Aug. 6, 1935. H. R. GRAF 2,010,298

WINDOW CONSTRUCTION

Filed July 6, 1933 2 Sheets-Sheet 1

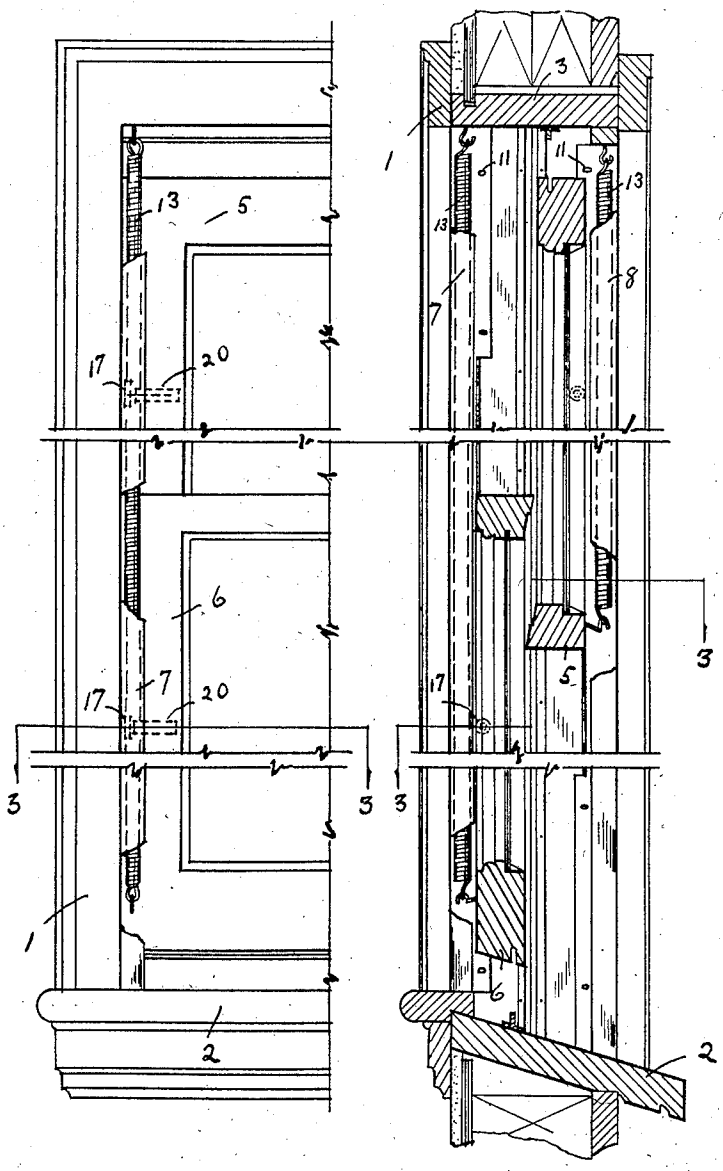


Fig. 1. Fig. 2. Fig 8

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WINDOW CONSTRUCTION

Filed July 6, 1933 2 Sheets-Sheet 2

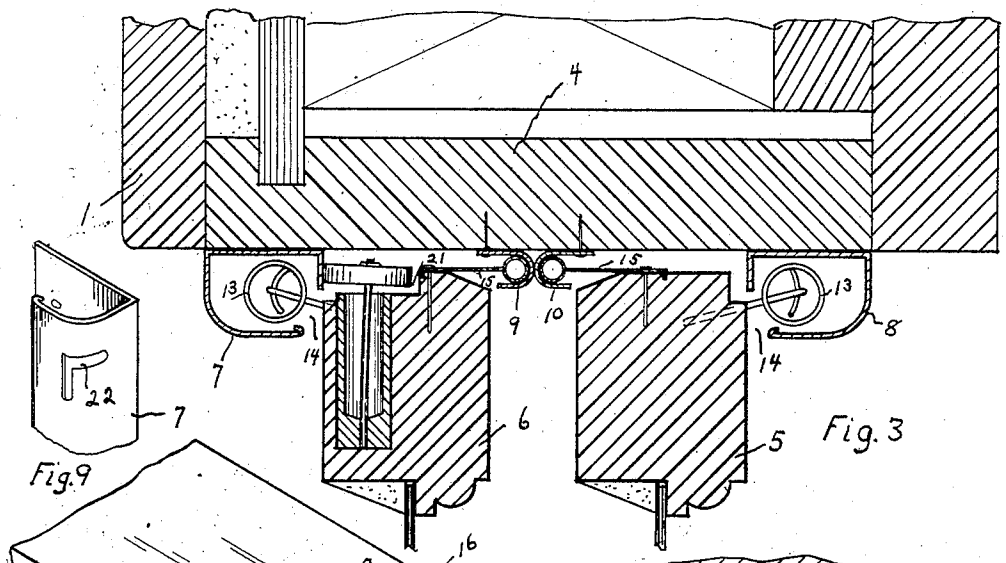


Fig. 9

Fig. 3

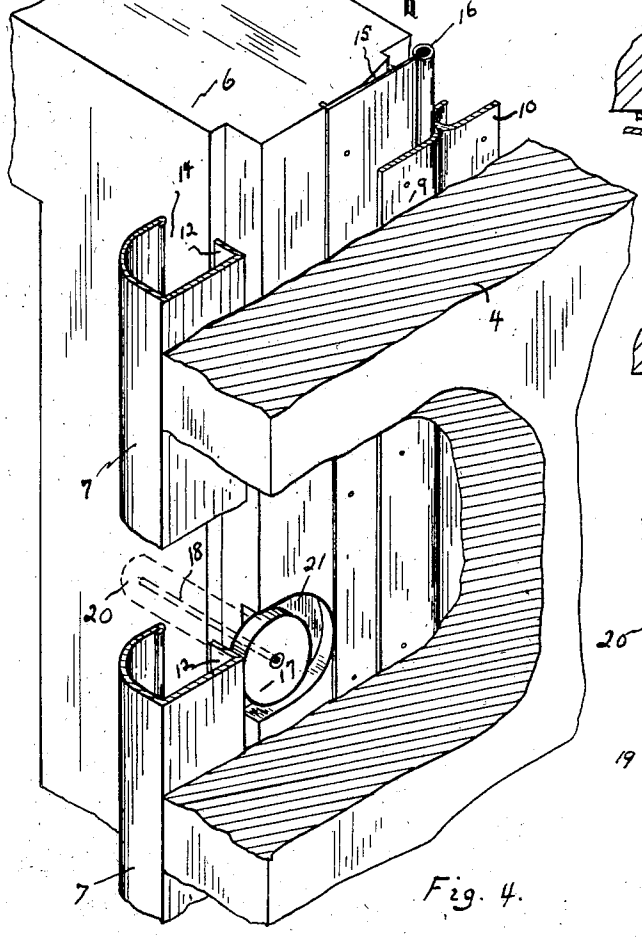


Fig. 4.

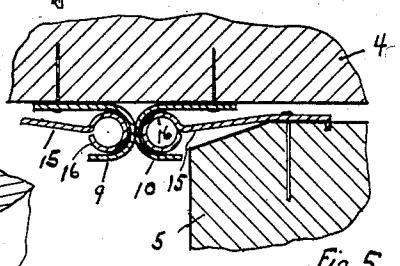


Fig. 5

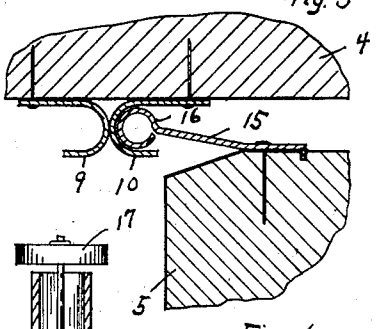


Fig. 6.

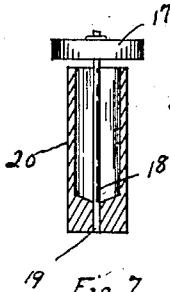


Fig. 7.

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2,010,298

WINDOW CONSTRUCTION

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Application July 6, 1933, Serial No. 679,238

13 Claims. (Cl. 20—52)

The present invention relates to improvements in window construction and has for one of its objects to provide a fully weather sealed structure at substantially the same cost as standard window constructions without weather stripping.

