

Sept. 28, 1954

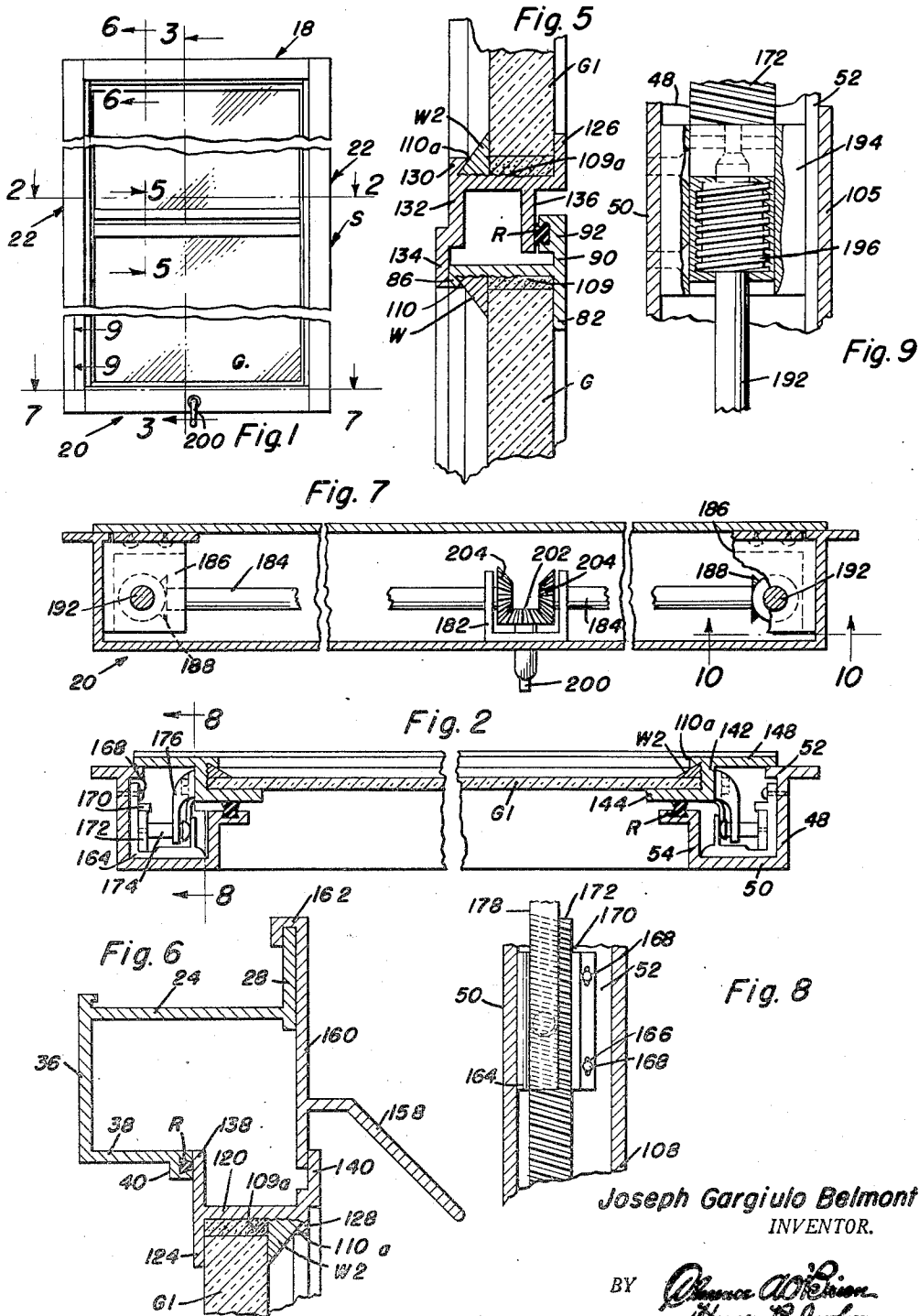
J. G. BELMONT

2,690,336

WINDOW OPERATING MECHANISM

Filed Dec. 12, 1950

3 Sheets-Sheet 1



Joseph Gargiulo Belmont
INVENTOR.

