Aug. 17, 1937. G. M. GRADY 2,090,349

WINDOW CONSTRUCTION

Filed June 5, 1936 3 Sheets-Sheet 1

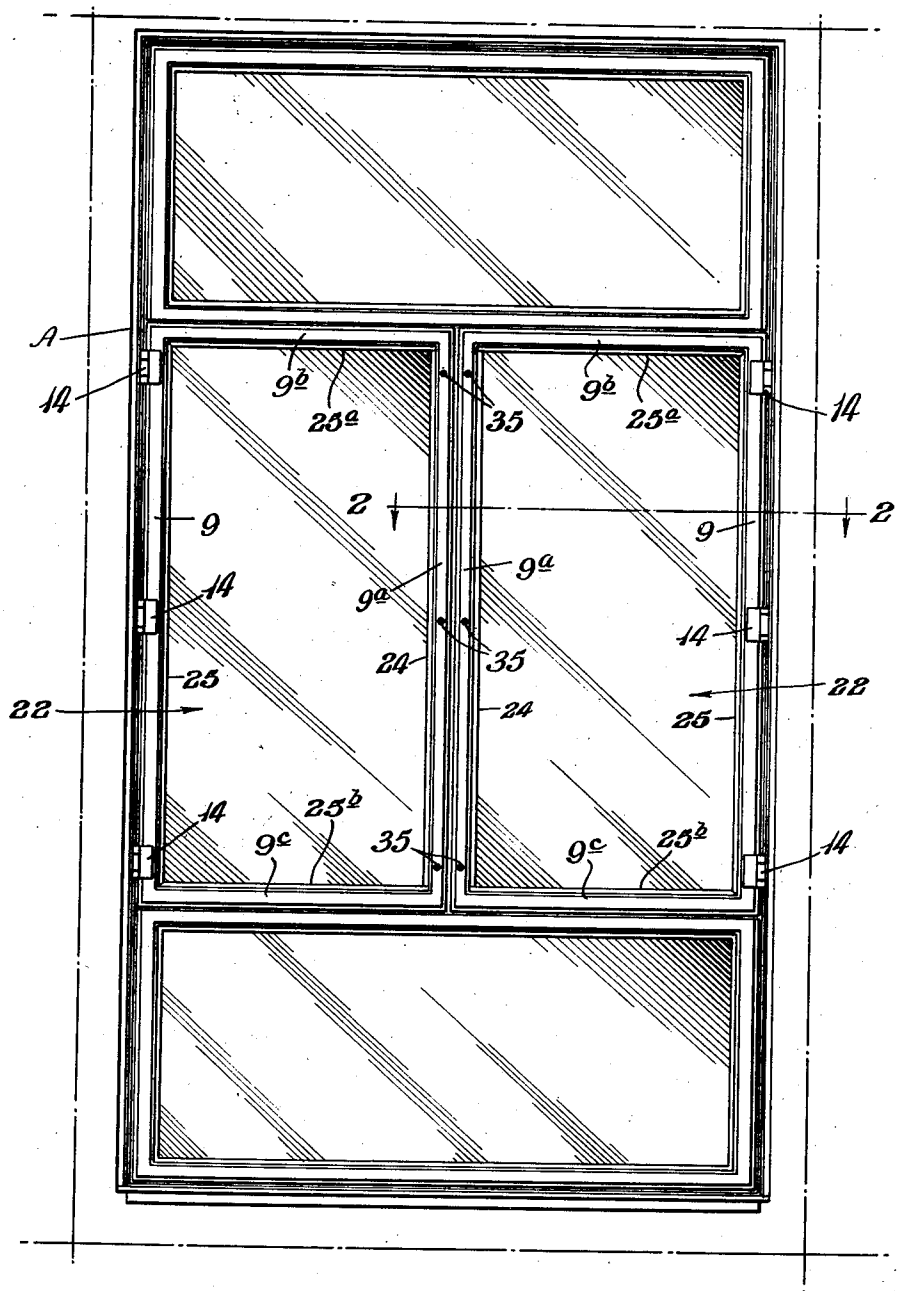


Fig. 1.