Another object is to provide a window construction of the aforesaid type which may be readily constructed and assembled upon the job by the ordinary carpenter without special training or tools.

A further object is the elimination of weights and boxes therefor thus facilitating the installation, enhancing the architectural beauty by permitting narrow window trim, and especially reducing the width of mullion required between double windows.

A still further object is to provide improved means for guiding and suspending a vertically slidable sash obviating binding or rattling as a result of weathering or otherwise; the preferred means employed permitting the sash to be conveniently removed or inserted in the frame.

Other objects and advantages reside in the novel details of construction and arrangement and combination of parts as will be more fully set forth. The invention is clearly defined in the appended claims.

I am fully aware that coiled springs have heretofore been employed in the suspension or counterbalancing of window sashes. However, up to the present development, as far as I know, the convenient and sightly housing of the same has presented considerable problem. In the patent to Madsen, No. 1,839,752, for example, the side jambs, stops and sashes must all be machined to provide the housing for the springs and then only that portion of the spring coextensive with the sash is completely housed.

In my construction, the weather tightness is augmented by the preferred employment of solid one piece jambs through which no cuts are made for pulleys or weight box covers. At the same time the springs suspending the sashes are adequately housed throughout by self contained casings which may be bodily removed together with their associated springs for the lateral removal of the sash; the casings and the weather seal slideways for the sashes being readily affixed to the face of the side jambs by nails or screws, for example, with wooden frames and by bolts or other convenient securing means when a metal frame is employed.

Preferably, the housing for the springs supplements the usual inner and outer stops with a portion thereof acting as a track for a spring stressed tension roller carried by the sash. This construction provides a rolling contact between the sash and the stop, constantly urges the sash to a weather sealing seat, avoids objectionable rattle, and makes allowances for swelling or shrinking of the sash or frame. Another important function of the roller construction in the combination disclosed is to provide sufficient friction between the sashes and their guiding framework to slightly overbalance the actions of the springs with the sashes in any position.

The construction of the weather sealing slideways and associated sealing members, preferably resiliently supported, is considered an important feature of the invention although not being necessarily limited in its application to the particular illustrated combination. As shown, vertically disposed channels opening along the side jambs and secured thereto constitute slideways for sealing members carried by the sashes. As stated, these members are resiliently supported and are flexed while tending to restrain endwise movement of the sashes. Thus it is to be understood that the sealing members position the sashes between the side jambs and, in cooperation with the rollers contacting the spring casings, the sashes are floated for vertical movement on the track portions of the casings and the weather sealing slideways; there being no sliding contact between the sashes proper and the window frame as has been standard practice heretofore. With the foregoing construction, the weather stripping is self adjusting to the swelling and shrinking of the window sashes and frame.

In the accompanying drawings, wherein a preferred embodiment of the invention is disclosed for the purpose of illustration,

Fig. 1 is an inside elevation of a window frame showing the left hand side thereof with parts broken away to illustrate the invention.

Fig. 2 is a vertical cross sectional view of the window frame shown in Fig. 1 with certain parts shown broken away.

Fig. 3 is an enlarged cross sectional view taken on line 3—3 of Figs. 1 and 2.

Fig. 4 is an enlarged fragmental perspective view of certain details of construction of the invention.

Figs. 5 and 6 are enlarged fragmental views showing the action of the weather stripping under endwise movement of the sash.

Fig. 7 is a longitudinal cross sectional view of the tension roller and spring casing.

Fig. 8 is a perspective view of the spring casing.

Fig. 9 is a perspective view of the upper end of the casing shown in Fig. 8 slotted to receive the roller shade.

Having specific reference to the drawings, the window frame 1 is provided with a sill 2, top jamb 3, and side jambs 4. Preferably, as a decided departure from standard practice, the side and top jambs are of plain milled stock which may be cut to proper lengths upon the job; obviating all rabbeting and channeling for stops, etc. An upper sash is indicated at 5 and a lower sash is indicated at 6. As will be more fully discussed, the present invention applies equally as well to metal window frames as to wooden.