BY *Alfred A. DeLeon*
and *Harvey B. Jackson*
Attorneys

Sept. 28, 1954

J. G. BELMONT

2,690,336

WINDOW OPERATING MECHANISM

Filed Dec. 12, 1950

3 Sheets-Sheet 2

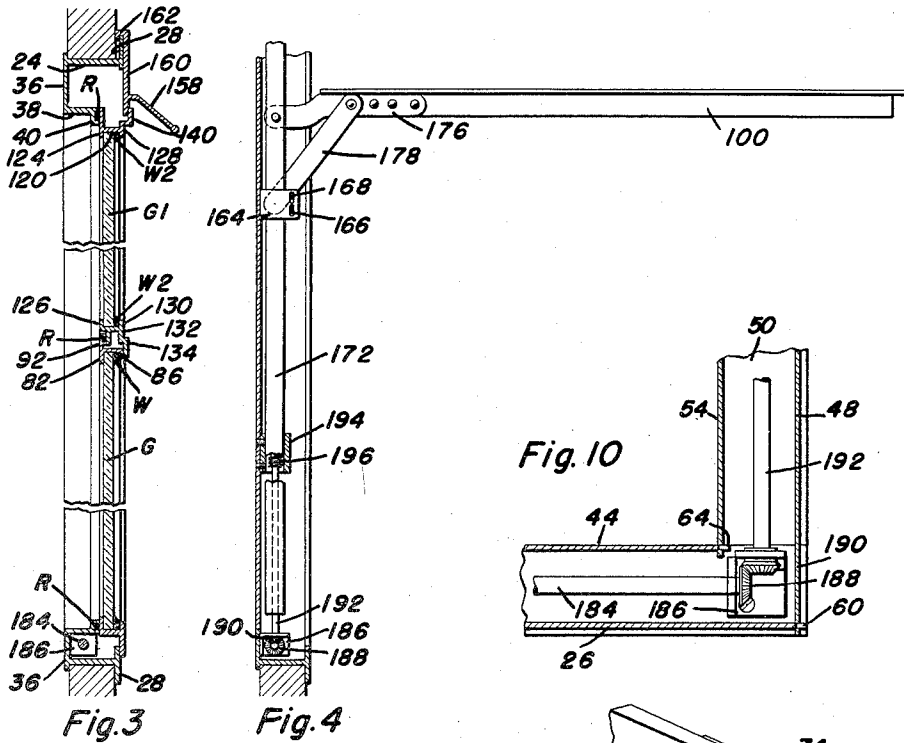


Fig. 10

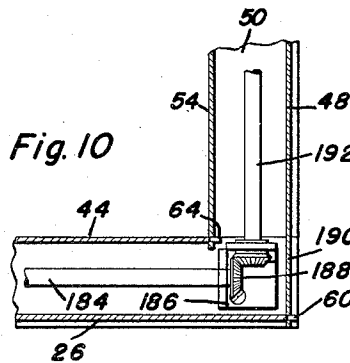
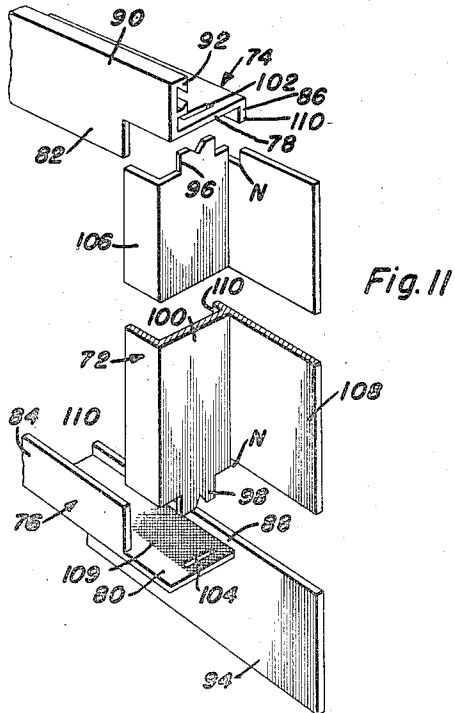


Fig. 11

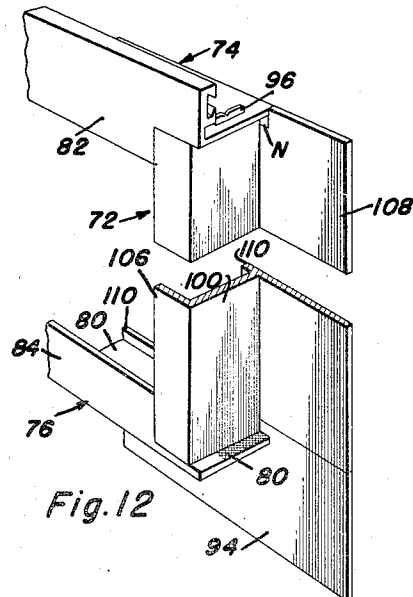


Fig. 12

Joseph Gargiulo Belmont
INVENTOR.

