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W. E. TOURTELOTTE

2,628,391

WINDOW CONSTRUCTION

Filed Oct. 26, 1949

2 SHEETS—SHEET 1

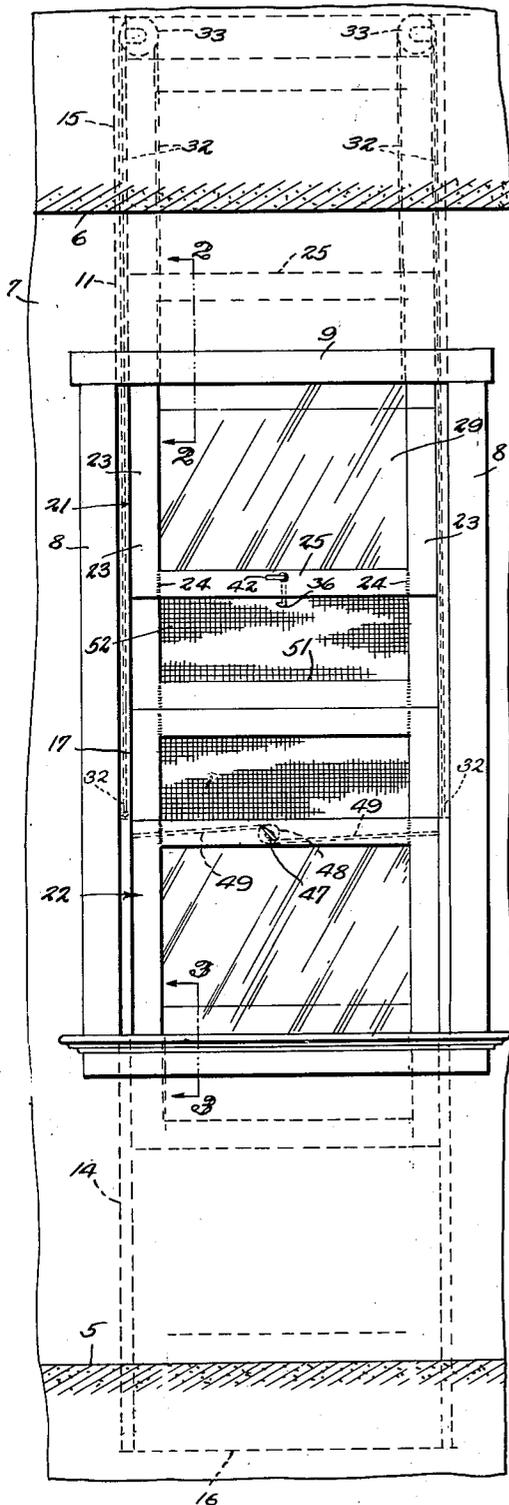


Fig. 1.

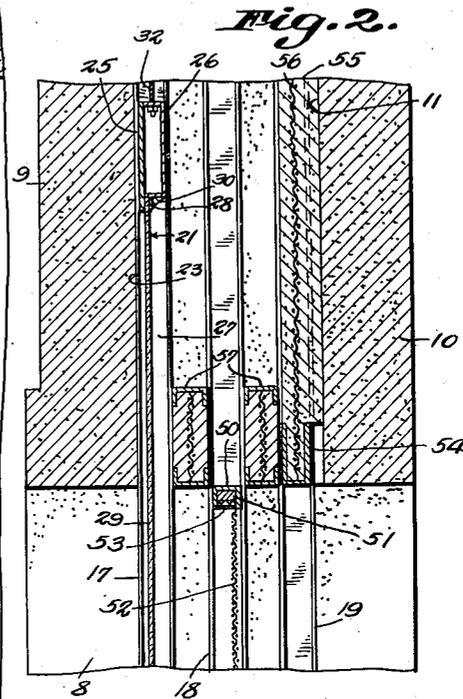


Fig. 2.

