July 9, 1957 H. L. HARDY 2,798,263

AWNING WINDOW

Filed Aug. 6, 1954 2 Sheets-Sheet 1

Fig. 1.

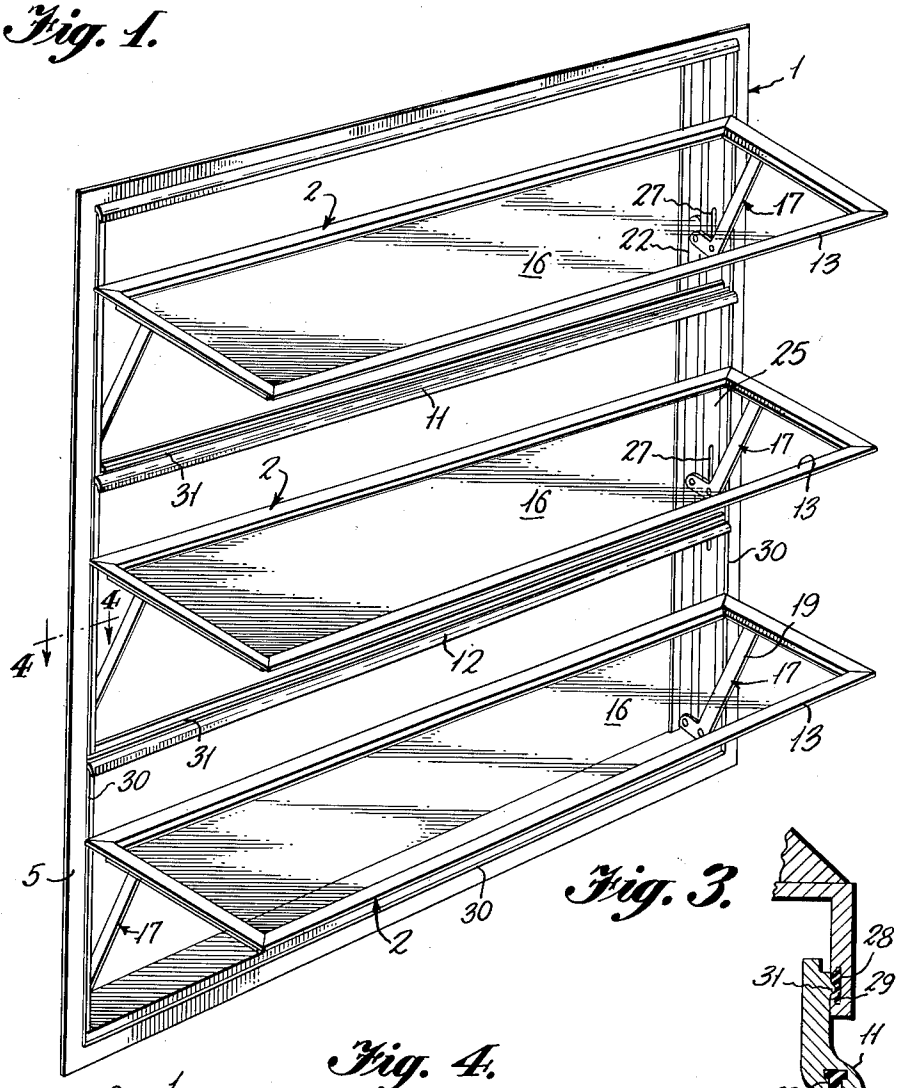


Fig. 3.

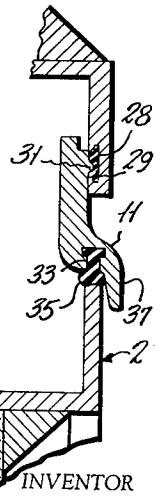
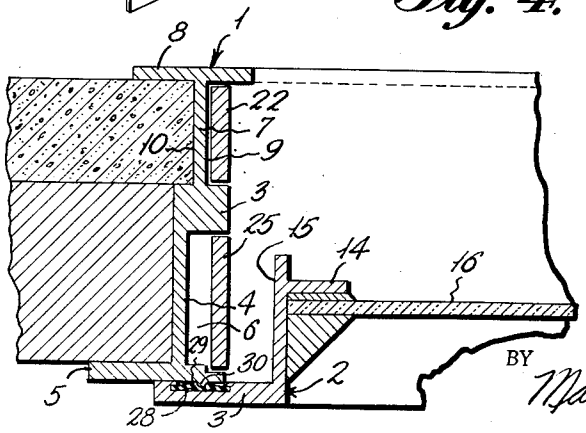


Fig. 4.