BY *Albion A. O'Brien*
and Harvey D. Jacobson
Attorneys

Sept. 28, 1954

J. G. BELMONT

2,690,336

WINDOW OPERATING MECHANISM

Filed Dec. 12, 1950

3 Sheets-Sheet 3

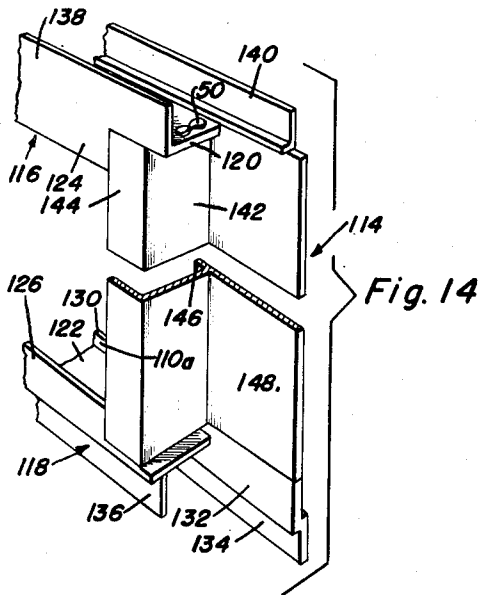
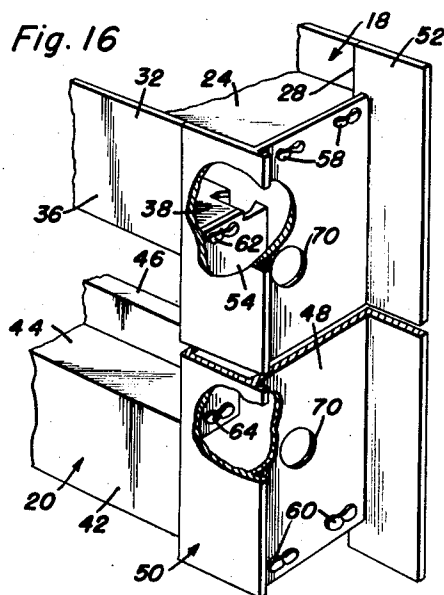
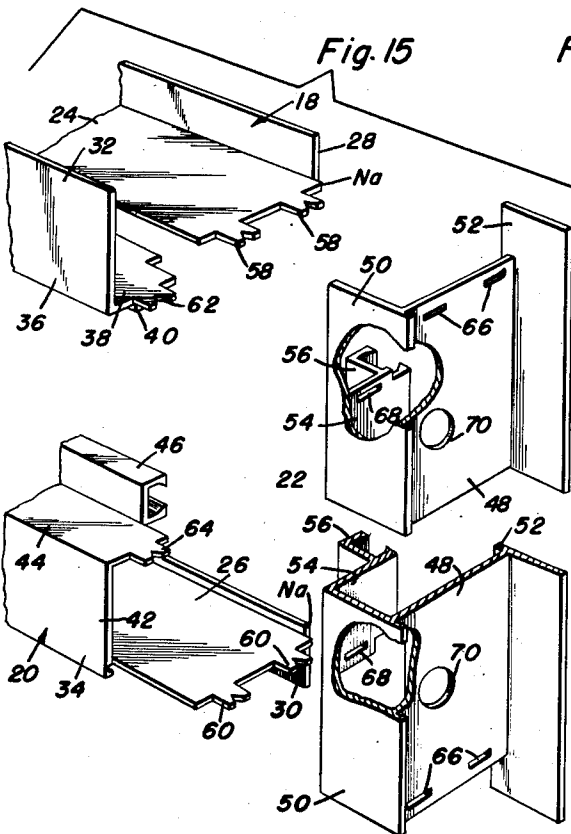
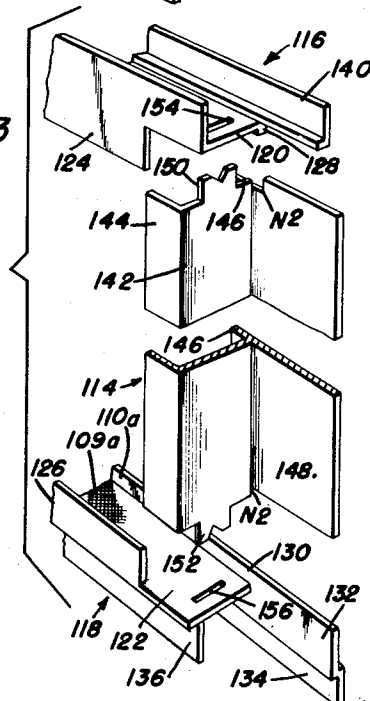


