents rearwardly of the sashes, a channel 10 within which a vertically-movable slide bar 11 is confined, said slide bar maintained in the channel and being restrained from forward movement by means of a plurality of rollers 11^a rotative on pivot pins 12 secured in the outer walls 2 of the vertical sides of the window frame 1. Secured to each side edge of the sashes 7 and 8 is an arm 13 which is formed with an offset outer end 14, pivotally attached at 15 to the slide bar 11. Also pivotally attached at 16 to each side edge of each of the sashes 7 and 8 is one end of a link 17 which has its opposite end pivotally attached at 18 to an adjustable anchorage plate 19 slotted as at 20 to receive the attaching screws 21 extending through the inner flanges 2 of the window frame. This slotted attachment enables a precise adjustment of the several sashes to accurate closing position.

It will be noted that in the structure described, the pivots 15 which attach the sashes to the slide bar, and the pivots 18 which attach the lower ends of the links 17 to the window frame, are not located between the edges of the respective sashes and the frame, but are in fact located in and confined by the channel 10 in the frame wholly to the rear of the sashes regardless of whether the sashes are in open or closed position, the window frame being of sufficient depth to enable these pivots to be housed within it to the rear of the sash frames.

From the structure thus far described, it will be apparent that when the slide bar is moved upwardly, it will carry the pivots 15 upwardly, and such movement will swing the several sashes inwardly and upwardly to closed position as shown in Fig. 1. When the slide bar is moved downwardly, the pivots 15 will then be moved downwardly, such movements causing the sashes to be moved downwardly and swung outwardly to the open positions shown in Fig. 2, or to any intermediate positions. The operating means for

3

vertically reciprocating the slide bar 11 clearly shown in Figs. 5 to 8 inclusive, will now be described.

Located in the lower horizontal channel 22 of the window frame is a lengthy rotating or rocking shaft 23 constituting the sash-operating member and having movements which cause raising and lowering of the slide bar and resultant opening and closing movements of the sashes. Said shaft is rotative within a torsion tube 24 of considerably greater diameter than the shaft 23. Said tube 24 is secured to parts of the frame by the fastening screws 25, and mounted within the tube are spacing bushings 26 and 27 in which the shaft 23 is rotative. The outer bushings 26 are provided with bearings 50 through which the shaft 23 passes and in which the same is rotative.

Secured at a central or middle point on the shaft 23 is a gear 28 which meshes with and is rotated by a gear 29 having its axis 30 arranged vertically and rotative within a housing 31 secured by the fastening screws 32 to the frame and which screws also enter and hold the bushings 27 in position within the tube 24. The gear 29 is maintained on spindle 30 by closure plate 45 held in place by the screw 46 as shown in Fig. 7. The tube 24 is cut away as required to enable the gears 28 and 29 to inter-engage, as clearly shown in Figs. 6 and 7. The gear 29 is rotated by a worm 33 secured on a shaft 34 having an end protruding out of the housing 31 and secured by the coupling 35 to the handle or operating crank 36.

Fastened to each end of the shaft 23 is a radially-extending arm 37 pivoted at 38 to one end of a link 39, having its upper end pivotally attached at 40 to one of the slide bars 11. Through the arrangement described, it will be apparent that by rotative movement of the crank or handle 36, the shaft 23 will be rocked or rotatively moved, and such movements will be transmitted to the slide bars 11 by means of the arms 37 and links 39. As the slide bars are moved up or down the same will cause the sashes to be moved accordingly to open, closed or intermediate positions.

The location of the operating means at the center of the operating shaft 23 results in a balanced arrangement whereby the operation of the sashes to open, closed or intermediate positions is smooth and effectively done. The enclosure of the operating shaft 23 in the relatively large diameter torsion tube adds strength and rigidity to and prevents deformation of the operating shaft 23, and the location of the slide bars, the pivot points for the sashes, connecting links and operating links to the rear of the sashes within a box-line window frame of substantial thickness enables the various parts of the structure to be made relatively large and strong and results in a window of very long operating life.

While the window described is shown as having two superimposed sashes, it will be understood that it is merely illustrative as the same may be made with a greater number of sashes if required.

Having described one embodiment of the invention, it is obvious that the same is not to be restricted thereto, but is broad enough to cover all structures coming within the scope of the annexed claims.

What I claim is:

1. A window construction of the character described comprising, a frame of substantially

4

channel shape, a slide bar mounted for vertical sliding movement within a vertical side portion of the frame, a sash having an offset arm fixed at one end to said sash and pivotally attached at its other end to the slide bar at the rear of the sash, a coupling link pivoted at one end to the sash and pivoted at its lower end to the frame, the frame having a lower channel containing a horizontally-extending rocking shaft, an arm at the end of said shaft, an operating link having a lower end pivotally attached to said arm and an upper end pivotally attached to the slide bar, the pivots for the lower end of the coupling link, for the upper end of the operating link and for the offset arm being all located to the rear of the sash, and gearing located substantially centrally of said shaft for imparting rotative movement to the rocking shaft.

2. In a window structure, a channel-shaped window frame, slide bars operative in the side channels of said frame, sashes having rigid offset arms pivotally attached to said slide bars, links pivotally attached at one end to the sashes and pivotally attached at their other ends to the frame, an operating shaft located in the lower horizontal channel of the window frame, arms extending radially from the ends of the shaft, links connecting the ends of said arms to the slide bars, a stationary tube within the lower horizontal channel of the window frame and extending for the length of the shaft and enclosing the same, bushings within the tube through which the shaft extends, a gear secured at a midway point on the shaft, a housing attached to the window frame, and manually-operated gearing in the housing and in engagement with the gear on the shaft and adapted to impart rotative movements thereto.

