

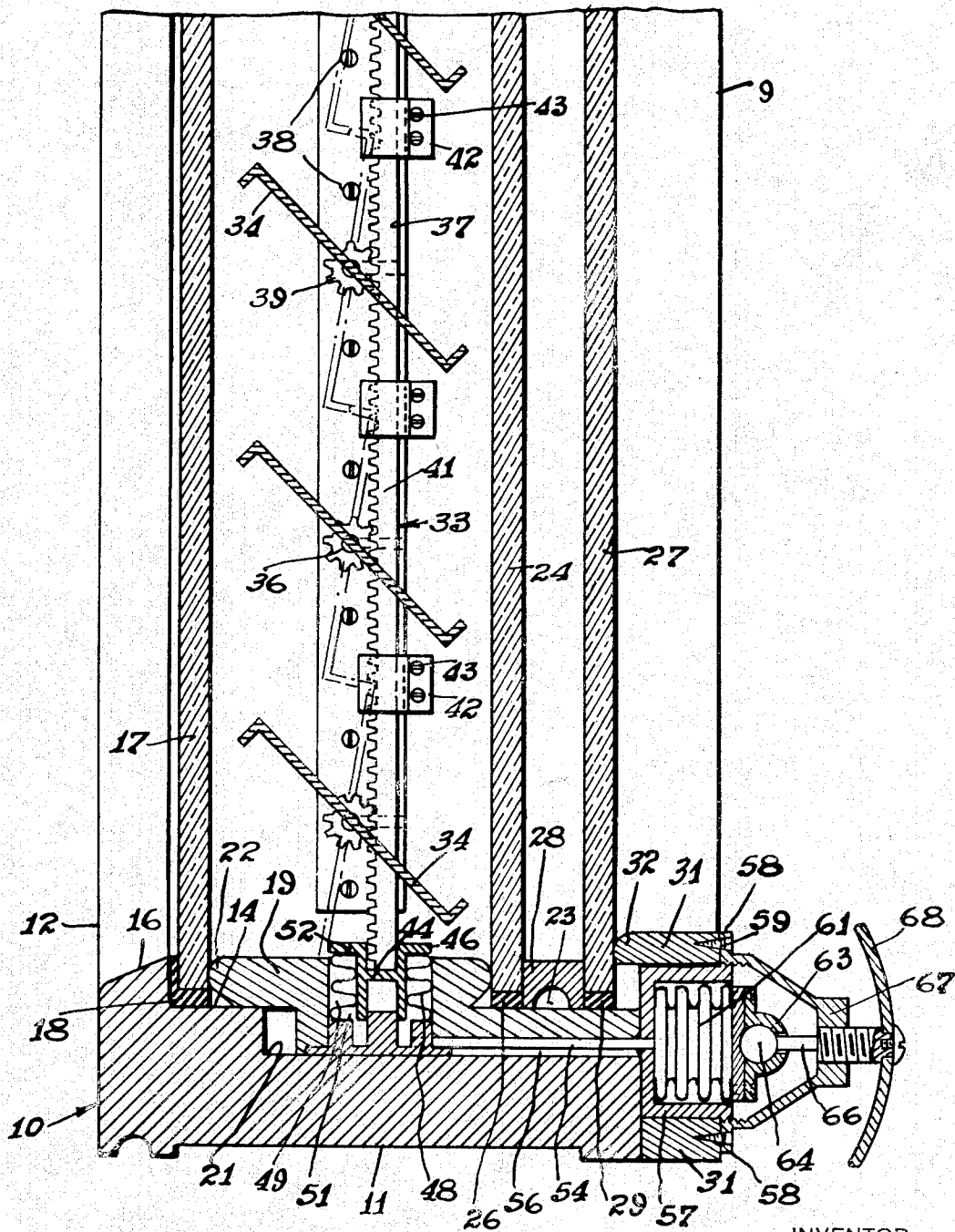
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WINDOW CONSTRUCTION

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WINDOW CONSTRUCTION

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The present invention relates to window constructions and notably to window constructions of the double or multiglazed type.