Fig. 13



Joseph Gargiulo Belmont
INVENTOR.

BY *Charles A. O'Brien*
and *Harvey E. Jacobson*
Attorneys

UNITED STATES PATENT OFFICE

2,690,336

WINDOW OPERATING MECHANISM

Joseph Gargiulo Belmont, Miami, Fla.

Application December 12, 1950, Serial No. 200,456

1 Claim. (Cl. 268—23)

1

This invention relates to new and useful improvements in window structures and more particularly to a window structure having novel and improved features over those disclosed in my U. S. Patents Nos. 2,383,912 and 2,478,044.

The primary object of the present invention is to provide a prefabricated window structure wherein the parts thereof are quickly and readily assembled in a convenient manner.

Another important object of the present invention is to provide a prefabricated window construction composed of extruded members and novel means for interlocking the members together.

Yet another object of the present invention is to provide a window sash so constructed as to receive wedge strips that will retain a pane of glass in the sash.

Another object of the present invention is to provide a window structure composed of a plurality of vertically swingable sashes, disposed one above the other, and embodying a unique sealing means between adjacent sashes.

Another object of the present invention is to provide a window structure including a plurality of vertically swingable window sections and a single operator crank for simultaneously actuating the sections.

Another object of the present invention is to provide a window structure of the aforementioned character having an extruded metal frame of minimum width in which the window section operator is housed.

A further object of the present invention is to provide a window structure involving guide brackets for the operating bars of the window sections which are manually adjustable from within the hollow frame and which are pivoted to the window sections to permit slight adjustment of the window sections relative to the frame when the window sections are raised.

A still further aim of the present invention is to provide a window structure of tested ability that is extremely simple and practical in construction, strong and reliable in use, and inexpensive to manufacture, assemble and install.

Other objects and advantages reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a broken front elevational view, partly in section, of a window structure con-

2

structed in accordance with the present invention;

Figure 2 is an enlarged horizontal sectional view taken substantially on the plane of section line 2—2 of Figure 1;

Figure 3 is an enlarged vertical sectional view taken substantially on the plane of section line 3—3 of Figure 1;

Figure 4 is a view similar to Figure 3 but showing the window sections raised;

Figure 5 is an enlarged detail vertical sectional view taken substantially on the plane of section line 5—5 of Figure 1;

Figure 6 is an enlarged detail vertical sectional view taken substantially on the plane of section line 6—6 of Figure 1;

Figure 7 is an enlarged horizontal sectional view taken substantially on the plane of section line 7—7 of Figure 1;

Figure 8 is an enlarged detail vertical sectional view taken substantially on the plane of section line 8—8 of Figure 2;

Figure 9 is an enlarged detail sectional view taken substantially on the plane of section line 9—9 of Figure 1 to show the manner in which the slide bars of the window sections are moved;

Figure 10 is an enlarged detail vertical sectional view taken substantially on the plane of section line 10—10 of Figure 7;

Figure 11 is a fragmentary group perspective view showing the manner in which the portions forming the bottom window section are assembled;

Figure 12 is a view similar to Figure 11 but showing the portions locked together;

Figure 13 is a fragmentary perspective view showing the manner in which the portions forming the top window section are assembled;

Figure 14 is a view similar to Figure 13 but showing the portions locked together;

Figure 15 is a fragmentary group perspective view showing the manner in which the top and bottom portions of the frame are connected to the vertical portions of the frame;

Figure 16 is a view similar to Figure 15 but showing the portions locked together.