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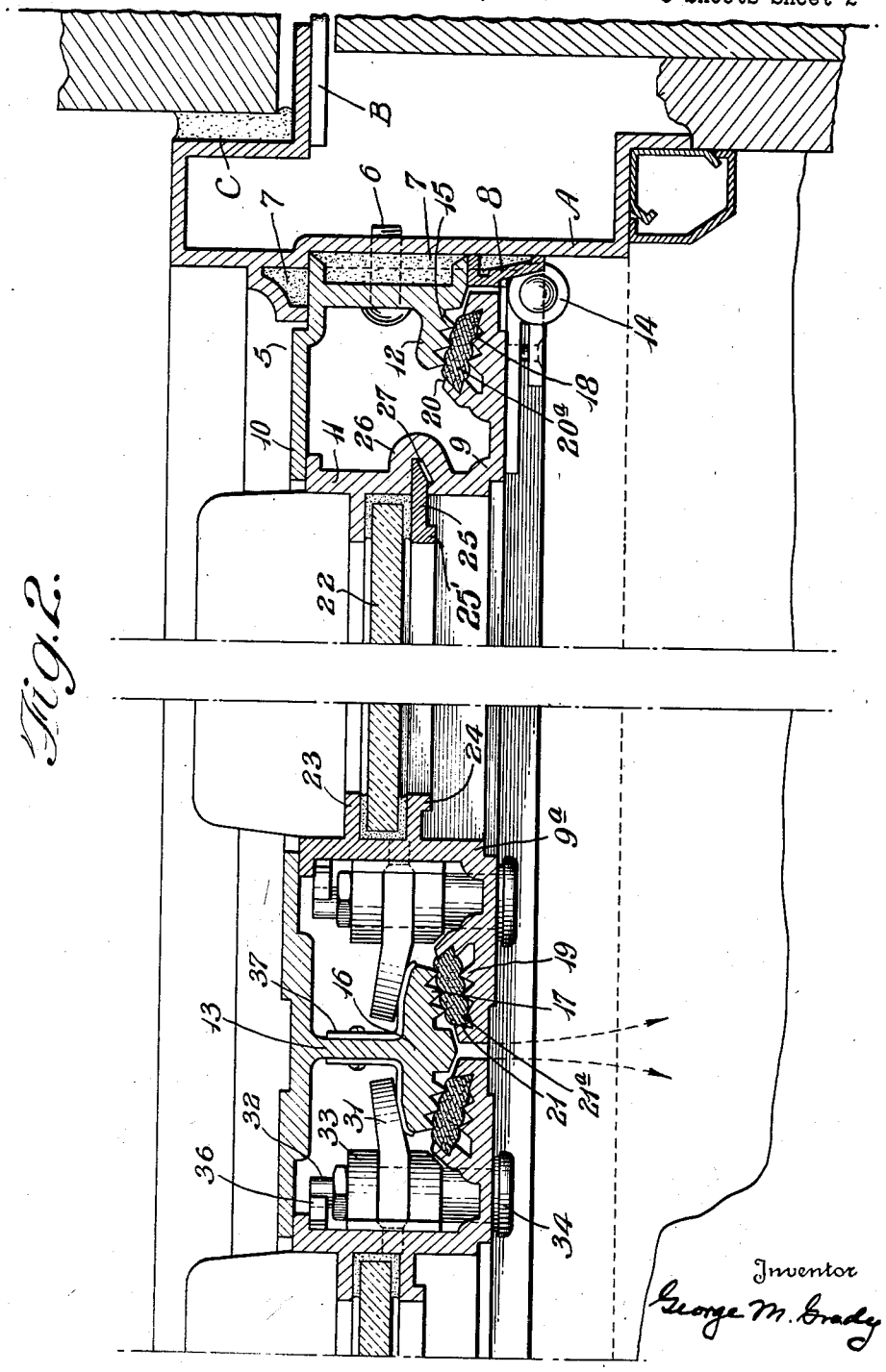


Fig. 2.