One object of the invention is to provide a simple and efficient mechanism for adjusting a screen or shade construction disposed between the glass plates in a multiglazed window.

A second object of the invention is to provide a mechanism of the foregoing type which, after installation, does not give access of air to the interior of the window, with which it is employed.

These and other objects of the invention will be apparent from consideration of the following specification and the appended claims.

It has heretofore been recognized that conventional windows involving a single plate or pane of glass were relatively inefficient barriers to the transmission of heat to or from the interior of buildings in which they were installed. For example, the outer surface of the glass, during cold weather, became chilled and in turn caused chilling of the atmosphere within the buildings in which the windows were employed. Conversely when the atmosphere without the buildings was warmer than the air within the buildings heat was transmitted from the exterior to the interior.

In order to obviate this type of heat transfer it has been proposed to provide windows having a plurality of sheets or panes of glass so spaced with respect to each other as to form insulative dead air spaces. By use of this type of construction heat losses by conduction and convection were substantially reduced.

Although multiglazed windows involving two or more spaced plates of glass substantially reduce transmission of heat by conduction or convection, they do not constitute satisfactory barriers to radiant heat to which the glass is transparent. One conventional method of excluding this type of heat has involved the provision of screens or shades secured within the building in which the windows are employed. By use of such screens the amount of light transmitted can be regulated fairly satisfactory. However, the screens act as collectors of dust and, moreover, in warm weather they become heated by radiant heat absorbed and, in turn, heat the indoor air. Of course after the heat once gains access to the interior of a building, it cannot be removed except by refrigerating apparatus or other cooling devices. For this reason it is preferable to intercept it before it gains access to the interior.

The present invention involves as one feature,

provision of a multiple glazed window structure embodying a system of adjustable louvers sealed in the dead air space between the sheets of glass, and including a closed fluid actuated system by means of which the louvers may be adjusted without admitting air to the space.

For a better understanding of the invention reference may now be had to the accompanying drawing in which like numerals refer to like parts throughout and in which the figure is a cross-sectional view taken transversely of the plane of a window unit embodying the invention.

In the form of the invention shown, a building or room having walls 9 is provided with a window embodying a suitable frame 10, including a transverse sill portion 11 connected to jamb portion 12. The remaining portions including the second jamb and the lintel, since they are similar, have not been shown.

The cross-sectional contour of the frame sections is exemplified by the sill 11 and comprises a rabbeted portion 14 providing a shoulder 16 to prevent outward displacement of the marginal portions of an outer plate 17 of glass. Preferably the edges or margins of the glass are cushioned from contact with the frame by means of a layer 18 of rubber, mastic or other suitable sealing material.

The plate 17 is maintained upon the rabbeted portion 14 by means of a spacer bar 19 resting upon a second stop 21 of the rabbet 14. The bar 19 also includes a lip 22 which projects outwardly to engage the inner surface of the glass 17, thus maintaining the latter in position.

Bar 19 is further rabbeted along its inner edge as indicated at 23, to provide a seat for a second sheet 24 of glass, which is insulated from direct contact with the bar by means of a suitable layer 26, of sealing material. If desired, the construction may further embody a third sheet 27 of glass, also resting upon the rabbeted portion 26 of the bar 19 and being maintained in spaced parallel relation with respect to the sheet 24, by means of a spacer bar 28, of wood, rubber, or any other suitable material. Sheet 27 is insulated from direct contact with the seat portion in the bar 19 by means of a layer 29 of material corresponding to the layer 26. The spaces between the sheets 17, 24 and 27 are sealed from the atmosphere by the layers 18, 26, and 29.