Referring now to the drawings in detail, wherein for the purpose of illustration, there is disclosed a preferred embodiment of the present invention, the letter S represents the window structure generally, that is composed of a frame, window sections or sashes, an operating mechanism for selectively raising and lowering the window sections and a mounting means for each of the window sections.

The frame as illustrated best in Figures 15 and 16 is composed of upper and lower or top and bottom portions 18 and 20, also a pair of vertical portions 22. The portions 18, 20 and 22 are extruded from metal, preferably aluminum, and the portions 18 and 20 include webs 24 and 26, outer horizontal flanges 28 and 30, and inner horizontal flanges 32 and 34.

The flanges 32 and 28 extend upwardly from the web 24 and the flanges 30 and 34 depend from the web 26. The flanges 28 and 30 are considerably wider than the flanges 32 and 34 as shown in Figure 15 of the drawings. The flange 32 is provided with a depending extension or portion 36 that extends below the web 24 and its lower edge is turned under the web 24 to form a horizontal ledge 38 whose lower face is integrally formed with a channel 40 in which there is yieldingly retained a resilient sealing strip R.

The flange 34 is formed with an upstanding horizontal extension 42 whose upper portion is turned down to provide a lower horizontal ledge 44 the upper face of which is integrally formed with a channel 46 that will yieldingly receive a resilient sealing strip R.

The vertical portions 22 each include a web 48 and inner and outer vertical flanges 50 and 52. The outer vertical edges of the flanges 50 are turned inwardly to provide vertical ledges 54 whose outer faces are integrally formed with vertical channels 56 that will yieldingly receive resilient sealing strips R.

As illustrated in Figure 15, the ends of the flanges 32, 32, the ledges 38, 44 and the channels 46 are removed or provided with notches, also, the ends of the webs 48, the flanges 50, the ledges 54 and the channels 56 are removed or provided with notches so that the ends of the webs 24 and 26 will abut the webs 48, the flanges 32, 36, 34, 42 will abut the flanges 50, the ends of the ledges 38 and 44 will abut the ledges 54 and the ends of the channels 40 and 46 will abut the ends of the channels 56.

Means is provided for locking the horizontal portions 18 and 20 to the vertical portions 22. This means consists of pairs of tongues 58 and 60 at the ends of the webs 24 and 26 and tongues 62 and 64 at the ends of the ledges 38 and 44. The ends of the webs 48 are provided with slots 66 that receive the tongues 58, 60 and the ends of the ledges 54 are provided with slots 68 that receive the tongues 62, 64. The outer ends of the tongues 58, 60, 62, 64 are provided with V-notches that accommodate a suitable tool for peening the tongues against web 48 and ledges 54. The webs 48 are formed with openings 70 in registry with the slots 68 so that the peening tool may be engaged with the tongues 62 and 64.

The ends of the flanges 28 and 30 are notched sufficiently, as at Na, to permit the ends of the flanges 52 to be received therein when the vertical and horizontal portions are locked together to form the window frame partially illustrated in Figure 16.

Window sections

The number of window sections used in conjunction with the present invention varies according to the size of the frame and the width of the individual window sections. However, the window sections are quite similar in construction as illustrated in Figures 11, 12 and 13, 14 wherein the bottom or lower window section and the upper

or top window section, respectively, are shown in detail.

The lower window section (Figures 11, 12) consists of a pair of vertical portions 72 and upper and lower horizontal portions 74 and 76. Each of the portions 74 and 76 is substantially h-shaped in cross-section. The portions 74 and 76 include webs 78 and 80, inner horizontal flanges 82 and 84, and outer horizontal flanges 86 and 88. The flange 82 is provided with an upstanding horizontal extension or portion 90 that extends above the web 78 and whose outer face is formed with a horizontal channel 92 for receiving a resilient sealing strip R.

The flange 88 is formed with a depending horizontal extension or portion 94 that extends well below the web 80 to overlap the flange 30 of the lower frame portion 20.

Means is provided for locking the portions 72, 74 and 76 together and this means consists of tongues 96 and 98 at the upper and lower ends of the webs 100 of the vertical portions 72 that extend through slots 102 and 104 adjacent the ends of the webs 78 and 80. The tongues 96 and 98 are formed with V-notches that will receive a suitable tool for peening the tongues against the webs 78, 80.

