Dec. 6, 1949 E. G. FISHER 2,490,295

COMBINED WINDOW UNIT AND BLIND CONSTRUCTION

Filed Nov. 26, 1946

FIG. 1

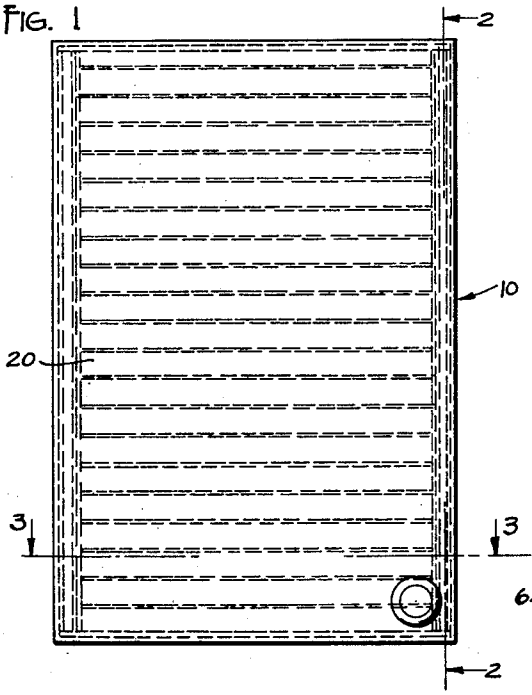



FIG. 2

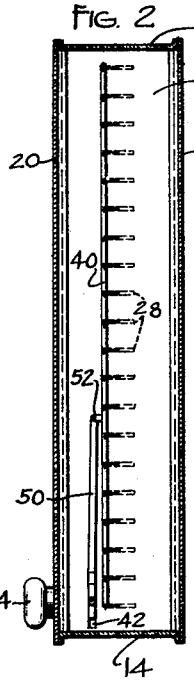



FIG. 5

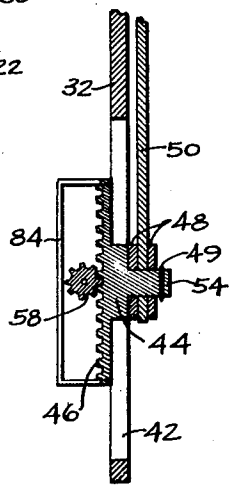



FIG. 3

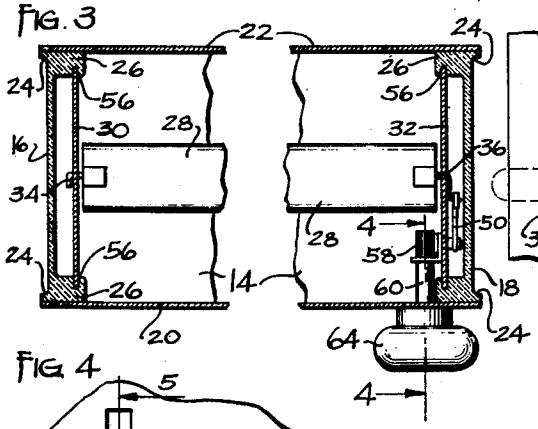



FIG. 6

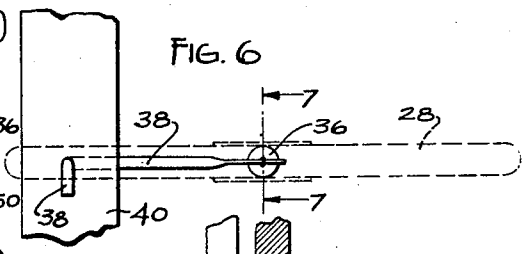



FIG. 7

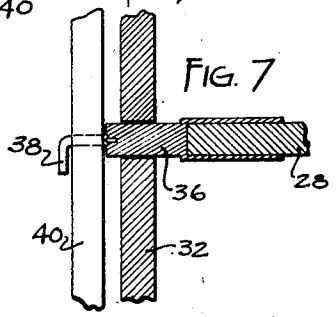
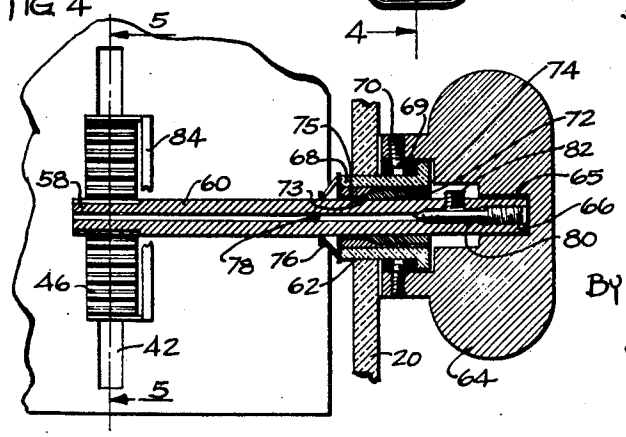



FIG. 4




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## COMBINED WINDOW UNIT AND BLIND CONSTRUCTION

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5 Claims. (Cl. 20—56.5)

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The present invention relates generally to assembled window units and more particularly to a window unit comprising spaced, sealed and partially evacuated glass panes including a Venetian type blind therebetween and with a blind operator projecting therefrom.

Although windows of the multi-glazed, blind-enclosing type are known in the prior art, none of these has completely or satisfactorily solved the problem of providing such a construction wherein the interior sides of the panes will not cloud due to condensation, and wherein the interior of the unit as a whole, and particularly the blind slats, is maintained free from dust and dirt particles so as to eliminate cleaning thereof.

Accordingly, the chief object of the present invention is to provide a sealed and evacuated multi-glazed, blind-enclosing window unit, the interior of which will be entirely free from dust, dirt particles or moisture so that once incorporated in a building structure, it will function to exclude heat and light in accordance with the manual adjustment of the blind slats and without requiring disassembly for cleaning or other maintenance purposes.

An important object of the present invention is to provide a method of assembling a multi-glazed, adjustable, blind-enclosing window which may then be delivered as a completed integral unit ready for installation in a wall opening or the like.