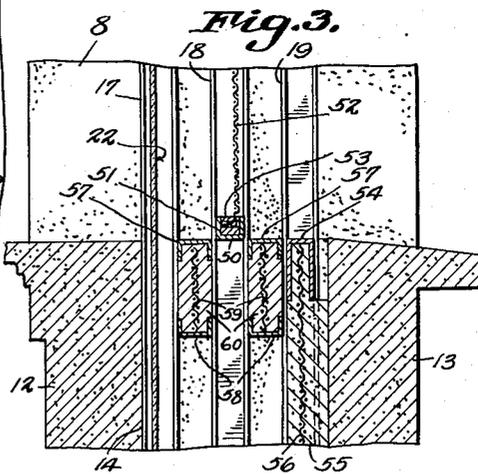


Fig. 3.

W. E. Tourtelotte

INVENTOR

BY *Chenoweth*  
ATTORNEYS.

Feb. 17, 1953

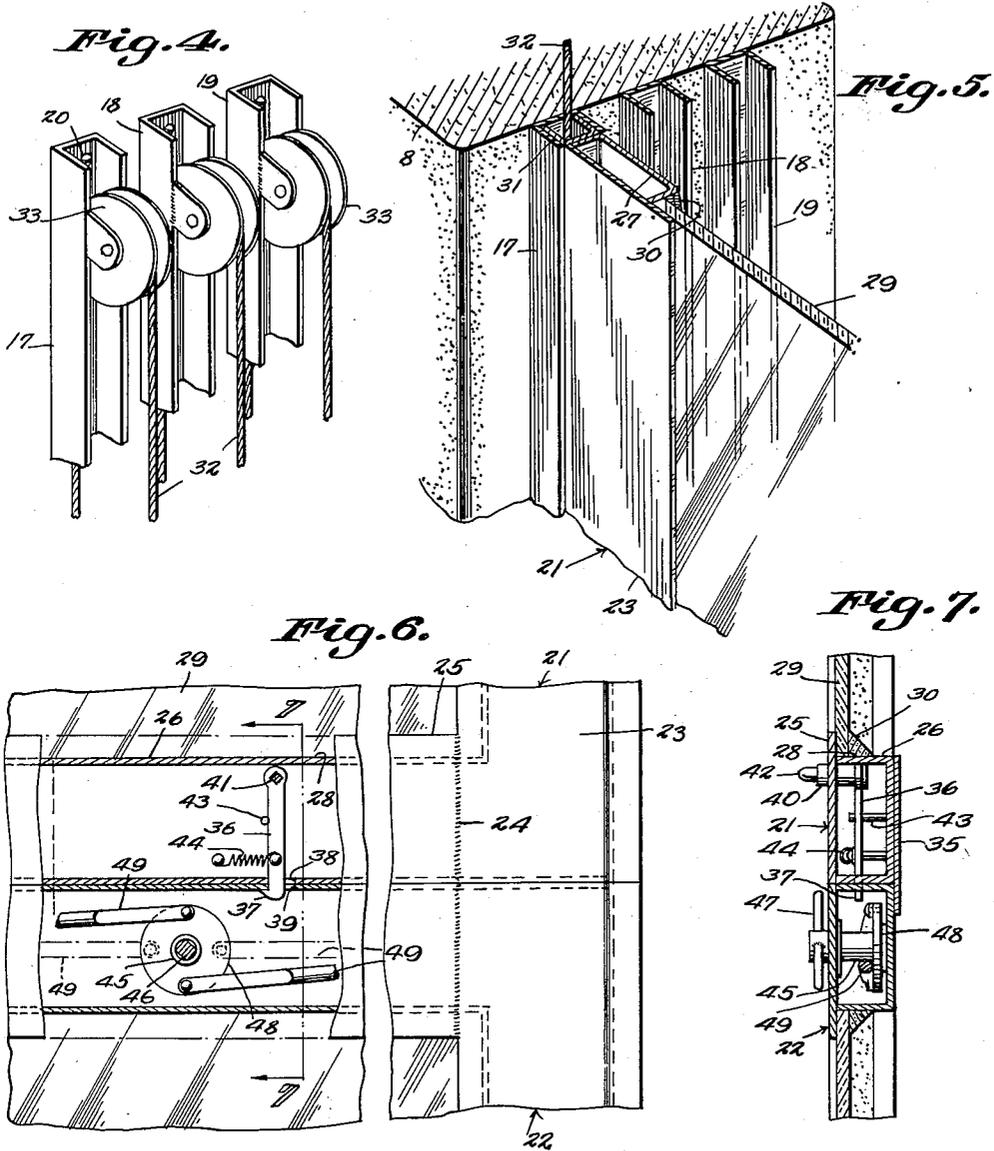
W. E. TOURTELOTTE

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2 SHEETS—SHEET 2



W.E. Tourtelotte

INVENTOR

BY *Chas. S. Snow & Co.*  
ATTORNEYS.