The ends of the flanges 82, 84 are notched to permit the webs 78 and 80 to rest against the ends of the webs 100 and the ends of the inner vertical flanges 106. The outer vertical flanges 108 of the vertical portions 72 are provided with notches N that receive the ends of the flanges 86 and 88 when the portions 72, 74 and 76 are assembled and locked together. The flanges 82, 84 and 106 are flush with each other and the flanges 86, 88 and 108 are also flush with each other.

The marginal edges of a pane of glass G rest against the roughened surface 109 of the webs 78, 80 and 100 between the flanges 82 and 86, 84 and 88, and 72 and 108. The flanges 82, 86, 84, 88, 72 and 108 are each provided with longitudinal lips 110. Retaining strips or wedges W are forced under the lips 110 and against the pane of glass and the flanges 86, 88 and 108 to retain the glass relative to the sash and against the flanges 82, 84 and 106.

The upper sash or window section as shown in Figures 13 and 14 comprises a pair of vertical portions 114 and upper and lower horizontal portions 116 and 118. The upper and lower portions 116 and 118 include webs 120 and 122, inner horizontal flanges 124 and 126, and outer horizontal flanges 128 and 130.

The flange 130 is provided with a depending horizontal extension 132 that extends below the web 122 and which terminates in an offset 134 that will overlap the flange 86 of the portion 74 of the lower window section. Another flange 136 depends from the web 122 and will abut the sealing strip mounted in the channel 92 of the lower window section.

A horizontal offset extension 140 for the flange 128 rises from the web 120 for overlapping the flange 28 of the frame portion 18 and a horizontal extension 138 for the flange 124 extends above the web 120 for engaging the sealing strip carried by the channel 40 of the frame portion 18.

The vertical portions 114 include webs 142 and inner and outer vertical flanges 144 and 146, and the flanges 146 are provided with vertical extensions 148 that will engage the strips carried by the vertical channels 56 of the frame portions or stiles 22.

5

The ends of the flanges 124 and 126 are notched to permit the webs 120 and 122 to rest against the upper and lower ends of the webs 142 and flanges 144. The flanges 148 are formed with notches N2 that receive the ends of flanges 128 and 120.

Tongues 150 and 152 are provided at the upper and lower ends of the webs 142 and extend through slots 154 and 156 adjacent the ends of the webs 120 and 122. These tongues are provided with V-notches that receive a tool for peening the tongues against the webs 120 and 122 to lock the portions 114, 116 and 118 together.

A pane of glass G1 rests against the roughened surfaces 109^a of webs 120, 122 and 142 between the flanges 128 and 124, 126 and 130, and 144 and 146. Lips 110^a are provided on the flanges 128, 130 and 146 and retainer strips W2 are forced under the lips 110^a and retain the glass G1 against the flanges 124, 126 and 144.

Reference is directed to Figure 6 wherein there is disclosed a deflector or rain shield 158 that overhangs the upper window section and which is a part of a horizontal plate 160. The plate 160 is formed with a channel 162 at its upper edge that receives the upper edge of the flange 28 and the lower end of the plate 160 is secured against the inner face of the flange 140.

Window section mount

Channel brackets 164 are positioned in the vertical portions 22 and include vertical slots 166 that receive fasteners 168. The fasteners 168 are threaded in apertures provided in the flanges 48 as shown in Figures 2 and 8. Ribs 170 on the brackets 164 coact with the webs of the brackets in defining channels that slidably receive vertical rack bars 172.

Pivots 174 are secured to and project horizontally from the rack bars 172 and these pivots support the inner ends of links 176 whose outer ends are fixed to the webs 100 and 142 of the upper and lower window sections behind the flanges 108.

Pitmans 178 are terminally secured to the brackets 164 and the upper ends of the webs 100 and 142 so that as the rack bars are raised the window sections will be swung upwardly to their open position.

Operator

Means is provided for imparting vertical sliding movement to the rack bars and this means consists of a central bearing 182 secured to the web 26 of the frame bottom 20 that rotatably supports the adjacent inner ends of a pair of horizontal shafts 184. End bearings 186 mounted within the portion 20 rotatably support the outer ends of the shafts 184. The outer ends of the shafts 184 support beveled gears 188 that mesh with beveled gears 190 at the lower ends of two vertical shafts 192 which are mounted in the vertical portions 22 of the frame.