Another important object of the present invention is to provide a novel seal for a rotatable shaft controlling the slat adjustment of an evacuated multi-glazed, blind-enclosing window unit, so as to prevent the entrance of air, moisture or dirt between the panes.

A further important object of the present invention is to provide novel means for evacuating the area within a sealed, multi-glazed blind-enclosing window unit.

A still further important object of the present invention is to provide a sealed, multi-glazed, blind-enclosing window unit having a combined blind operator and evacuator valve projecting therefrom.

A further object of the invention is to provide a seal for the rotatable control shaft of a blind-containing window unit of the type described wherein part of the seal forms the bearing for the shaft.

Other objects and advantages of the present invention will become apparent during the course of the following description.

In the drawings I have shown a preferred embodiment of my invention, in which:

Fig. 1 is a front elevation of the window unit comprising my invention;

Fig. 2 is a vertical sectional view thereof taken on the line 2—2 of Fig. 1;

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Fig. 3 is a horizontal sectional view thereof to an enlarged scale taken on the line 3—3 of Fig. 1;

Fig. 4 is a vertical sectional view to a further enlarged scale of the combined blind operator and evacuating valve and the seal therefor, taken on the line 4—4 of Fig. 3;

Fig. 5 is a vertical sectional view to an enlarged scale of rack and pinion operating means, taken on the line 5—5 of Fig. 4;

Fig. 6 is a view in end elevation of a blind slat and its connection to the vertical operating bar; and

Fig. 7 is a vertical sectional view thereof taken on the line 7—7 of Fig. 6.

Referring now to the drawings, numeral 10 designates the glass window unit as a whole, which comprises identical channel-shaped top and bottom closure members 12 and 14, identical side supporting members 16 and 18, and a pair of face plates 20 and 22 of plate glass or a similar material having transparent, distortion-free characteristics so as to provide unimpaired visibility.