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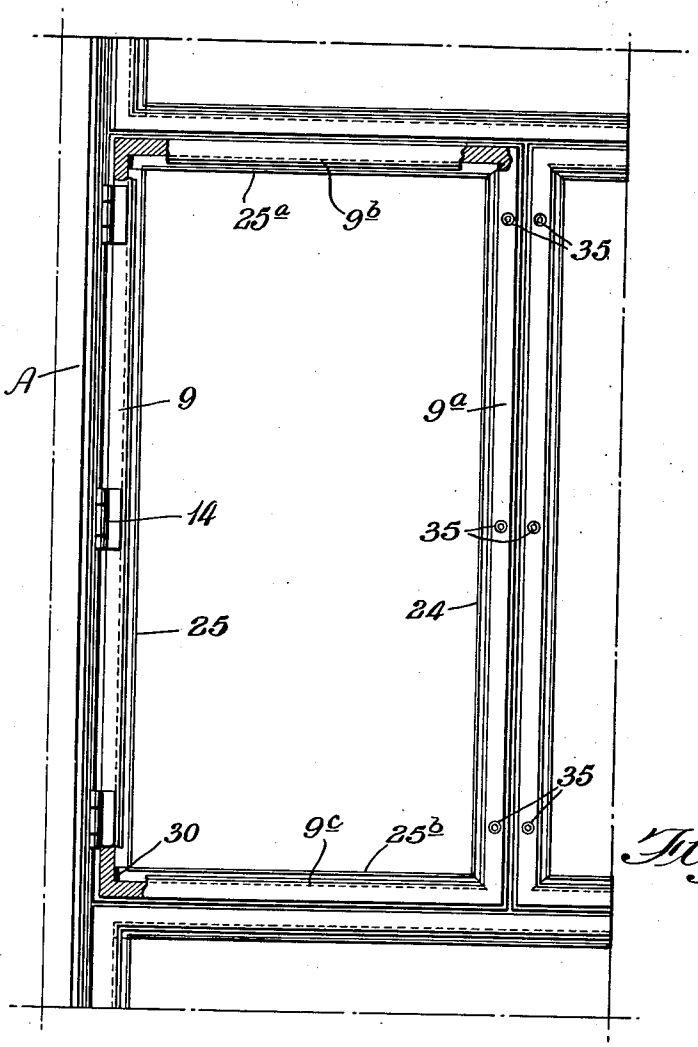


Fig. 3.



Fig. 5.

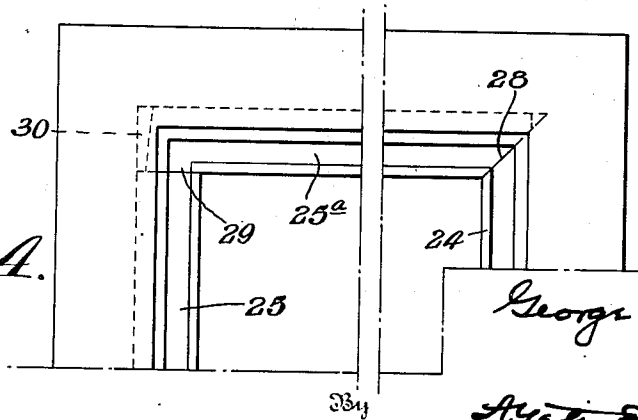


Fig. 4.

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2,090,349

WINDOW CONSTRUCTION

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10 Claims. (Cl. 189—65)

This invention relates to window construction broadly and embodies features of advantage and novelty which render it particularly adaptable to windows of the type utilizing channel metal frame and sash sections.

One of the problems which gave rise to the invention was the requirement for a window having unusually low air infiltration qualities for use in an air conditioned building and, accordingly, an object is to provide a window of the metal section type having an improved, highly effective seal at the closure joints and one which at the same time permits relatively simple and easily manufactured frame and sash sections.

Other objects are, to provide a metal section window wherein the glass panes may be easily and quickly removed and replaced and yet at the same time be effectively seated and sealed in the sash sections; a window of the metal section type having a latch which not only has an effective clamping action but which also serves as a key-operated lock and is concealed or lies within the frame sections; and to generally improve and simplify the construction of windows of this type.