The upper ends of the vertical shafts 192 are rotatably supported in combined bearing and guide members 194 fixed within the portions 22 and support gears or worms 196 that mesh with the rack bars 172. The members 194 are formed with vertical channels that slidably receive the lower ends of the rack bars.

The central portion of the web 42 rotatably supports the shaft 198 of a crank handle 200. The shaft 198 carries a beveled gear 202 that meshes with beveled gears 204 on the inner ends of the shafts 184 so that as the crank handle is rotated in one direction the window sections will be raised whereas a rotation of the crank handle

6

in the opposite direction will effect a lowering of the window sections and the rack bars.

In practical use of the present invention, when the window sections are in their closed position the flanges 108, 148 and the ends of the flanges 94, 132 rest against the sealing strips carried by the channels 56, the flange 40 overlaps the plate 160, the flange 138 rests against the strip carried by the channel 40, the flange 136 rests against the strip carried by channel 90, the flange 134 overlaps the flange 86, the flange 94 overlaps the flange 30 and the flange 34, 42 rests against the strip carried by the channel 46.

As the crank handle 200 is manually operated, the rack bars 172 will slide vertically to impart swinging movement to the windows. The rack bars may be locked in a vertically adjusted position by any suitable means such as a lock preventing rotation of the crank handle.

Obviously, intermediate window sections may be mounted between the upper and lower window sections described with the upper horizontal portions of the auxiliary window sections constructed as the portion 74 and with the lower horizontal portions of the auxiliary window sections constructed similar to the portion 118.

It should be observed that the frame and window sash forming members or portions are of minimum width and that the window operator is concealed in the frame. Also the brackets 164 are vertically adjustable to compensate for shrinkage or warping of the window sections.

The window structure thus described may be shipped in sections and readily assembled on the job in a minimum time with few tools and requiring few workmen. Corking or a sealing compound may be employed about the frame and the opening in the building structure in which the frame is mounted.

In view of the foregoing description taken in conjunction with the accompanying drawings it is believed that a clear understanding of the construction, operation and advantages of the device will be quite apparent to those skilled in this art. A more detailed description is accordingly deemed unnecessary.

It is to be understood, however, that even though there is herein shown and described a preferred embodiment of the invention the same is susceptible to certain changes fully comprehended by the spirit of the invention as herein described and the scope of the appended claim.

Having described the invention, what is claimed as new is:

A window operator mechanism for windows of the type including a window frame and a plurality of sashes pivotally carried by a window frame for movement by said window operator mechanism, said window operator mechanism comprising a transversely extending horizontal shaft, means connected to said horizontal shaft for effecting selective rotation and positioning thereof, vertical shafts mounted at opposite ends of said horizontal shaft, intermeshing gears carried by adjacent ends of said vertical and horizontal shafts to effect rotation of said vertical shaft in response to rotation of said horizontal shaft, slide bars mounted for vertical sliding movement in alignment with said vertical shafts, each of said slide bars having a rack portion facing an adjacent one of said vertical shafts, worm gears on upper ends of said vertical shafts intermeshed with said rack portions to effect vertical movement of said slide bars in response to rotation of said horizontal shaft, said slide bars being

7

adapted to be pivotally connected to a plurality of window sashes.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,306,868	Tuomi -----	June 17, 1919
1,391,602	Abramson -----	Sept. 20, 1921
1,619,167	Tuomi -----	Mar. 1, 1927
1,648,584	Gaudard -----	Nov. 8, 1927
1,804,787	Kullmer -----	May 12, 1931
1,960,920	Plym -----	May 29, 1934

5

10

8

Number	Name	Date
2,252,634	Justason -----	Aug. 12, 1941
2,270,348	Rumney -----	Jan. 20, 1942
2,272,722	Morin -----	Feb. 10, 1942
2,327,246	Bunjes -----	Aug. 17, 1943
2,331,823	Baldock -----	Oct. 12, 1943
2,383,912	Gargiulo -----	Aug. 28, 1945
2,478,044	Gargiulo -----	Aug. 2, 1949
2,478,061	Stearns -----	Aug. 2, 1949
2,486,407	Hoffam -----	Nov. 1, 1949
2,552,298	Stiles -----	May 8, 1951
2,580,933	Larson -----	Jan. 1, 1952