The face plates 20 and 22 are fused in a conventional manner to the glass closure members 12 and 14, as well as to the glass supporting sides 16 and 18, so that the assembled unit will retain a partial vacuum. It will be noted that the sides include small outwardly projecting flanges 24 and large inwardly projecting flanges 26 in spaced parallel relation. The faces 20 and 22 are fused to the flanges 24 and to the flanges of the closures 12 and 14 to provide a pair of spaced continuous flanges at the edges of the faces. A recess is thus provided in the sides, top and bottom of the unit and affords a means for securing it within a wall opening by cement or mortar.

The blind assembly is supported on the bottom closure member 14 and comprise a plurality of parallel horizontally disposed slats 28 pivotally mounted in a pair of side members 30 and 32 by means of bearing members 34 and 36. A crank arm 38 is fixed to each bearing 36 and extends toward the front of the edge of the slat where it is connected to a bar 40. Thus vertical movement of the bar will effect a simultaneous rotary adjustment of each slat through an arc of almost 90 degrees in either direction.

The side 32 of the blind assembly is provided with a vertical slot 42 for the reception of a rectangular bearing 44 which is fixed to or integral with a rack 46. The bearing is retained in the slot by the rear face of the rack and by washers 48 of greater diameter than the width of the slot. A link 50 is pivotally connected at its upper end to a lug 52 on the bar 40 and at its lower end to a stud 54 on the rack bearing 44 by means of a cotter pin 49. The link 50 is spaced from the side 32 by one of the washers 48 and thus avoiding frictional contact.

The blind assembly described is adapted to be slidably inserted within the window unit 10. The large flanges 26 are each provided with opposed vertically extending slots 56 for the reception of the lateral edges of the sides 30 and 32 (Fig. 3). The blind assembly may be inserted from either the top or bottom end of the window unit, either of which is subsequently fused to the other parts of the unit as described.

The rack 46 is operated by a pinion 58 (Figs. 3, 4 and 5) cut on the inner end of a hollow shaft 60 which projects through an aperture 62 in the face 20 of the window unit. The shaft 60 is rotated by means of a control knob 64 having a squared recess 65 which receives the squared outer end 66 of the shaft. A flanged glass collar 68 is sealed in the aperture 62 as by fusing. In order to prevent the transmittal of other than turning stress to the shaft 60, the knob 64 is given a bearing on the collar 68 through a split ring 69 and retained in position by set-screws 70.

An elongated annular sealing ring 72, which is tapered at its rear end as at 73 is sweated to the hollow shaft 60 while a mating, coextensive annular sealing ring is sweated within and to the glass collar 68 and includes a horizontal portion 74 and a tapered portion 75. The mating horizontal portions 72 and 74 constitute a bearing which prevents non-torsional stress from turning the shaft 60 or decreasing the effectiveness of the tapered portions 73 and 75 forming the seal. The portions 73 and 75 are strongly urged together by a resilient spider washer 76 acting against the rear end of the collared sleeve 68 and a cotter key 78 extending through the shaft.

Preferably, the sealing members 72—75, which cooperate to effectively seal the control shaft aperture 62 so as to maintain a partial vacuum within the window unit, are formed of a lubricant-bearing metal.

The bore or conduit formation of the hollow shaft 60, through which the unit is evacuated, is closed from outside by a needle valve 80 after evacuation through a lateral port closed by the screw plug 82.

During adjustment of the slats 28, the pinion 58 is prevented from overrunning the rack 46 by means of an enclosing guard 84 fixed to the rack. This guard also supports and maintains the pinion 58 in mesh with the rack and prevents strain on the seal.

The multi-glazed, blind-enclosing window unit 10 described is well adapted for assembly line methods of mass production as will be apparent from the following. The top 12, the sides 16 and 18, the rear face 22 and the front face 20 are all placed in properly abutting position and fused together. A blind unit is assembled and the edges of sides 30 and 32 slidably inserted upwardly in the opposing pairs of slots 56. Next, an assembled control shaft and seal unit is carefully placed in the face 20 in the aperture 62 and the pinion 58 meshed with the rack 46. After this is done, the bottom 14 is fused in its proper place.