The assembly of glass plates may be clamped in place in the frame 10 by means of plate 31, which may be formed of metal, or as shown in the drawings, of wood. This bar is secured to the inner face of the frame by screws (not

shown) or any other convenient fastening device, and is provided with an outwardly-projecting lip 32 adapted to engage the exposed face of the plate 27.

It will be noted that sheets or plates 17 and 24 are sufficiently spaced to accommodate a louver construction 33 embodying horizontal bars 34, which are so spaced that when they are closed their edges overlap. These bars, at their extremities, are provided with axially disposed pintles 36, having bearings in a vertically-disposed metallic bar, or plate 37, which is secured to the jamb section 12 by means of screws 38. Pintles 36 are, also, provided with pinions or gears 39 rigidly secured thereto and engaging corresponding teeth upon a vertically-disposed rack bar 41. The rack or bar is guided and maintained in a vertical path by means of suitable bracket 42 secured to the jamb section 12 by means of screws 43.

At its lower extremity, it rests in a depression 44 in head 46 of an accordion-like bellows or diaphragm 47 termed a sylphon, which is formed of thin, flexible, brass or other suitable metal having pleats or corrugations 48 designed to permit a substantial degree of axial extension of the construction. The bellows extends into an opening 49 in bar 22 and at its lower extremity is provided with a closure or bottom 51 which may rest upon the upper face of sill section 11 and tightly seals the opening. Contact of the rack bar 41 provides an operative mechanical connection between bellows 46 and bars 34 for rotation of the latter upon extension of the bellows. If desired, the head 46 of the bellows may be guided in its vertical movement by means of a downwardly-extending tubular boss 52 secured thereto and mating with an upwardly-extending boss 53 upon the upper face of the closure 51.

Fluid for actuating the bellows is admitted by means of a conduit 54 extending through an opening in the closure 51 and being disposed in a groove or opening 56 in the bar 22. The inner extremity of the tube extends through the bottom of a bushing 57 which is embedded in an opening in the clamping bar or strip 31 and which is provided with a peripheral flange 58 resting upon the outer face of the strip and being secured thereto by means of screws 59. The bushing houses, and also closes, one end of a second pleated bellows 61 substantially corresponding to the bellows 47 already described. The bellows is further closed by a head 62 to which is secured a socket 63 that receives a ball 64 of an actuating stem 66. The stem is outwardly threaded through a bracket 67 approximately of U-shape, which is formed integrally with or otherwise secured to the flange 58. At its extremity the stem is provided with a suitable knob or hand-wheel 68 by means of which it may be rotated to actuate the head 62 of the bellows 61 inwardly, or outwardly, to inflate or deflate the latter.

Bellows 47 and 61 and the connecting tube 54 are filled with a suitable fluid medium, such as glycerol, glycol, or other non-freezing liquid. Accordingly, when it is desired to actuate the rack bar 41 upwardly or downwardly, it is merely necessary to rotate knob or hand-wheel 68, thus inflating or deflating the bellows 61. The latter operation in turn injects or withdraws fluid from the bellows 48, thus inflating or deflating the latter. As the head 46 is actuated upwardly or downwardly by fluid within the bellows, rack bar 41 is correspondingly actuated, and in turn

causes simultaneous rotation of the gears 36. The louver bars 45 may thus be rotated to any desired position to control the radiation passing through the window. When the bars are perfectly horizontal in plane, light and radiant heat passes through almost without obstruction. However, when bars are tilted approximately to vertical position as indicated in dotted line in the drawing, substantially all light and radiant heat is excluded.

It will be apparent that the bars 34 may be coated upon one face with a reflective material such as an aluminum paint and upon the opposite face with an absorptive material, e. g., a black paint. Therefore, when it is desired to exclude heat from entrance into the building in which the construction is employed, the reflective side may be faced outwardly, thus reflecting the heat to the exterior and preventing its entrance into the building. If it is desired to prevent radiation losses from the building the bars may be faced the opposite direction, in order to reflect heat inwardly.

