

Dec. 12, 1961

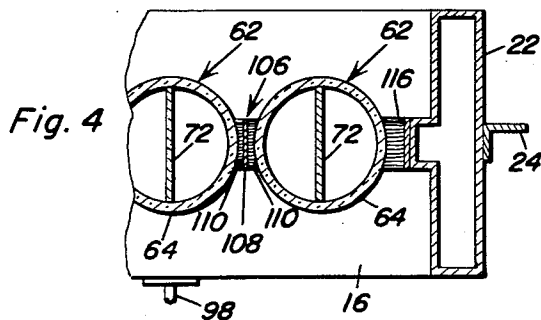
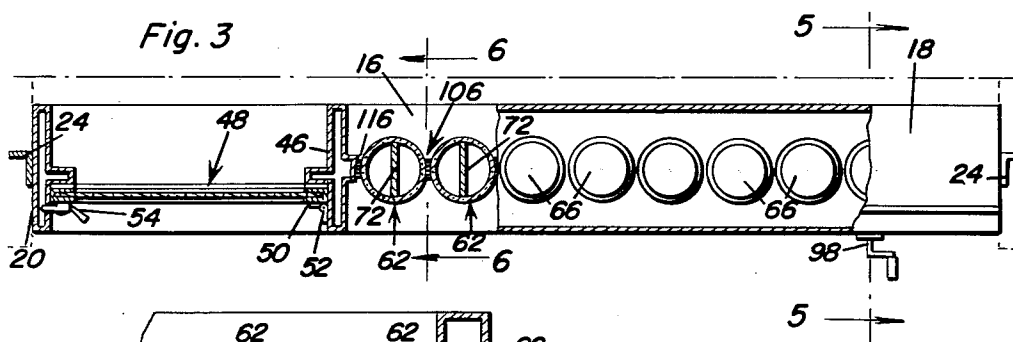
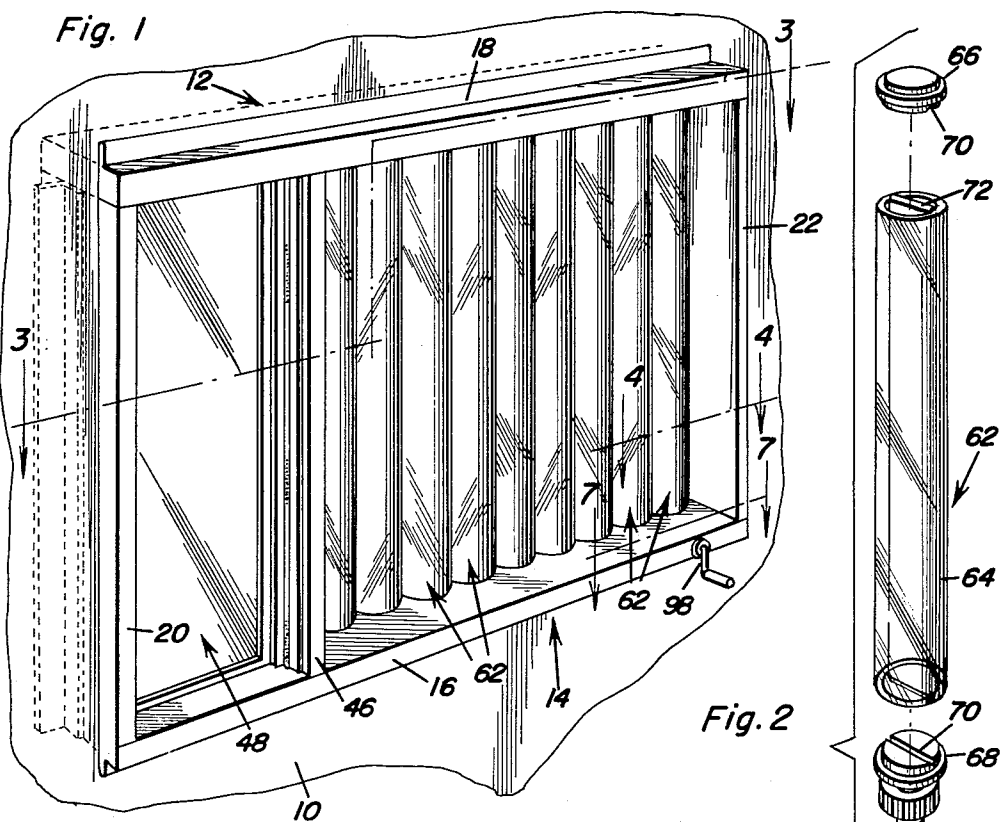
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3,012,294