INVENTOR

H. Lynn Hardy

BY Mason, Fenwick & Lawrence

ATTORNEYS

July 9, 1957

H. L. HARDY

2,798,263

AWNING WINDOW

Filed Aug. 6, 1954

2 Sheets-Sheet 2

Fig. 2.

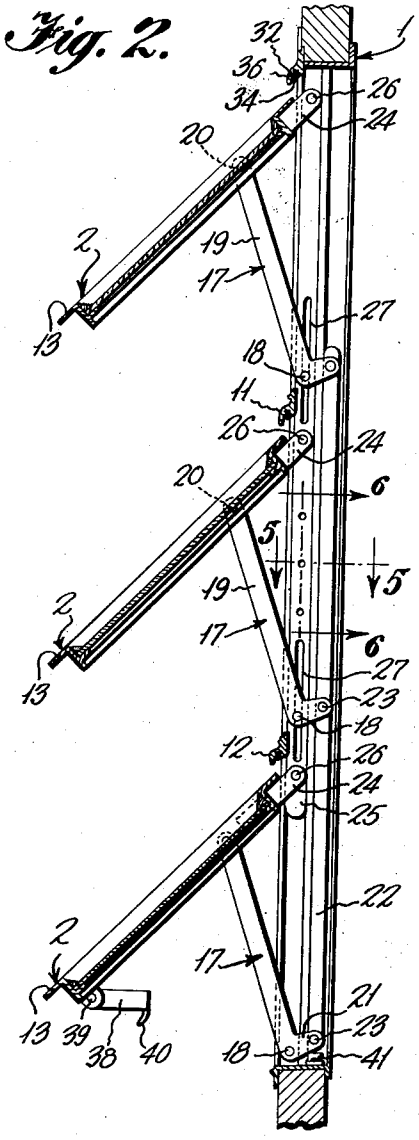


Fig. 5.

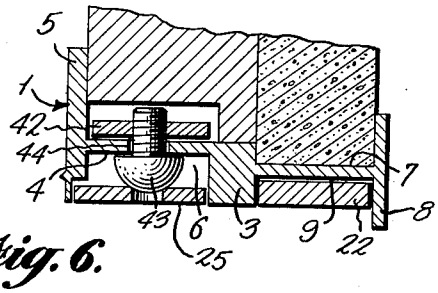
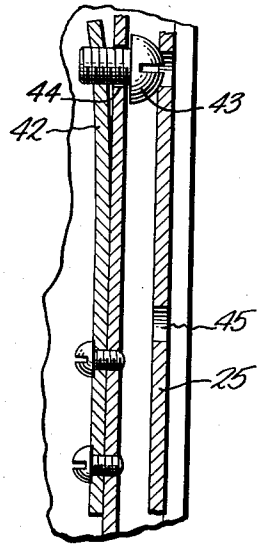


Fig. 6.



INVENTOR

H. Lynn Hardy

BY

Mason, Fenwick & Lawrence

ATTORNEYS

United States Patent Office

2,798,263

Patented July 9, 1957

2,798,263

AWNING WINDOW

Henry Lynn Hardy, Orlando, Fla.

Application August 6, 1954, Serial No. 448,225

11 Claims. (Cl. 20—42)

This invention relates to windows of the awning type wherein several sash in a vertical tier are mounted for simultaneous movement.

The advantages of this general type of construction are being increasingly appreciated, partly as a result of present popularity of metal sash. Prior windows of this type have had certain disadvantages, resulting to a large extent from the use of complicated structure to insure smooth operation or, where simplified structures are used, binding or jamming of the sash in operation. Former windows have not provided adequate sealing means so that they have not been air-tight and water-tight.