# UNITED STATES PATENT OFFICE

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## WINDOW CONSTRUCTION

William E. Tourtelotte, Burlingame, Calif.

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1 Claim. (Cl. 20—52.1)

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This invention relates to window construction, and more particularly has reference to the type of window construction that is particularly adapted for use in concrete building structures, although it can as well be used in structures of other types.

An important object of the present invention is to provide a window construction wherein a plurality of channels are utilized, with each channel accommodating double hung sashes, the upper and lower sashes of each channel adapted to be recessed entirely within the wall above and below the window frame.

Another important object is to provide a window construction of the type stated wherein one set of sashes can be equipped with the usual glass panes, another set can be formed as screen sashes, and the third set can comprise fireproof shutters of vermiculite or similar material.

Another important object is to provide a window construction as stated wherein the upper and lower sashes of each channel have a cord and pulley connection with each other in such a way that the raising of the upper sash into the recess above the window will cause the lower sash to be dropped into the recess below the window, so that both of said sashes will clear the window aperture entirely if desired.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists of certain novel details of construction and combinations of parts, hereinafter more fully described and pointed out in the claim, it being understood that changes may be made in the construction and arrangement of parts without departing from the spirit of the invention as claimed.

Referring to the drawings,

Fig. 1 is a front elevational view of the window construction as viewed from the interior of a building structure.

Fig. 2 is an enlarged detail section on line 2—2 of Fig. 1.

Fig. 3 is an enlarged sectional view on line 3—3 of Fig. 1.

Fig. 4 is a fragmentary perspective view showing the upper ends of the channels.

Fig. 5 is a fragmentary perspective view showing the cross sectional configuration of the channel and window frame assembly.

Fig. 6 is a fragmentary front elevational view of latching mechanism utilized in the window construction.

Fig. 7 is a section on line 7—7 of Fig. 6.

Referring to the drawings in detail, I have

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particularly designed the window assembly to be described hereinafter, so that it may be utilized in buildings constructed all or in greatest part of concrete or similar cementitious material. However, at this point it should be noted that as will be apparent hereinafter, the construction of the window assembly does not preclude its use in other types of building structures.

In any event, in the illustrated example a concrete floor 5 is provided and a concrete ceiling 6, while 7 designates a concrete building wall formed with an aperture for a window, and set into the concrete wall 7 at the sides of said aperture are the concrete posts 8.

Above the window aperture, I provide (Fig. 2) an inner top wall slab 9 and an outer top wall slab 10 spaced apart to define a pocket 11 in which the upper sashes of the window assembly are adapted to be recessed in a manner to be described hereinafter.

Below the window aperture I provide the inner bottom slab 12 and the outer bottom slab 13 spaced apart to define the lower pocket 14 receiving the bottom sashes.

If necessary the pocket 11 can be extended upwardly above the ceiling 6 as shown at 15, and the pocket 14 can be extended below the floor 5 as at 16.

Mounted against the concrete posts 8 are parallel channels 17, 18, and 19 respectively (see Fig. 5) and these are of a length to extend upwardly along the side walls of the respective upper and lower pockets to the inner ends of said pockets. The channels 17, 18, 19 can be securely mounted in place in any suitable manner, but I prefer that the channels be formed with openings 20 adapted to receive screws that can extend into the concrete posts 8 into threaded engagement with nuts embedded in said posts.

The channel 17 is adapted to provide a slideway for the upper and lower window sashes, the channel 18 is adapted to provide a slideway for the upper and lower screen sashes, and the channel 19 is adapted to provide a slideway for the upper and lower fireproof shutters.