SOLAR WINDOW CONSTRUCTION

Filed Jan. 14, 1959

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Fig. 5

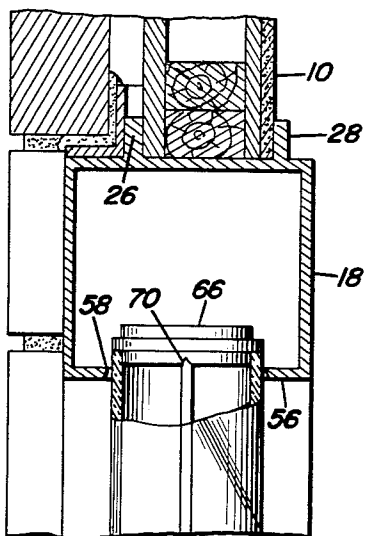


Fig. 6

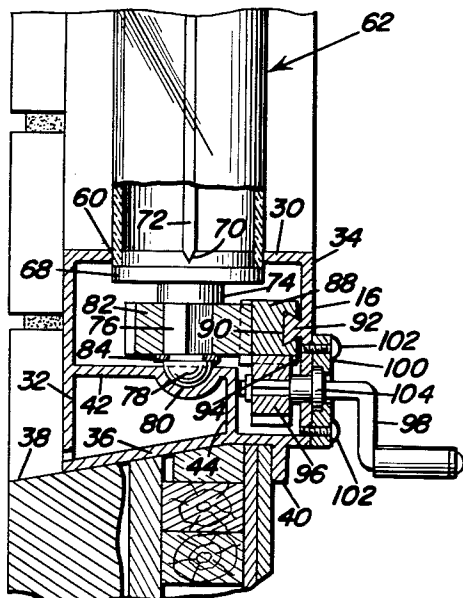
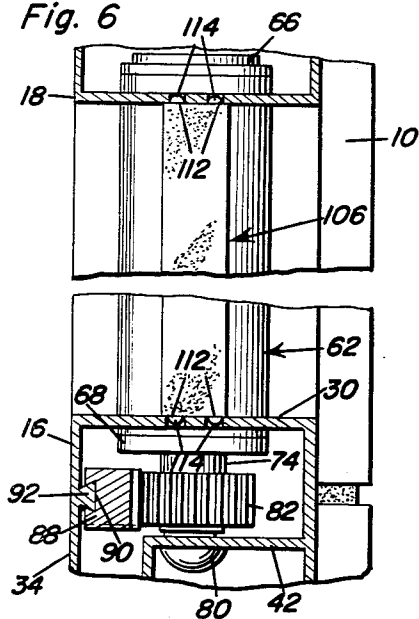
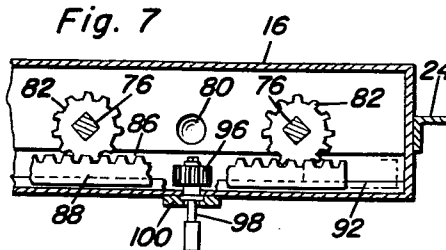


Fig. 7



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SOLAR WINDOW CONSTRUCTION

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1 Claim. (Cl. 20—62)

This invention relates in general to new and useful improvements in window construction, and more specifically to a window which is of the solar type.

The window construction as is now known includes panes which are either fixed or which are mounted in movable frames, such as sash frames. Associated with such windows are Venetian blinds or other types of shades which must be pulled in order to control the flow of light into a room. While the Venetian blinds are normally of a light color and thus reflect the light, no provisions have been made for the absorption of heat by the shades in the wintertime.

It is therefore the primary object of this invention to provide a solar window construction which window construction is of such a nature whereby the desired light may pass through the window at such time as light is desired and at the same time the window may function as a shutter with the shutter being of such a nature so that it either may reflect light and heat or may absorb the light and heat.

Another object of this invention is to provide a combined shutter and window structure, the shutter portion of the window structure including slats which are provided with a reflective coating on one surface thereof and with a dark light absorbing structure on the opposite surface thereof so that the window construction may selectively be of a nature to reflect the heat and light or retain the heat and light.

Another object of this invention is to provide a window construction which is formed of a plurality of tubular transparent members which are mounted in a frame for rotation, the tubular members being sealed with respect to each other to prevent the influx of air and having mounted therein strips which may be disposed normal to the plane of the window and thus permit the desired infiltration of light, or may be disposed parallel to the plane of the window and thus form a shutter to exclude light.