The primary object of the present invention is to provide an assembly which is very simple to install, easy to operate, efficient in preventing air and water infiltration and durable to insure long life.

A more specific object of the invention is to provide a window of the type indicated in which the various sash are interconnected by an improved link system whereby all of the sash can be operated by movement of one of them, and no braces or guides are necessary to provide sufficient strength and effectiveness in operation.

Another object is to provide such a window in which all of the sash can be locked in several open positions.

A still further object is to provide a window of this type having an improved seal which is placed under pressure when in use and held under constant pressure after initial contact, and which is protected from the elements to insure its resiliency and long life.

Yet another object of the invention is to provide a window incorporating means to determine the proper distance plaster is to extend on the inside frame of the window.

Other objects of the invention will become apparent from the following description of one practical embodiment thereof when taken in conjunction with the drawings which accompany, and form part of, this specification.

In the drawings:

Figure 1 is a perspective view of a window embodying the principles of the invention;

Figure 2 is a vertical section through the window shown in Figure 1;

Figure 3 is a fragmentary vertical section through one of the horizontal partitions of the window, showing portions of adjacent sash in position with respect thereto;

Figure 4 is a horizontal section through one of the side stiles of the frame and adjacent structure, and is taken substantially on the line 4—4 of Figure 1;

Figure 5 is a horizontal section through one of the side stiles, certain operating linkage and locking means therefor; and,

Figure 6 is a vertical section through the side stile, locking mechanism and associated control link.

In general, the invention consists of a metal window having a plurality of superimposed tiltable sash which are adapted to be moved simultaneously and bodily in equal amounts when any one sash is moved. The various

sash are connected by movable bars, and the sash may be locked in several open positions by means of suitable locking mechanism arranged for engagement with one of the movable bars. Movement of the sash into a vertical plane will cause parts of the sash to contact cooperating elements carried by the frame to seal each of the sash along all four edges.

Referring to the drawings in detail, the window shown comprises a rectangular frame **1** in which a plurality of superimposed sash **2** are mounted. The number of sash to be employed is a matter of choice, and the proportions and dimensions may be selected as desired. The frame **1** is formed of metal, such as aluminium, and the top, bottom and sides will have similar cross-sections.

The central portion **3** of the frame cross-section is thickened to provide a rigid member, or post, extending completely around the frame. A web **4** extends outwardly from the center post **3** and carries the outer frame **5** which engages the outer surface of the wall in which the window is installed. It will be noted that the web **5** projects in the plane of one edge of the central post **3**, and this web, with the projecting portions of the center post and the rearward extension of the frame **5**, forms a channel **6** to receive one of the movable bars, as will be described. A second web **7** extends inwardly from the center post **3** and is integral with an inner flange **8** which is adapted to lie against the inner wall surface. Web **7** projects centrally from the center post **3** and, with the inward extension of the flange **8**, forms a channel **9** to receive another of the movable bars. On the opposite side of this web the indentation **10** will provide a guide for the plaster layer, to insure its proper thickness and a neat joint between the plaster layer and the window frame.

Frame **1** is divided into vertically arranged sections by means of cross bars **11** and **12**, which extend horizontally between the side stiles of the frame. These cross bars with the frame members define the openings into which the sash **2** fit.

Each sash is rectangular and may be formed of aluminum of Z cross-section. The outer peripheral flanges **13** are adapted to overlie the outer flange **5** of the main frame when the sash are in vertical, or closed, position. The inner flanges **14** with the connecting webs **15** form a rabbet to receive the glass panes **16** in usual fashion.