The foregoing and other objects and advantages will become apparent in view of the following description taken in conjunction with the drawings, wherein:—

Figure 1 is a view in inside elevation of a complete window installation embodying the features of the present invention.

Figure 2 is an enlarged sectional view taken on the line 2—2, Figure 1.

Figure 3 is an enlarged view similar to Figure 1 but showing only part of the installation.

Figure 4 is a still further enlargement in elevation of the upper part of the window; and

Figure 5 is a fragmentary detail view of one of the removable glazing strips.

Referring in detail to the drawings, the window installation shown consists of upper and lower fixed panels with a pair of windows mounted intermediate thereof and hinged at the sides for opening and closing movements. It will be understood, however, that the windows may be hinged at the top or bottom or may be unhinged and simply removably mounted, the invention being primarily concerned with the frame and sash construction and cooperating parts.

Anchor frame sections, generally indicated at A, are illustrated as being suitably embedded in and secured to the masonry as by anchor straps B and sealed by mastic or the like as at C. These sections are adapted to receive the stationary window frame sections which comprise the frame rails generally indicated by the reference numeral 5 and shown as anchored to the frame sections A by means of screws 6 and sealed by suitable mastic or other sealing material 7. A separate frame section 8 is also shown as being secured to the anchor rail A against an inturned flange formed on the one leg of the rail 5. As will be obvious the frame rail 5 is stationary and forms part of the stationary window frame structure.

The side pane-seating sections or sash rails of each window are indicated at 9 and 9a and the top and bottom sections at 9b and 9c. Since the frame sections are similar in each window, a description of one window will suffice for both. Referring particularly to Fig. 2, it will be noted that the coacting sash and frame rails are substantially L-shaped in cross section, the one leg 10 of the rail 5 serving as an abutment flange against which the flanged edge of the leg 11 of the rail 9 is adapted to abut when the window is closed to effect a metal seal at this point. The remaining leg of the rail 5 is formed with a contact head or flange 12. Extending upwardly between the windows and forming part of the stationary frame assembly is a central mullion 13, note left-hand side of Fig. 2, which has a general H-shape in cross section, and while not visible in the drawings, it will be understood that a member functioning in substantially the same manner may and preferably does extend across the top and bottom of the window frame between the upper and lower panels and the hinged windows. The side rails 9 are shown as being hinged for opening and closing movement by means of hinges 14 which may be of any suitable or conventional type.

A feature of the present invention lies in the provision of a highly effective seal at the point where the side and top and bottom sash sections contact with the stationary frame sections when the windows are closed. This sealing construction is clearly illustrated in section in Fig. 2. The contact flange 12 of the stationary frame section 5 is provided with a series of teeth or serrations 15, and likewise the central mullion 13 is formed with substantially T-shaped contact flanges having therein a series of teeth or serrations 17. The coacting legs of the rails 9, 9a, 9b and 9c are formed with teeth or serrations 18 and 19 which are arranged in staggered relation with respect to the teeth 15 and 17, the teeth or serrations 18 and 19 forming the bottom wall of undercut rabbets or grooves 20 and 21 in which sealing or weather strips of suitable yielding or flexible ma-

terial 20a and 21a are inserted. The use of felt for the sealing strips has proven satisfactory.

It will be noted that when the window is swung to closed position, the staggered teeth or serrations 15 and 18 and 17 and 19 contact and slightly embed themselves in the opposite sides of the resilient sealing or weather strips, or bend the strip over the teeth and form an effective seal at the closure joints between the window sash rails and the fixed frame rails or sections. The action of the teeth on the sealing material is essentially one of bending rather than of compression. In cases where a strip of felt is used as the sealing material, the felt will retain its resiliency for a much greater length of time than where the strip is merely compressed between flat surfaces and becomes packed and hardened. Experience has demonstrated that this staggered tooth type of contact does not destroy the resiliency or effective action of the sealing material, while at the same time a remarkably low degree of air infiltration is obtained.