The sashes 5—6 are slidably supported for vertical movement between the side jambs 4; having perhaps more clearance therewith for endwise movement than has been heretofore considered practical in prior weather proof construction. It is the ability to loosely fit the sashes within the frame 1, yet firmly float the same therein fully weather sealed, that imparts to the construction the characteristics of freedom from binding resulting from swelling or warping of the sashes or off center application of raising or lowering forces. To this end, vertically disposed casings 7—8 and channels 9—10 are provided between and at the sides of the sashes 5—6 at each end. These elements may be considered in one sense as eliminating the usual inner, outer and parting stops, yet in another as being the equivalent thereof in their double function.

The casings 7—8 are preferably of sheet metal stock presenting a molding effect, as viewed from the inside or outside of the construction, with the portions contacting the side jambs 4 provided with elongated apertures 11 for receiving suitable securing means permitting removal and lateral adjustment of the casings relative to the side jambs. As in the case of the jambs of the frame, the casings 7—8 will likewise be of standard stock which may be readily cut, with a hack saw, to proper length upon the job. In my preferred form, the central portions of the casings 7—8 are provided with turned back flanges 12 constituting track portions for rollers carried by the sashes. Longitudinally extensible members, which may take the form of coiled springs 13, are housed within the casings 7—8 and are in operative connection with the frame 1 and sashes 5—6 for counterbalancing the latter. Longitudinal openings 14 in the casings 7—8 are provided to accommodate the interconnection between the ends of the springs and the sashes.

Although the housing of the springs 13 in the casings 7—8 constituting the inner and outer stops is considered an important feature of the invention, obviously, other well known forms of sash suspension may be advantageously employed in combination with my improved guiding and weather proof means hereinafter set forth. For this reason it is not my intention to limit myself in the appended claims to the type of sash suspension shown.

The means for guiding and weather proofing the sashes comprises longitudinally extending sealing members 15 coextensive with and carried by opposite ends of the sashes. Preferably, the sealing members 15 are formed from resilient metal strips with a rolled bead 16 of substantially the same outside diameter as the inside of the channels 9—10 in which the members 15 are received and which constitute slideways therefor. With the springs 13 disconnected from the frame and sashes and the casings 7—8 housing the same removed from the side jambs 4, the sashes may be directly positioned within or removed from the frame solely by lateral movement. This is made possible by having the channels 9—10 receiving the sealing members 15 open along the side jambs. With the sealing members 15 in interlocking relationship with the channels 9—10 (see Fig. 5), with respect to endwise movement of the sash, any movement of such a character results in a flexure of the members with a ball and socket like action of the beads 16 in the channels 9—10 (see Fig. 6).

The resiliency of the members 15 extends to correctly position the sashes within the frame at all times, preferably, slightly spaced at the ends from the side jambs to avoid sliding contact therewith. It should be readily apparent that the cantilever mounting of the sealing members 15 from the sashes permits self adjustment with the channels 9—10 resulting from swelling or shrinking; the beads 16 always retaining a sealing relationship with their associated channel members. It is to be understood that the channels 9—10 are of a breadth and depth to effect a seal with the beads 16 although the latter as a result of lateral movement of the sashes or inaccuracy in installation are not in abutting relationship with the closed portion of the channels.

Tension rollers 17 are carried by the sashes and roll upon the flanges 12 of the casing 7—8. Aside from imparting a roller bearing action to the movement of the sashes, these rollers, by urging the members 15 to a seat in the slideway constituted by the channels 9—10, eliminates all rattles and objectionable looseness resulting from shrinking and at the same time makes necessary allowance for swelling of the sashes. Another important function of the rollers 17 is to provide the proper amount of resistance to movement of the sashes to slightly overbalance the suspension springs in all positions of the sashes. As shown, the rollers which may be of composition rubber are rotatably supported upon fairly stiff resilient shafts 18 which in the assembled construction are constantly stressed between the casings 7—8 and channels 9—10 urging the sealing members 15 to a seat in the latter. One convenient way to support the shafts 18 of the roller is to anchor one end as 19 within a cylindrical shell 20. In this manner the cantilevered shaft has adequate clearance for flexure and the shell may be readily affixed in the sash by drilling a recess therein of sufficient diameter and depth to accommodate the shell. As shown in Fig. 4, the sash has been recessed at 21 to receive the roller 17.

In Fig. 9, an upper end portion of the spring casing is shown with an aperture 22 of a configuration permitting the insertion and removal of supporting ends of roller shade mechanisms.