Each sash is connected to the main frame **1** by means of a pair of bell crank levers **17**. The bell cranks are pivotally connected to the webs **4** of the side stiles of the frame, as at **18**, and have the outer ends of their long arms **19** pivotally connected, as at **20**, to the connecting webs **15** of the sides of the sash. The short arms **21** are connected at their ends to a link bar **22** which is positioned vertically in the channel **9**. The connections between the short arms and link bar are indicated at **23**. As all of the bell cranks **17** are pivoted to the main frame and each has its short arm connected to the link bar **22**, synchronous movement will be imparted to all of them when any one is moved. Straps **24** are provided at the sides of the sash near their upper ends and project beyond the upper ends of the sash for pivotal connection to slide bars **25**, vertically positioned within the channels **6**. The pivotal connections between the straps **24** and the slide bars are shown at **26**. Each slide bar is provided with elongated slots **27** to receive the pivots **18** of the bell crank levers so that the slide bars may move freely in a vertical direction. By having the upper ends of the sash connected to the slide bars, all of the sash will move simultaneously.

When the sash are in closed position and it is desired to open them, one of them will be pushed outwardly near its bottom, which will cause the bell cranks to rock about their pivots. As the bell cranks connected

to the sash being moved rock, their motion will be transmitted to the other bell cranks by means of the link bar. Due to the fact that the bell cranks are pivoted to the fixed frame, the pivotal connection between the long arms of the bell cranks and the sash will move on an arc having the pivotal point of the bell crank as its center. Thus, the movement of the sash at its connection to the bell crank will be outward and downward. This movement could not be possible if the upper ends of the sash had fixed pivotal connections to the frame. As the sash are connected to the slide bar, and the slide bar is free to move, it will move downwardly carrying the upper edges of the sash with it. Because of this arrangement very little movement of the bell cranks and the link and slide bars is required to achieve considerable movement of the sash. It will be noted that the movements of the link and slide bars are in opposite directions. By tieing the pivots **26** together, uniform and simultaneous movement of the sash is assured. The movement of each sash exerts its influence upon the others. This prevents binding such as would occur if the pivots were not connected but each moved independently in its own slot.

Means are employed to provide a tight seal between the sash and the frame when the sash are in vertical, or closed, position. It has been mentioned that the side peripheral flanges **13** of the sash overlie the flanges **5** of the main frame when the sash are closed. The bottom section of the peripheral flange **13**, in like manner, overlies the flange at the bottom of the frame or the cross-bars **11** and **12** depending upon the position of the sash in the frame. The inner surface of the sash flange on the sides and bottom of the sash are provided with a channel **28**, into which is fitted a longitudinally corrugated sealing member **29**. One of the grooves of the member **29** is adapted to receive ribs **30** and **31** which are formed on the frame **1** and cross-bars **11** and **12** respectively. When the sash are closed the ribs fit in the grooves and form an airtight seal along the sides and bottom of the sash.

The top seal is quite different in construction. The top member of the frame **1** and the lower portions of the cross-bars **11** and **12** have identical constructions to seal the top edges of the sash. The lower portions of the frame top and the cross-bars are off-set forwardly of the plane of the sash when in closed position, and provided with the longitudinally extending grooves **32** and **33** which are in the closed plane of the sash. Resilient sealing members **34** and **35** are seated in the grooves and project downwardly beyond the grooves. It is contemplated that the sealing strips **34** and **35** will have greater thickness than the width of the grooves and will be under compression when in position in the grooves. Due to the fact that the sealing members are in the closed plane of the sash, they will be contacted by the upper edge of the sash as the sash swings inward and upward in moving to closed position. The sealing members project sufficiently beyond the grooves so that they will be engaged by the sash flange before the sash is fully closed, and put under pressure as the sash moves to closed position. This will seal the top edge of the sash and complete the sealing around the sash perimeter.

In order to protect the sealing members **34** and **35** from deterioration by the elements, the top frame member and the cross-bars are provided with the downturned lips **36** and **37**. The lips are spaced far enough outward to permit widthwise expansion of the sealing members **34** and **35** under compression, and project downwardly below the bottom of the sealing members when uncompressed. This prevents rain and sunlight from reaching the sealing members. The particular mounting of the sash will cause them to swing inward to permit their top edges to pass beneath the bottoms of the lips and then slide upwardly into engagement with the sealing members.

