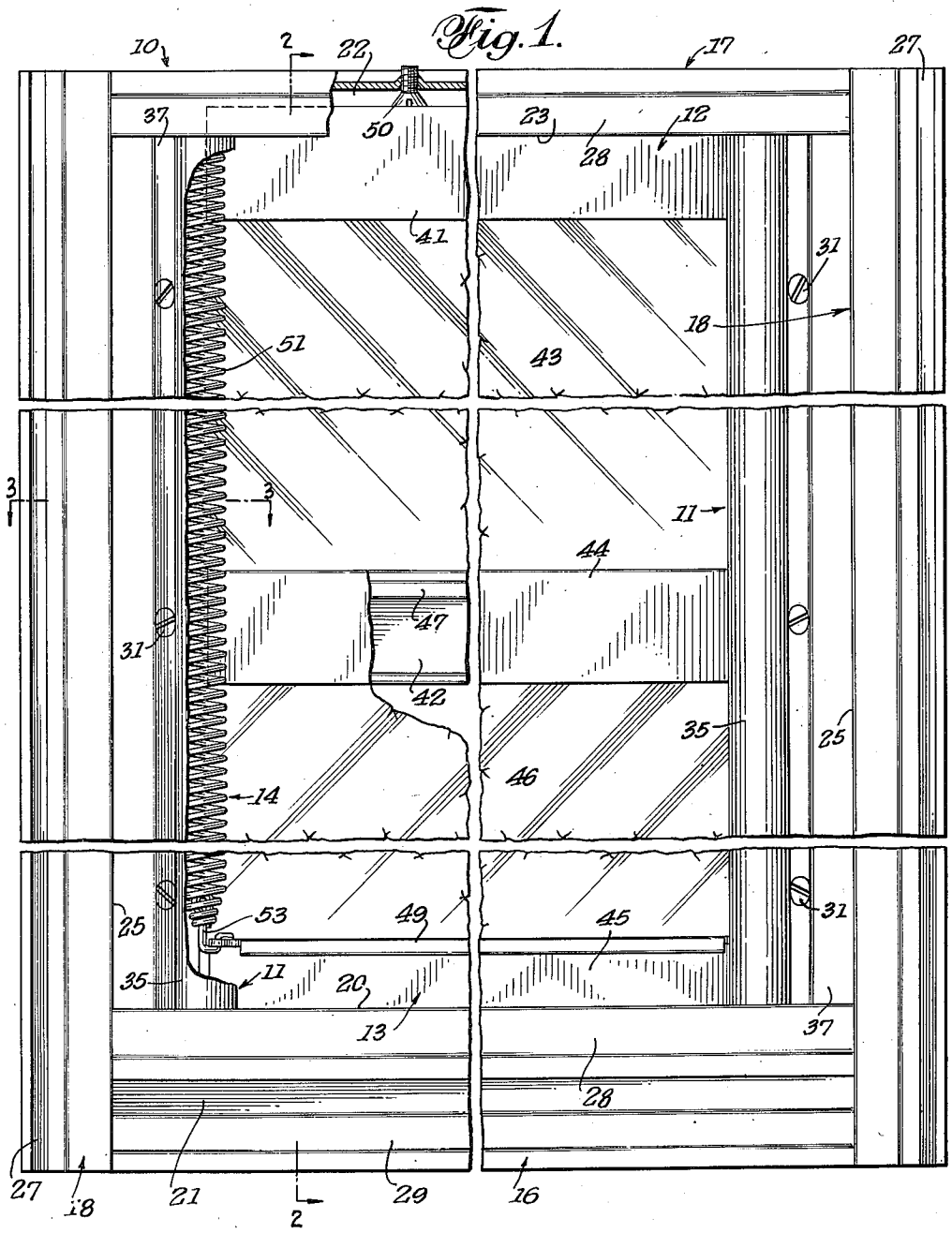
March 11, 1952 C. L. TOMSCHE 2,588,432

WINDOW CONSTRUCTION

Filed Dec. 6, 1947 2 SHEETS—SHEET 1

Fig. 1.




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Fig. 2.