The construction of the window sashes which will be the innermost pair of sashes in most instances, will first be described, and the upper and lower window sashes are generally designated 21 and 22 and are shown in partially open or recessed position in Fig. 1. The upper sash 21 is typical, and is provided with a metal frame including (Fig. 5) side plates 23 of metal material welded at 24 to horizontal plates 25 at the top and bottom of the sash. Horizontal

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channel members 26 and vertical channel members 27 are welded or otherwise rigidly secured to the outer surfaces of the plates 23 and 25, as best seen from Fig. 5, and since the plates 23, 25 are wider than the channels 27, 26 respectively, there are defined recesses 28 for receiving the marginal edges of a pane of glass 29, said pane 29 being held in position by vermiculite plaster 30.

The sash formed as described above is mounted for sliding movement in the channels 17, and to this end, there are secured to the opposite sides of the sashes the outwardly extended channeled guides 31 (see Fig. 5) which are mounted for sliding movement in the respective sash runs or channels 17.

By reason of this construction it will be seen that slidable mountings for the window sashes are provided, with there nevertheless being provided at opposite sides of each sash openings defined between the opposite side walls of each of the channeled guides 31. These openings or vertical passageways are for a purpose to be apparent immediately hereinafter, there being secured to the respective upper corners of the upper window sash 21 the sash cords 32 that are extended upwardly as best seen in Fig. 1, and are trained over pulleys 33 mounted on brackets extending outwardly from the upper ends of the respective channels 17 as best seen in Fig. 4. Thereafter, the sash cords 32 are extended downwardly within the channels 17 and are extended through the passageways described immediately above (see Fig. 5). The lower ends of the sash cords 32 are then connected to the upper corners of the bottom sash 22.

By reason of this construction, it will be readily seen that when the upper window sash 21 is raised by a user, the lower window sash 22 will move downwardly. Assuming that the upper sash 21 is raised to its maximum extent, in which it is recessed fully within the top pocket, the bottom sash 22 will be moved downwardly a corresponding extent, so that it is fully recessed within the lower pocket. Thus the window aperture is cleared entirely of the sashes. In this connection, it will be appreciated that the sashes are of substantially identical construction, and are of the same weight, so that one counterbalances the other during the raising and lowering thereof.

Referring to Fig. 7, to the outer surface of the horizontal lower rail 26 is secured a plate 35 that extends downwardly over the joint between the top and bottom sashes when said sashes are in closed position as illustrated in Fig. 7, so as to provide a drip strip or joint covering means to prevent leakage through the sashes to the interior of the building structure.

I believe that various means can be devised for locking the windows in closed position and open position. However, I prefer that a means such as shown in Fig. 6 be used for this purpose. In this figure there is illustrated a means for locking the windows in closed position wherein a swinging latch 36 has a beveled hook 37 at its lower end adapted to engage in registering openings 38 and 39 of the top and bottom sashes respectively thus to hold said sashes locked together when the windows are brought to closed position.

The latch 36 is pivoted at its upper end to a sleeve 40 that extends through the bottom rail of the upper sash, there being rotatably mounted within said sleeve the shaft 41 of non-circular cross-sectional configuration that is engaged with the upper end of the pivoted latch for the purpose

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of swinging said latch to open or unlatching position when the hook 37 is out of engagement with the bottom sash 22. For this purpose, the shaft 41 extends out of the sleeve 40 as best seen in Fig. 7, and is extended laterally to provide an operating handle 42 accessible from the interior of the building structure. When the window sashes are moved to closed position, the cam portion or beveled surface of the hook 37 will be cammed outwardly so as to permit the latch to enter the registering openings 38 and 39 after which the latch 36 will automatically move to a position in which the hook 37 will engage the bottom sash. A stop 43 is provided limiting movement of the latch in one direction, and for the purpose of automatically engaging the latch with the bottom sash, I provide the spring 44 secured to the latch and to the bottom rail of the upper sash respectively.