Another advantage is that practically any number of metal to felt or sealing strip contacts may be had with only one strip, resulting in reduced manufacturing costs and at the same time maximum sealing efficiency.

The window panes, indicated at 22, may be easily seated in and removed from the grooved seats of the sash sections 9, 9a, 9b and 9c, the present construction being of the removable glazing strip type. The side and top and bottom sash sections preferably have the glazing strips 23 on the outer side of the windows formed integrally therewith, and the inner glazing strip 24 of one side section, for example section 9a, is also preferably made integral with its section, while the remaining glazing strips 25, 25a and 25b are detachably mounted, note Fig. 2 in conjunction with Figs. 3, 4 and 5. To accommodate this structure, the sections or rails 9, 9b and 9c are each formed with an elongated rib or boss 26 having therein a beveled keyway or groove 27 in which the detachable glazing strips 25, 25a and 25b may be inserted. Referring particularly to Figs. 3 and 4, it will be noted that the corner joints of these strips, indicated at 28, which lie on the outer or right hand side of each window, are mitered or beveled, while the opposite ends are provided with a butt or squared joint as at 29.

In applying a pane of glass, the pane-seating grooves defined by the glazing strips may have a suitable amount of sealing material applied thereto; the pane may then be inserted by a slight lateral sliding movement to the left to seat its one edge in the groove between the permanent strips 23 and 24; the top and bottom strips may then be applied and finally the side key strip 25 may be wedged in place with its ends abutting the adjacent surfaces of the strips 25a and 25b, note particularly Fig. 4. Strip 25 is shown in detail in Fig. 5 and may be considered the key strip. This key strip is formed with a beveled edge portion to conform to the bevel of groove 27. In those types of window structures wherein the removable strips have a plain squared or rectangular edge fitting into a like recess, glazing putty gets into the recess or seat, and after it sets, acts as a cement and locks the strip in the groove, rendering it difficult to remove the strip. This locking action is avoided by the construction herein disclosed. Removal of the strip is further facilitated by forming a projection or rib 25' on the strip 25 which is preferably continuous. Clearance may be provided at 30 to permit installation of strips 25a and 25b.

Combined lock and latch mechanism is preferably provided as particularly shown at the left hand side of Fig. 2, this mechanism for each window comprising a latch cam 31 fixed on a shaft 32 which is mounted in a bearing or keeper 33, having a central slot to accommodate the latch cam. Shaft 32 has an enlarged outer member 34 which is formed with a key socket 35 which may be squared, hexagonal or otherwise shaped and is adapted to receive a key not shown. A friction spring 36 is provided and bears against the inner end of shaft 32. The cams 31 each are adapted to engage the inner sides of the head 16 of the mullion 13, and these heads are shown provided with renewable contact or wear strips 37. Latch cam 31 is preferably bent laterally and provided with a cam edge or contact surface. It will be noted that the latch and locking mechanism is entirely concealed in the frame sections when the windows are closed, the only part being visible being the key socket. When an attendant desires to unlock or unlatch the window, he inserts a key in socket 35 and turns shaft 32 in the proper direction to free cam 31 from locking engagement with head 16 of mullion 13.

While the invention is shown and described solely in connection with windows, it will be obvious that the features thereof are applicable to doors and like constructions where analogous problems are encountered.

It will be understood that certain minor changes in construction, design and arrangement of parts may be adopted within the scope of the invention as defined by the appended claims.

I claim:

1. In a frame construction for windows and the like, a fixed frame, a window frame mounted in the fixed frame, said frames having coacting flange members extending longitudinally of the closure joints therebetween, the opposed contiguous faces of said members being formed with a series of longitudinal serrations, the serrations of one face being in substantially non-intermeshing relation with those of the opposed face, and a weatherstrip arranged to lie between said faces and be engaged by said serrations when the window is closed.

2. In a frame construction for windows and the like, a fixed frame, a window frame mounted in the fixed frame, said frames having coacting sealing flanges extending longitudinally of the closure joints therebetween, the opposed contiguous faces of said flanges being formed with a series of longitudinal serrations arranged in staggered but substantially non-interengaging relation, and a weather strip arranged to lie between said faces and be engaged by said serrations when the window is closed.