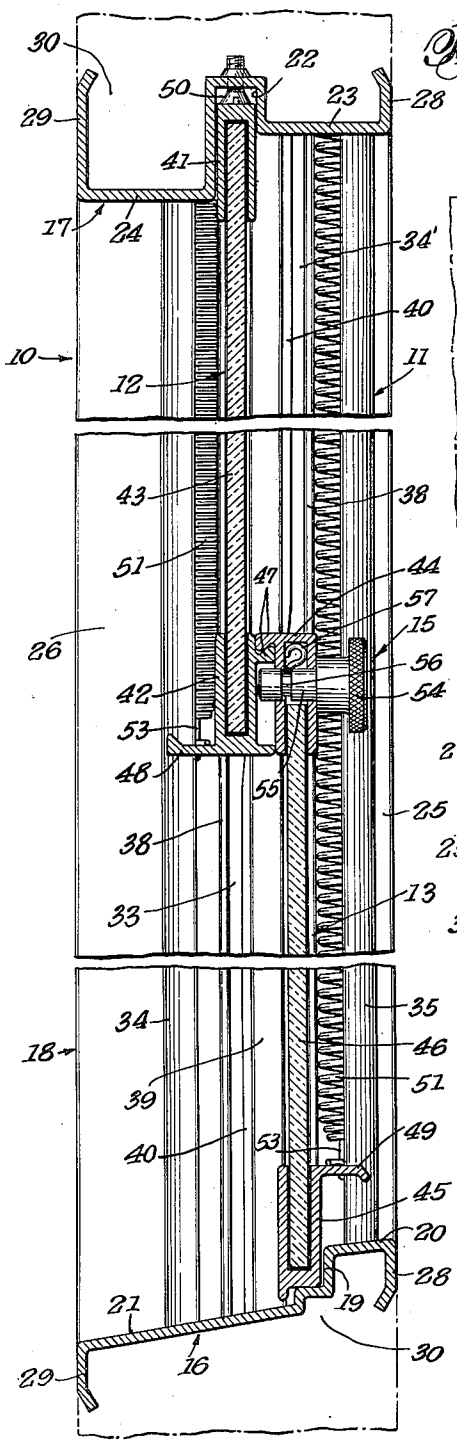



Fig. 3.

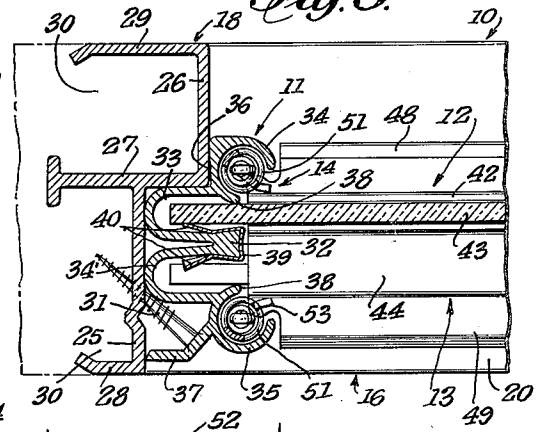



Fig. 4.

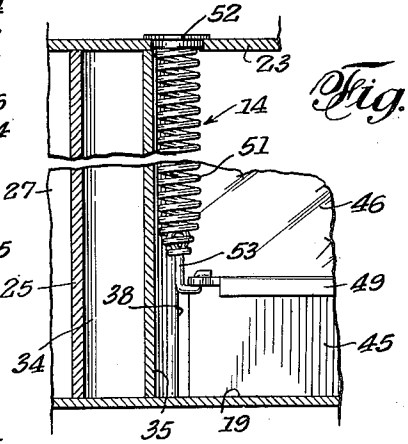
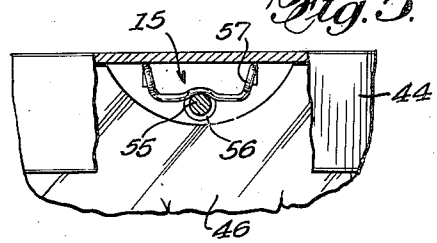



Fig. 5.




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# UNITED STATES PATENT OFFICE

2,588,432

## WINDOW CONSTRUCTION

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Application December 6, 1947, Serial No. 790,107
In Canada April 1, 1947

3 Claims. (Cl. 20—52)

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This invention relates to window construction and seeks to provide a novel and improved metal window of the double-hung type.

The primary object of the present invention is to provide a metal window for general use, but more particularly adapted for use in pre-fabricated structures.

Another object of the invention is to provide a metal window structure having an improved and simplified frame and embodying novel means for counterweighting the window sashes hung therein.

Another object of the invention is to provide a window structure, as indicated, which embodies simple and effective weather-stripping between the frame and sashes thereof.

A further object of the invention is to provide a window structure, as indicated, having sashes of novel form each counterweighted by tensioned weight-balancing means, the latter simply comprising tension springs.

A still further object of the invention is to provide, in a double-hung window, a novel design and arrangement of stile in the frame of the window for housing the tensioning springs which counter-balance the window.

My invention also has for its objects to provide such means that are positive in operation, convenient in use, easily installed in working position and easily disconnected therefrom, economical of manufacture, relatively simple, and of general superiority and serviceability.

The invention also comprises novel details of construction and novel combinations and arrangements of parts, which will more fully appear in the course of the following description. However, the drawings merely show and the following description merely describes one embodiment of the present invention which is given by way of illustration or example only.