3. In a window structure, a window frame having a lower channel, a lengthy, large-diameter tube secured in said channel, spaced bushings secured in the tube, a shaft contained within the tube and extending co-extensively therewith and rotative within the bushings, a gear located at a midway point on the shaft, a housing attached to the window frame, gearing contained in the housing and in meshed engagement with the gear on the shaft, a crank for operating said gearing, and arms extending radially from the opposite ends of the shaft for causing sash operation upon rotative movement of the shaft.

4. In a window structure, a channel-shaped window frame, slide bars slidable vertically in the side channels of said frame, means for holding said slide bars in the frame, sashes having rigid extensions pivotally attached to said slide bars, links pivotally attached at one end to the sashes and pivotally attached at their other ends to the frame, an operating shaft located in the lower horizontal channel of the window frame and extending for substantially the length of the lower part of said frame, arms extending radially from the ends of the shaft, links connecting the ends of said arms to the slide bars, a stationary tube extending for the length of the shaft within the lower horizontal channel of the frame and enclosing the same, bushings secured within the tube and through which the shaft extends, a gear secured at a midway point on the shaft, the tube being cut away adjacent said gear to expose the same, a housing attached to the frame, and manually-operated gearing therein in engagement with the gear on the shaft and adapted to impart rotative movements thereto.

5. In a window construction, a channel-shaped

5

window frame, slide bars housed in the side channels of said frame and vertically slidable therein, sashes mounted in the frame and adapted to seat when in closed positions against the forward edges of the walls of the channels, the slide bars being located to the rear of the sashes, rigid offset arms secured to the side edges of the sashes and pivotally attached at their ends to the slide bars, coupling links attached at one end to the frame and at the other end to the sashes, rollers secured to walls of the frame channels for holding the slide bars against forward movement out of the channels, an operating shaft housed in the lower portion of the frame and extending for substantially the length of said lower part of the frame, arms attached to the opposite ends of the operating shaft, operating links attached at one end to the ends of said arms and at the other end to the slide bars, a lengthy, relatively large-diameter torsion tube secured inside of the channel in the lower portion of the frame and constituting a housing for the operating shaft, bearings in the tube in which the shaft is rotative, a gear secured on the shaft and located substantially centrally of the shaft and centrally of the window frame, a gear-housing attached to the outside of the frame and containing gearing in engagement with the gear on the shaft, and a crank for operating said gearing.

6. The combination of a horizontal hollow sill with a center cutout in its front wall, an elongated horizontal drive shaft in the sill and having a driving gear exposed at said cutout, said sill also being elongated and substantially the same length as the shaft, and completely enclosing it end to end and concealing it therein, and a regulator including a box like housing adapted to be mounted in front of said sill at said cutout and open at its back and containing a gear means exposed at the open back of the housing and formed and positioned for automatically meshing with the front exposed part of the shaft driving gear through said sill cutout as said housing is mounted in front of said sill at said cutout, bearing rings surrounding said shaft and exposed at said cutout of the sill, and screws passing through the housing of said regulator at said cutout and threading into said bearing rings for relatively clamping said bearing rings and the shaft therein, the regulator housing and said sill, and additional bearing rings surrounding said shaft at ends thereof, and screws passing through said sill at ends thereof and threading into said end bearing rings for clamping said end bearing rings and the shaft therein to the ends of said sill.

7. The combination of a horizontal hollow sill with a center cutout in its front wall, an elongated horizontal drive shaft in the sill and having a driving gear exposed at said cutout, said sill also being elongated and substantially the same length as the shaft, and completely enclosing it end to end and concealing it therein, and a tube surrounding said shaft for its full length and having a cutout alined with the cutout of the sill to expose the driving gear, bearing rings

6

in said tube for journalling said shaft therein, and screws passing through said sill and tube and threading into said bearing rings for clamping said tube and the bearing rings therein and the shaft therein in place in said sill.

8. The combination of a horizontal hollow sill with a center cutout in its front wall, an elongated horizontal drive shaft in the sill and having a driving gear exposed at said cutout, said sill also being elongated and substantially the same length as the shaft, and completely enclosing it end to end and concealing it therein, and a regulator including a box like housing adapted to be mounted in front of said sill at said cutout and open at its back and containing a gear means exposed at the open back of the housing and formed and positioned for automatically meshing with the front exposed part of the shaft driving gear through said sill cutout as said housing is mounted in front of said sill at said cutout, and a tube surrounding said shaft for its full length and having a cutout alined with the cutout of the sill to expose the driving gear, bearing rings in said tube and exposed at its cutout, and screws passing through the housing of said regulator at and in front of said cutout, and threading into said exposed bearing rings for relatively clamping said tube, the bearing rings and shaft therein, the regulator housing, and said sill.

9. The combination of a horizontal hollow sill with a center cutout in its front wall, an elongated horizontal drive shaft in the sill and having a driving gear exposed at said cutout, and a regulator including a box like housing adapted to be mounted in front of said sill at said cutout and open at its back and containing a gear means exposed at the open back of the housing and formed and positioned for automatically meshing with the front exposed part of the shaft driving gear through said sill cutout as said housing is mounted in front of said sill at said cutout, the regulator housing back wall being so formed that it alines with and seats in said sill cutout, bearing rings surrounding said shaft and seating in seats formed in the back wall of the housing, and screws passing through said housing and said sill, and threading into said bearing rings for relatively clamping said bearing rings and said housing and said sill and for seating said bearing rings in the seats of said housing.

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