3. In a metal frame construction for windows and the like, a fixed frame and a window frame mounted for opening and closing movements in said fixed frame, said frames being formed with coacting sealing flanges extending longitudinally of the closure joints therebetween, one of said flanges being formed with a longitudinal seat in the face thereof and both of said flanges having a series of longitudinally extending tooth-like serrations formed in their contiguous faces, and a weather strip of suitable flexible material disposed in said seat and adapted to be engaged by said serrations when the window is closed.

4. In a channel metal frame construction for windows and the like, a fixed frame and a win-

dow frame mounted for opening and closing movements in said fixed frame, said frame being provided with coacting sealing flange members extending longitudinally of the closure joints therebetween, the opposed contiguous faces of said flange members being formed with a series of longitudinally extending teeth arranged in staggered relation, and a weather strip of suitable flexible material common to the teeth of the opposed flange members arranged to lie between said faces and be engaged by said teeth when the window is closed.

5. In a channel metal frame construction for windows and the like, a fixed frame and a window frame mounted for opening and closing movements in said fixed frame, said frames having coacting sealing flanges extending longitudinally of the closure joints therebetween with their opposed faces adapted to lie in contiguous relation when the window is closed, the face of one of said flanges being provided with a longitudinal key seat and both of said faces being formed with a series of longitudinally extending tooth-like serrations, the serrations of one face being staggered with respect to the serrations of its coacting face, and a weather strip of suitable flexible material engaged in said seat and adapted to be contacted on opposed sides by said teeth when the window is closed.

6. In a window construction, a fixed metal frame section and a window sash frame section hinged to said fixed section, frame members having sealing flanges extending longitudinally of the closure joints between the sections, the opposed contiguous faces of said flanges being formed with a series of longitudinally extending tooth-like serrations and one of said flanges being formed with a longitudinally extending key seat adapted to receive and retain a strip of sealing material, the base of the seat constituting one of the serrated flange faces.

7. In a window construction, a pair of coacting metal frame sections, one of said sections being fixed and constituting a supporting frame and the other of said sections consisting of a sash section and being hinged to said fixed section for opening and closing movements with respect thereto, said sections being formed with sealing flanges extending longitudinally of the closure joints between the sections, the opposed contiguous faces of said flanges being formed with a series of longitudinally extending staggered teeth and one of said flanges being also formed with a longitudinally extending weather strip key seat overlying the teeth therein, and a weather strip of suitable sealing material positioned in said seat and being adapted to be engaged by said teeth when the hinged section is in closed position.

8. In a window construction, a fixed metal frame section and coacting window sash frame section hinged to the fixed section, said sections being of substantially L-shape in cross section and having side members formed with coacting sealing flanges which lie adjacent the closure joints between the sections, a central mullion member forming part of the fixed frame and extending intermediate of the windows, said mullion member having a substantially T-shape contact head formed with a series of longitudinal teeth on the outer face thereof, the flange of the sash frame section being formed with a longitudinally extending weather strip key seat and the contiguous faces of said flange members being formed with a series of longitudinally extending staggered teeth adapted to engage a strip of suitable sealing material in said seat when the windows are closed.

9. In a frame construction for windows and the like, a fixed frame, a window frame mounted in the fixed frame, said frames being formed with coacting sealing flanges extending longitudinally of the closure joints therebetween the opposed contiguous faces of said flanges being toothed, with the teeth of one flange arranged in staggered but substantially non-interengaging relation with respect to the teeth of its coacting flange.

10. In a frame construction for windows and the like, a supporting frame, a movable frame mounted in said supporting frame, said frames being formed with coacting sealing flanges extending longitudinally of the closure joints therebetween, the opposed contiguous faces of said flanges being formed with a plurality of longitudinally extending tooth-like serrations, a weather strip of suitable flexible material common to said serrations, and means for holding said strip in fixed position overlying the serrations of one of the flanges.

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