In the drawings, like reference characters designate similar parts in the several views.

Fig. 1 is a broken inside view of a window structure embodying features of the present invention.

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

Fig. 3 is a cross-sectional view as taken on the line 3—3 of Fig. 1.

Fig. 4 is a broken detailed sectional view showing a sash counter-balancing spring in greater detail.

Fig. 5 is a fragmentary face view, partly in section of the middle upper part of the lower sash and showing sash-locking means employed in the invention.

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The window structure which is illustrated in the drawings comprises, generally, a window frame 10, auxiliary stiles 11 mounted in the frame 10 within the opening thereof, upper and lower sashes 12 and 13, respectively, in the frame opening and guided by said stiles 11, counter-balancing means 14 for each sash, and means 15 to lock the sashes against sliding movement.

The window frame 10 comprises a sill 16, a top rail 17 and connecting stiles 18, the latter extending completely from top to bottom of the frame with the sill and top rail end butted thereto as shown. The connection between the parts may be accomplished in various ways, by staking, welding, or the like.

The sill 16 is formed with a rabbet 19 between an elevated inner ledge 20 and an outer-sloping watershedding part 21, said rabbet forming a seat for the lower window sash 13.

The top rail 17 is formed with a groove 22 between an inwardly extending wall 23 and a lower outwardly extending wall 24, said groove being located to receive the upper window sash 12.

Each window-frame stile 18 is formed with an inwardly extending wall 25, an outwardly extending wall 26 offset with respect to the wall 25, to reduce the width of the frame opening. The walls 25 and 26 are connected by a transverse intermediate wall 27 which is extended laterally as shown. The sill 16, the top rail 17, and the stiles 18 are each provided with an inner flange wall 28 and an outer flange wall 29 which serve to frame the inner and outer faces of the window frame 10.

Each element of the window frame is formed as an extruded preferably aluminum member of light weight yet sturdy form, the walls 28 and 29 thereof defining the thickness of the frame and thereby defining grouting, brick, concrete, cement or adobe-receiving pockets 30 bonding said frame to a wall.

The auxiliary stiles 11 are each also formed as an extruded preferably aluminum member extending between the sill 16 and top rail 17 along the inside opening framing faces of the frame stiles 18 to which they are connected as by screws 31 entering suitable seats formed in the walls 25. Each stile 11 is formed with a central portion 32 which connects a pair of side-by-side channels 33 and 34'. The latter respectively connect with open-sided parallel and flanking housings 34 and 35 which are co-extensive with the respective channels. Each stile 11 is so formed as to have a longitudinal rabbet 36 to accommodate the corner formed by the walls 26 and 27 of each frame stile 18 and includes an

angularly directed and then laterally directed wall 37 extending from the housing 35 and abutting the wall 25 at a point adjacent to the flange wall 28 of each frame stile 18. The mentioned screws 31 enter through holes provided in the angularly directed portion of each wall 37.

Each housing 34 and 35 is of round sectional form for suitably housing the counter-balancing means 14. The longitudinal opening formed in each housing is so directed and located as to provide a lip 38 having sliding contact with a respective sash 12 or 13. The portion 32 of each stile 11 is flared to provide a snap-on-bead for a metal strip 39. The latter is channel-shaped to have flared portions 40 which extend laterally and angularly into the channels 33 and 34 for wiping engagement with the sashes 12 and 13 on the sides thereof opposite to the sides engaged by the lips 38. The strip 39 is effective as a weather-strip sealing against transverse passage of air through the channels 33 and 34 and also obviates sash rattle by firmly pressing the latter against the lips 38.

The upper sash 12 comprises an upper sash bar 41, a lower sash bar 42, and a connecting window-pane 43. The sash bars are generally channel-sectioned and extend across the window opening between, but clear of, the auxiliary stiles 11. The pane 43 is wider and extends, at both sides, into the opposed channels 33 for the mentioned sliding engagement with the lip 38 of housing 34 and the related flared portion 40 of the weather-strip 39.

The lower sash 13 comprises an upper sash bar 44, a lower sash bar 45, and a connecting windowpane 46. These latter sash bars are generally similar to those of the upper sash and the pane 46 extends, at both sides, in the opposed channels 34 as described for pane 43.

The sash bar 41, with the upper sash up, extends into the groove 22 of the top rail 17; the sash bar 45, with the lower sash 13 down, seats in the mentioned rabbet 19 of the sill 16; and the sash bars 42 and 44 coincide vertically and extend across the middle of the window opening. The latter bars are formed with overlapping lips 47 to seal against each other, with the window closed. An outwardly extending lip 48 is provided on the sash bar 42 along the bottom thereof to provide a hand-gripping portion used for effecting manual sliding of the upper sash. Similarly, an inwardly extending lip 49 is provided on the sash bar 45 preferably along the top thereof for use in manipulating the lower sash. Both lips 48 and 49 extend between but are clear of the opposed housings 34 and 35.