It will be apparent that the construction as shown is relatively simple of design. It will also be apparent that the chambers or spaces between the glass plates in the construction are substantially sealed from the external atmosphere, thus preventing the entrance of dust and moisture, which would tend to cloud or obscure the interior faces of the glass, and which in the case of dust might be deposited upon the louver bars 34. The pleated tubes or bellows 47 and 61 together with the connecting tube 54 provide means for the control of the rack bar 41, which means is operable without in any way giving access of air to the interior of the construction.

The form of the invention herein disclosed is to be regarded as exemplary. It will be apparent that numerous modifications may be made therein without departure from the spirit of the invention, or the scope of the following claims.

What I claim is:

1. A multiple glazed window construction embodying a sash frame including jamb sections at the sides thereof and transverse sections connected thereto, inner and outer spaced sheets of glass disposed in the frame and having their edges sealed in the frame to provide a sealed dead air chamber, horizontal louver bars having pintles at opposite ends journaled at the sides of the frame, pinion gears upon the pintles, a rack bar engaging the gears, one of said transverse sections having an opening formed therein contiguous to an extremity of said rack bar and means for reciprocating the bar, which means comprises an extensible diaphragm disposed to seal the opening formed in the transverse section and having an operative connection with the rack bar to reciprocate the latter and means for extending and retracting the diaphragm for reciprocatingly operating the rack bar.

2. A multiple glazed window construction embodying a sash frame including jamb sections at the sides thereof and transverse sections connected thereto, inner and outer spaced sheets of glass disposed in the frame and having their edges sealed in the frame to provide a sealed dead air chamber, horizontal louver bars having pintles at opposite ends journaled at the sides of the frame, pinion gears upon the pintles, a rack bar engaging the gears, one of said transverse sections having an opening formed therein contiguous to an extremity of said rack bar and means

for reciprocating the bar, which means comprises an extensible diaphragm disposed to seal the opening formed in the transverse section and having an operative connection with the rack bar to reciprocate the latter and means for extending and retracting the diaphragm for reciprocatingly operating the rack bar, said means for expanding and retracting the diaphragm including a second diaphragm connected through the opening with the first diaphragm, by a fluid sealed connection, whereby expansion or retraction of the second diaphragm causes fluid pressure to be transmitted to the first.

3. A multiple glazed window construction embodying a sash frame including jamb sections at the sides thereof and transverse sections interconnecting the jamb sections, inner and outer spaced sheets of glass disposed in the frame and having their edges sealed in the frame to provide a sealed chamber, horizontal louver bars disposed in parallel relation in the chamber and being supported by means permitting individual rotation of the bars about individual vertically spaced longitudinal axis, and means interconnecting the bars for simultaneous rotation, one of said sash frame sections being provided with an opening formed therein, an extensible diaphragm disposed to seal the opening and having an operative connection with said means for simultaneously rotating the bars and means for extending and retracting the diaphragm for ac-

tuating the latter means, said means for extending and retracting the diaphragm including a second diaphragm connected through the opening with the first diaphragm by a fluid sealed connection, whereby expansion or retraction of the latter diaphragm causes fluid pressure to be transmitted to the second diaphragm.

4. A multiple glazed window construction embodying a sash frame including jamb sections at the sides thereof and transverse sections connected thereto at the top and bottom, inner and outer spaced sheets of glass disposed in the frame and having their edges sealed in the frame to provide a sealed dead air chamber, horizontal louver bars having pintles at opposite ends journaled in the jamb sections at the sides of the frame, a vertically disposed, bar-like actuating member operatively interconnecting the louver bars for tilting movement in unison about their pintles, one of said transverse sections having an opening formed therein contiguous to an extremity of said actuating member, and means for reciprocating the latter member, which means comprise an extensible diaphragm disposed to seal the opening formed in the transverse section and having an operative connection with the actuating member to reciprocate the latter and means for extending and retracting the diaphragm.

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