A further object of this invention is to provide an improved window construction which includes a frame having mounted therein for rotation a plurality of tubular members, the tubular members being formed of transparent material so as to permit the influx of light, and there being mounted within the tubular members strips which function as shutters, the strips having a reflective coating on one side thereof and a light absorbing coating on the opposite side thereof whereby the strips, when functioning as a shutter, may either reflect light and heat or absorb such light and heat.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a perspective view of the window construction which is the subject of this invention, as viewed from the interior thereof and shows generally the details of the window construction;

FIGURE 2 is an exploded perspective view of one of the tubular members with the end plugs thereof removed;

FIGURE 3 is an enlarged horizontal sectional view taken substantially upon the plane indicated by the section line 3—3 of FIGURE 1 and shows the general arrangement of the component parts of the window;

FIGURE 4 is an enlarged fragmentary sectional view

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taken substantially upon the plane indicated by the section line 4—4 of FIGURE 1 and shows the manner in which weatherstripping seals the individual tubular members with respect to each other;

FIGURE 5 is an enlarged fragmentary vertical sectional view taken substantially upon the plane indicated by the section line 5—5 of FIGURE 3 and shows the manner in which the tubular members are mounted and the manner in which they are driven so as to be rotated, an intermediate portion of the window construction being broken away;

FIGURE 6 is an enlarged fragmentary vertical sectional view taken substantially upon the plane indicated by the section line 6—6 of FIGURE 3 and shows further the details of the window construction including the mounting of a weatherstripping element, an intermediate portion of the window construction being broken away; and

FIGURE 7 is an enlarged fragmentary sectional view taken substantially upon the plane indicated by the section line 7—7 of FIGURE 1 and shows the manner in which the tubular members are rotated.

Referring now to the drawings in detail, it will be seen that there is illustrated in FIGURE 1 a wall 10 in which there is mounted the window construction which is the subject of this invention, the window construction being referred to in general by the reference numeral 12. The window construction 12 includes a window frame which is referred to in general by the reference numeral 14.

The window frame is formed of suitable frame members including a sill 16, a header 18, and a pair of jambs 20 and 22. As is best illustrated in FIGURE 3, the jambs 20 and 22 are of a tubular construction and have secured to the exterior surface thereof a vertically extending angle member 24 so as to anchor the jambs 20 and 22 in the wall 10.

Referring now to FIGURE 5 in particular, it will be seen that the header 18 is of a box-type construction and has projecting upwardly therefrom a pair of mounting flanges 26 and 28 for the purpose of mounting the header 18 in the wall 10. The mounting flange 26 is mounted within the wall 10 whereas the mounting flange 28 defines a trim along the upper surface of the header 18.

The sill 16 is also of a box-type construction and includes a top flange 30, an outer vertical flange 32, an inner vertical flange 34 and a bottom flange 36. The bottom flange 36 is slightly angular in cross-section so as to conform to the downwardly and outwardly slope of the sill 38 of the wall 10. Also extending downwardly from the bottom flange 36 adjacent the inner edge thereof is a mounting rib or flange 40 which is flush with the inner surface of the wall 10. Extending inwardly from the outer flange 32 is a horizontal flange 42 which terminates at its inner end in face relation from the inner flange 34 in a vertical flange 44 which is connected to the bottom flange 36.

Referring now to FIGURES 1 and 3 in particular, it will be seen that the left half of the window construction 12 is set off by a vertical partition member 46 and that the left portion of the window frame 14 is closed by a sash 48. The sash 48 has a frame 50 which is hingedly connected to the partition 46 by means of suitable hinges 52 and is retained in a closed position by means of a latch 54. Thus the desired ventilation may be obtained by opening the sash 48.

The header 18 includes a bottom flange 56 which is formed with a plurality of longitudinally spaced circular openings 58. The top flange 30 of the sill 16 is also provided with a plurality of circular openings 60 which are longitudinally spaced and which are vertically aligned

with the opening 53. Extending between the sill 16 and the header 18 and rotatably journaled in the openings 60 and 58 are window elements which are referred to in general by the reference numeral 62. Each of the window elements 62, as is best shown in FIGURE 2, includes a transparent tubular member 64 which has the upper end thereof closed by an upper plug 66 and the lower end thereof closed by a lower plug 68. The plugs 66 and 68 are provided with aligned slots 70 disposed in opposed relation in which there are positioned the ends of an elongated strip 72. The strip 72 extends substantially the full length of the tubular member 64 and is disposed diametrically thereof. At this time it is pointed out that the strips 72 may be of any desired construction, one side thereof will have light reflective qualities whereas the opposite side thereof will be dark and have light absorption qualities.