In order to effect proper registration of the sash bars 42 and 44 so that the lips 47 thereof suitably engage, the top rail 17 of the windowframe is provided with one or more adjustable stops 50 which are shown as screws whose heads limit the upward movement of the upper sash.

The counter-balancing means 14 comprises four substantially similar springs 51 arranged in pairs for each window sash. Each spring is formed as an elongated coiled expansion spring, housed in each housing 34 and 35, connected to the top rail 17, as best seen in Fig. 4, by means of a flanged washer 52 seated in a hole formed in said rail. The pair of springs in the housings 34 are connected by hooks 53 to the ends of the sash bar 42 and the pair of springs in the housings 35 are similarly connected to the ends of the sash bar 45. In practice, the contracted length of each spring approximates three-eighths



the height of the window opening. Thus, with the upper sash up and the lower sash down, the first-mentioned pair of springs—those connected to the upper sash—are extended to a length approximating one-half the height of the window opening. The tension of these springs is sufficient to support the weight of the upper sash to hold the same up. The pair of springs connected to the lower sash are extended to a length approximating the full length of the window opening and their greater tension makes raising of the lower sash easier but is insufficient to overcome the weight thereof. By means of the described spring arrangement, both sashes are counter-balanced for easier manipulation, the weight of the sashes acting against the tension of the springs connected to them.

The sashes can be locked by the means 15 which consists of a sash knob 54 having a shank 55 passing through a central transverse opening in the sash bar 44 and extending into interfering relation to the lip 47 of the sash bar 42. An annular groove 56 in the shank 55 is engaged by a torsional spring 57 housed in the pane-receiving groove of the bar 44 to normally hold said shank 55 in the mentioned interfering relation to the lip 47 of sash bar 42. An endwise pull on the knob 54 retracts said shank and permits ready sliding of the sashes.

It will be noted that the auxiliary stiles 11 are set sufficiently forward of the outer-flange walls 29 of the frame elements to provide an opening outward of said stiles in which suitable screens are adapted to be positioned. The structure lends itself to a mullioned window by a mere duplication of the described structure on each side of a central mullion.

While I have illustrated and described what I now regard as the preferred embodiment of my invention, the construction is, of course, subject to modifications without departing from the spirit and scope of my invention. I, therefore, do not wish to restrict myself to the particular form of construction illustrated and described, but desire to avail myself of all modifications that may fall within the scope of the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A window structure comprising a frame having a sill, top rail, and side stiles, the stiles having inwardly and outwardly disposed walls, the latter being offset relative to the former to define a narrower transverse space between the outwardly disposed walls than between the inwardly disposed walls, there being a transverse wall connecting the offset walls of the respective frame stiles, an auxiliary stile longitudinally coextensive with and positioned against the inwardly disposed wall, the transverse wall and the adjacent portion of the outwardly disposed wall of each frame stile, each auxiliary stile comprising an integral longitudinal member having a pair of side-by-side channels, a pair of sashes mounted in the frame and guided laterally in the channels of the auxiliary stiles, each auxiliary stile having a pair of longitudinal housings flanking the pair of channels, and a sash-counter-balancing expansion spring in each of said housings, each of said springs being connected to the top of the frame and directly to each respective sash.

2. In a window structure, a frame comprising a pair of stiles and a connecting upper rail, the stiles being each formed with an intermediate

wall dividing the inner and outer sides of the stiles and with laterally offset inner and outer walls extending from said intermediate wall, and an auxiliary stile covering one of said laterally offset walls and engaged with an adjacent portion of the other and with said intermediate wall, each auxiliary stile comprising an integral elongated element formed to have centrally disposed side-by-side sash-guiding channels positioned against and extending inwardly from said inner walls and spring housings flanking said channels, said housings being disposed inward of the outer wall of each respective frame stile.

3. In a window structure, a frame comprising a pair of stiles and a connecting upper rail, the stiles being each formed with an intermediate wall dividing the inner and outer sides of the stiles and with laterally offset inner and outer walls extending from said intermediate wall, and an auxiliary stile covering one of said laterally offset walls and engaged with an adjacent portion of the other and with said intermediate wall, each auxiliary stile comprising an integral elongated element formed to have centrally disposed side-by-side sash-guiding channels positioned against and extending inwardly from said inner walls and spring housings flanking said channels, said housings being disposed inward of the outer wall of each respective frame stile, each auxiliary stile further including an integral wall extending from one side of one of said spring housings and abutting the inner wall of the frame stile.



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