I also provide a means for locking the windows in any selected open position, and to this end there is provided in the top rail of the bottom sash a sliding bolt arrangement wherein a sleeve 45 extends through said top rail of the bottom sash and has rotatably mounted therein the shaft 46 of non-circular cross section, there being secured to the projecting portion of the shaft 46 the operating handle 47 for rotating said shaft. Secured rigidly to the inner end of the shaft 46 for rotation thereby is the disc 48 and pivotally secured to the disc at diametrically opposite points are the retractable bolts 49 that extend through openings in the opposite sides of the bottom sash so as to engage in any of a series of openings spaced vertically of the channels 17 thus to permit the sashes to be locked in a selected open position by adjustment of the bolts 49 to the dotted line position illustrated in Fig. 6.

Referring now to the construction which I prefer to utilize for the middle set of sashes comprising the screen sashes, reference should be had to Figs. 2 and 3 in which it is seen that each screen sash is provided with a frame which is formed from channel members 50 in which are mounted wood fillers 51. Screen mesh material 52 has its marginal portions engaged under retaining strips 53 formed with suitable openings through which screws extend for the purpose of securing the marginal portions of the screen mesh material between the strips 53 and the wood fillers 51. These screen sashes formed as described are connected by a cord and pulley arrangement exactly as in the case of the window sashes, and the screen sashes slide in the middle channels 18. Thus, elevation of one screen sash to its maximum extent causes the other screen sash to drop into the bottom pocket to its maximum extent so as to clear the window aperture entirely of the screen sashes whenever desired. This would be desirable in the wintertime perhaps, or on any other occasion when screen sashes are not necessary.

Referring now to the outer channels 19, these accommodate slidably mounted fireproof shutters the construction of which is best shown in Figs. 2 and 3, each fireproof sash comprising a frame composed of channel members 54 embracing the marginal portions of a vermiculite shutter member 55 reinforced by wire mesh material 56. Ordinarily, the fireproof shutters can be recessed entirely within the upper and lower pockets, but if a fire occurs in a nearby structure, the shutters can be swiftly moved to closed position, and in said position will hold back as much heat

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as the concrete wall 7 itself. This is desirable because a window is a vulnerable point in a concrete building, when a combustible structure is burning closely adjacent thereto. By provision of the fireproof shutters, the concrete structure in which it is preferred the window assembly be used is made wholly fireproof so far as firing of said structure from an adjacent burning structure is concerned.

Referring again to Figs. 2 and 3, immediately above and below the window aperture I provide the spacers extending transversely across said aperture and disposed between and spacing apart the sash runs 17, 18 and 19. These spacer members are each comprised of (see Fig. 3) opposed top and bottom channels 57 and 58 embracing the upper and lower longitudinal edges of a concrete bar 59 reinforced by wire mesh 59.

The window stiles and rails may be constructed in several ways, but I prefer to use stock channels about  $\frac{7}{8}$  x 2 inches for stiles and top and bottom rails, and  $\frac{7}{8}$  x  $1\frac{1}{2}$  inches for meeting rails with the open side inside to be covered by a steel plate, spot-welded or brazed or screwed on where it is necessary to remove plates for repairs.

Further, I believe it is also desirable to mention that the screen sash can be made similarly to the window sash and fireproof shutters, with a wooden core in the hollow space extending around the sash frame, to which core the screen may be tacked. A face plate of the frame can then be screwed on, and this plate, whenever necessary, can be removed for the purpose of repairing screens.

What is claimed is:

In a window assembly for supporting upper and lower sashes in a window opening having spaced vertical side walls, vertically spaced channel

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members secured to opposite vertical side walls of the window opening, said channel members opening into the window opening and defining within and between them vertically spaced sash runways, a pair of spaced laterally inclined arms carried by each channel member adjacent the upper end thereof, said arms extending into the window opening, a pulley mounted in each pair of arms for rotation about a horizontal axis which lies parallel to the walls of the window opening to cause diametrically opposed portions of the periphery of said pulley to lie midway between adjacent runways, sashes mounted in adjacent runways to move vertically in the window opening and cables trained over the pulleys and connected to the sashes to cause the sashes to move in unison and in opposite directions in the runways.

WILLIAM E. TOURTELOTTE.

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