As the bottom sash will usually be the most convenient to use as the operating sash, it is shown as having an operating handle **38** having a pivotal connection **39** to the sash. The handle has a hooked end portion **40** adapted to engage a latch member **41** fixed to the bottom frame member to lock all of the sash in closed position.

In order to hold the sash in various selected open positions, a releasable holding mechanism is employed. This consists of a leaf spring **42** of desired strength having one end rivetted, or otherwise secured, to the outside of one of the side members of the frame. A stud, or other projection, **43** is provided on the free end of the leaf spring and projects through an opening **44** in the web **4** of the frame. The stud may be headed and have a threaded shank so that it can be inserted from inside the frame and threaded into the leaf spring. The headed portion of the stud is adapted to seat into openings **45** in the slide bar to hold the sash in desired positions. As the stud is spring pressed into the opening, its latching action can be released by pulling or pushing the operating handle of the lower sash.

It is believed that the above description clearly sets out the operation of the window so that no detailed recapitulation is thought necessary. It will be evident that the operation of the device will be quite smooth as all movements of the several sash will be transmitted to all others through the link and slide bars. The sealing means will assure that leakage will be prevented when the sash are closed.

In the above, one practical embodiment of the invention has been disclosed, but it will be understood that the structure shown and described is merely by way of example, and may be varied within the scope of the appended claims.

What is claimed is:

1. In a window of the awning type wherein several sash are mounted in a vertical tier for simultaneous movement, a frame, a plurality of bell-cranks pivoted to the sides of the frame and each having one arm pivotally connected to one of said sash, a link bar to which the other arms of said bell cranks are pivotally connected, and slide bars to which the upper corners of said sash are pivotally connected.

2. In a window as claimed in claim 1, means to hold the sash in positions of adjustment.

3. In a window as claimed in claim 1, means on the sides and bottom of said sash and companion interfitting means on the frame to seal the sides and bottom of said sash when in closed position, and compressible means carried by said frame above the top of each of said sash and engageable by the top edge of said sash to seal the top edges of the sash when the sash are closed.

4. In a window of the awning type wherein several sash are mounted in a vertical tier for simultaneous movement, a rectangular frame, horizontal cross-bars bridging said frame at spaced points to form a plurality of rectangular openings to receive the sash, a bell-crank pivotally mounted upon said frame at either side of each of said openings near the bottom thereof, a link bar at each side of said frame pivotally connected to one arm of each of the bell-cranks on that side, said sash being pivotally connected to the other arms of the bell-cranks on that side, a slide bar on each side of said frame having pivotal connection to said sash near the upper corners of said sash.

5. In a window of the awning type as claimed in claim 4, means to hold the sash in positions of adjustment.

6. In a window of the awning type as claimed in claim 4, said slide bars having openings spaced longitudinally therealong, spring actuated members to releasably engage the openings in said slide bars.

7. In a window of the awning type as claimed in claim 4, said slide bars having openings spaced longitudinally therealong, spring actuated means to releasably engage

the openings in said slide bars, and means to latch one of said sash in closed position.

8. In a window of the awning type as claimed in claim 4, companion engageable means on said sash and said frame and cross bars to seal said window when said sash are closed.

9. In a window of the awning type as claimed in claim 4, means on the sides and bottom of said sash and companion interfitting means on the frame and cross bars to seal the sides and bottom of said sash when said sash are closed, and compressible means carried by said frame and cross bars above the top of each of said sash engageable by the top edge of said sash to seal the top of the sash when the sash are closed.

10. In a window of the awning type as claimed in claim 9, said frame and cross bars adjacent said compressible means having lips overhanging said compressible means to protect the compressible means from the elements.

11. In a window of the awning type as claimed in claim 10, said frame and cross bars being offset in the region of the compressible members and having grooves in the plane of the sash when closed to receive the compressible means which are in the form of strips.

References Cited in the file of this patent

UNITED STATES PATENTS

2,620,523	Broleman	Dec. 9, 1952
2,639,791	Grist	May 26, 1953
2,690,336	Belmont	Sept. 28, 1954