As is best shown in FIGURE 5, the plug 68 has a lower extension 74 which includes a non-circular cross-sectional intermediate portion 76 and a semi-spherical lower end 78. The semi-spherical lower end 78 is seated in a semi-spherical seat 80 formed in the flange 42 in alignment with a respective one of the openings 60. It is to be understood that the window elements 62 are held in place by their own weight and may be removed by merely sliding them upwardly into the shutter 18 until such time as the lower end of the extension 74 clears the sill 16 and then tilts them at a slight angle so as to withdraw them from the header 18. For that reason, the openings 58 are of a frusto-conical outline.

Carried by the non-circular cross-sectional portion 76 of each extension 74 is a gear 82. The gear 82 is held in place by means of a locking ring 84. The gears 82 are in meshed engagement with vertically disposed teeth 86 of a horizontally disposed rack bar 88. The inner surface of the rack bar 88 has a dovetail slot 90 extending longitudinally thereof receiving a dovetail projection 92 extending outwardly from the inner flange 34 of the sill 16, as is best shown in FIGURE 5. Thus the rack 88 is mounted for sliding movement within the sill 16.

The rack 88 also has lower teeth 94 with which there is meshed a drive gear 96 carried by a crank 98. The crank 98 is rotatably journaled in a retainer 100 secured to the inner surface of the inner flange 34 by means of fasteners 102 and holding the crank 98 in place by means of engagement with a collar 104 on the crank 98. Thus as the crank 98 is rotated, the rack 88 will be shifted longitudinally of the sill 16. The longitudinal shifting of the rack 88 will result in the driving of the gears 82 and the resultant rotation of the window elements 62.

Referring now to FIGURES 4 and 6 in particular, it will be seen that disposed intermediate each of the window elements 62 is a weatherstripping 106. The weatherstripping 106 has a central core 108 and sealing elements 110 extending from opposite sides thereof and engaging the tubular members 64. The weatherstripings 106 are held in place by projections 112 when the ends of the cores 108, the projections 112 being seated in suitable openings 114 formed in the opposed flanges of the sill 16 and the header 18. Thus the window elements 62 are sealed against the influx of air therebetween. Also, suitable weatherstripping 116 is carried by the jamb 22 and the partition 46 to form a seal with the endmost ones of the window elements 62.

When it is desired that light be admitted through the window elements 62, they are so rotated whereby the strips 72 thereof are disposed in parallel relation normal to the plane of the window construction 12, as is best shown in FIGURE 3. On the other hand, when it is desired to reduce or shut-off the influx of light, the window elements 62 are rotated so that the strips 72 are either in alignment or approach alignment. At this time the strips 72 function as a shade or shutter. Inasmuch as one surface of the individual strips 72 is of a

highly reflective nature, it will be seen that when this surface is disposed outermost, preferably in the summertime, heat and light is reflected and thus coolness of the room of which the wall 10 is a part is maintained. On the other hand, in the wintertime the light absorbing surface of the individual strips 72 may be disposed outermost with the result that the light and heat striking the strips 72 will be absorbed by the strips and transmitted into the room.

From the foregoing, it will be readily apparent that there has been devised a highly desirable window construction which incorporates all of the features of a window and a shutter or blind. Furthermore, the details of the elements which function as the shutter or blind are such that the shutter or blind may be selectively used for the purpose of reflecting light or heat or absorbing light or heat to maintain the desired temperature within the room of which the window construction is a part.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

A solar window construction comprising a frame including a pair of vertically spaced frame members, a plurality of transparent tubular members extending between and individually removably and rotatably supported by said frame members in closely spaced relation, at least one opaque strip disposed within at least some of said tubular members and extending between spaced portions of the inner surfaces of corresponding ones of said tubular members thereby dividing each of said tubular members having a strip disposed therein into at least two separate compartments, said opaque strips each including opposite sides having different heat reflecting properties, weatherstripping extending and removably secured between said frame members intermediate adjacent tubular members for sealing adjacent tubular members to each other, and drive means operatively connected to said tubular members and including an actuator for simultaneously rotating said tubular members, a pair of end plugs removably secured in the opposite ends of at least each of said some of said tubular members, the confronting ends of each pair of end plugs including non-circular recess means, the opposite end portion of each opaque strip removably seated in the corresponding recess means, the lowermost of said frame members including means journaling, preventing downward axial movement of and enabling free upward axial movement of the lower ends of said some of said tubular members, the uppermost of said frame members defining a plurality of openings rotatably journaling the upper ends of said some of said tubular members, said openings being frusto-conical in outline whereby said some of said tubular members may be raised to move the lower ends thereof out of engagement with said journaling means carried by said lowermost frame member and laterally displaced at the lower ends whereby said tubular members may then be lowered from within said openings in order to remove said some of said tubular members from said frame.

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