The unit is preferably partially evacuated to the predetermined strength of the glass after installation in order to relieve all pressure strain on the glass during the handling and installation process. The evacuating is readily accomplished by detaching the blind control knob 64, removing the valve port plug 82 and evacuating through the port when the needle valve 80 is backed off (to the right in Fig. 4). These parts are returned to the position shown when the partial evacuation is completed.



It will now be readily apparent that the blind is completely enclosed and sealed within the window unit and thus permanently free of dirt or grime as is also the blind control mechanism. Accordingly, these parts need not be of heavy or cumbersome construction. The blind slats may be constructed of any suitable material resistant to sunlight.

The partial evacuation of the window unit further eliminates the formation of moisture on the inaccessible interior surfaces and substantially lowers the rate of heat transmission through the unit. The sealing of the blind assembly within the unit also eliminates the need of unsightly lubricants in the bearing surfaces and greatly retards their tendency to corrode, due to the elimination of moisture and air.

It is to be understood that the form of the invention which has been shown and described is to be taken as a preferred example of the same and that various changes in the shape, size, and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

I claim:

1. A multi-glazed window unit comprising top, bottom, side, and face members forming an enclosure, said side members including slotted inwardly projecting flanges, a blind assembly including supporting end members mounted in said slots within said enclosure, a bar connecting the slats of said blind for simultaneous adjustment, a rack slidably mounted on one of said end members, a link connecting said bar and said rack, and operating means projecting within said enclosure and engaging said rack for adjustment of said blind.

2. A multi-glazed window unit comprising top, bottom, side, and face members forming an enclosure, said side members including slotted inwardly projecting flanges, a blind assembly including supporting end members mounted in said slots within said enclosure, a bar connecting the slats of said blind for simultaneous adjustment, a rack slidably mounted on one of said end members, a link connecting said bar and said rack, operating means projecting within said enclosure and engaging said rack for adjustment of said blind, and rotary sealing means fixed to said operating means and said unit for preventing the entrance of air and moisture into said enclosure.

3. In a multi-glazed window unit including a slatted blind therein and having a rack for adjustment of the blind slats, said window unit being provided with an aperture therein, a bearing mounted in said aperture, a hollow control shaft fixed in said bearing and having a squared outer end and a gear-shaped inner end for operative engagement with said rack, a valve closing the outer end of said shaft, and an operating knob fixed to said squared end and rotatable to effect an adjustment of said blind slats.

4. In a multi-glazed window unit including a slatted blind therein and having a rack for adjustment of the blind slats, said window unit being provided with an aperture therein, a bearing mounted in said aperture, a hollow control shaft fixed in said bearing and having a squared outer end and a gear-shaped inner end for operative engagement with said rack, a valve closing the outer end of said shaft, an operating knob fixed to said squared end and rotatable to effect an adjustment of said blind slats, and a guard fixed to said rack to prevent disengagement of the gear-shaped shaft end therefrom.

5. In a multi-glazed window unit including a slatted blind therein and having a rack for adjustment of the blind slats, said window unit being provided with an aperture therein, a bearing collar mounted in the aperture, a control shaft mounted in said collar and having a squared outer end and a gear-shaped inner end for operative engagement with said rack, and an operating knob cooperating with said squared end and rotatably bearing on said collar for effecting an adjustment of said blind slats.

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## REFERENCES CITED

The following references are of record in the file of this patent:



UNITED STATES PATENTS

| Number | Name | Date |
|---|---|---|
| 546,256 | Stewart | Sept. 10, 1895 |
| 1,336,211 | Duffy | Apr. 6, 1920 |
| 1,931,723 | Fageol et al. | Oct. 24, 1933 |
| 2,179,763 | Smolowitz | Nov. 14, 1939 |
| 2,213,468 | Haven | Sept. 3, 1940 |
| 2,239,528 | Knudsen | Apr. 22, 1941 |
| 2,281,071 | Knudsen | Apr. 28, 1942 |
| 2,288,465 | Knudsen | June 30, 1942 |
| 2,340,411 | Chorpenning | Feb. 1, 1944 |
| 2,404,690 | Caserta | July 23, 1946 |
| 2,415,222 | Spencer | Feb. 4, 1947 |