Suitable means (not shown) may be located within the casings 7—8 to dampen any objectionable vibration that may take place in the springs 13 during operation.

For the purpose of disclosure, I have shown a single practical and highly satisfactory way of carrying out the present invention. Innumerable changes and modifications should readily suggest themselves to those skilled in the art. For example, the channels 9—10 may be carried by the sashes and the resilient sealing member carried by the side jambs; the appended claims have

been drafted with this in mind. At the same time, I contemplate the possibility of that portion of the sealing member 15 supporting the bead 16 or its equivalent from the sash being of sufficient rigidity to omit the endwise resiliency of the sash from consideration but merely being employed to space the sash from the side jambs as the bead is traversed in the slideway. Furthermore, as heretofore stated, I contemplate the advisability of employing the roller construction and weather seal in combinations other than that disclosed and with this in mind have made specific claim to such structure in window constructions per se.

From the foregoing it should be readily apparent that I have provided a simple frame construction for windows which may be equally as well constructed from metal as wood to produce attractive narrow window trim and mullion between double windows; the sashes being floated in the frame and out of contact therewith upon weather proof roller bearing and slideway structures with means for compensating for all in and out and endwise swelling or shrinking of the sashes to avoid binding and rattling. At the same time the construction is inexpensive and is not of a character necessitating its construction and assembly at the mill.

Having described my invention, what I claim as new and desire to protect by Letters Patent is:

1. In a window construction the combination with a frame having plain side jambs with a sash arranged to slide therebetween, of guiding and weather stripping means for said sash comprising vertically disposed casings secured to said side jambs at one side of said sash, means for effecting rolling contact between said sash and casings including rollers carried by one and engaging track portions presented by the other, vertically disposed interlocking guiding and weather stripping means having one part secured to said jambs upon the other side of said sash and another part carried by said sash for receiving the thrust from said rollers, and sash counterbalancing means housed within said casings.

2. In a window construction, the combination with a frame having plain side jambs with a sash arranged to slide therebetween, of guiding means for said sash, comprising vertically disposed casings secured to said side jambs at one side of said sash, vertically disposed guiding means having one part secured to said jambs upon the other side of said sash and another part carried by said sash for receiving the thrust from said casings, and sash counterbalancing means housed within said casings.

3. In a window construction, the combination with a frame having plain side jambs with a sash arranged to slide therebetween, a guiding means for said sash comprising vertically disposed removable casings secured to said side jambs at one side of said sash, vertically disposed interlocking guiding means having one part secured to said jambs upon the other side of said sash and another part carried by said sash for receiving the thrust from said casings, sash counterbalancing means housed within said casings, the interlocking of said guiding means being effected by lateral movement of said sash whereby the sash may be laterally removed from or placed in the frame upon removal of the casings.

4. In a window construction, the combination with a frame having side jambs with a sash arranged to slide therebetween, of guiding means for said sash comprising vertically disposed removable members secured to said side jambs at one side of said sash, means for effecting rolling contact between said sash and members including rollers carried by one and engaging track portions presented by the other, vertically disposed interlocking guiding means having one part secured to said jambs upon the other side of said sash and another part carried by said sash for receiving the thrust from said rollers, the interlocking of said guiding means being effected by lateral movement of said sash whereby the sash may be laterally removed from or placed in the frame upon removal of the members.

5. In a window construction, the combination with a frame having side jambs with a sash arranged to slide therebetween, of guiding means for said sash comprising vertically disposed removable members secured to said side jambs at one side of said sash, means for effecting rolling contact between said sash and members including rollers carried by one and engaging track portions presented by the other, vertically disposed interlocking guiding means having one part secured to said jambs upon the other side of said sash and another part carried by said sash for receiving the thrust from said rollers, said sash being loosely received between said jambs and guiding means to provide for weathering, said first and second means resiliently positioning said sash restraining lateral and endwise movement thereof.

6. In a window construction, the combination with a frame having side jambs with a sash arranged to slide vertically therebetween, of guiding means for said sash comprising vertically disposed removable members secured to said side jambs at one side of said sash, resiliently supported rollers carried by said sash and engaging portions of said members constituting tracks, vertically disposed guides secured to said side jambs at the other side of said sash, resilient members carried by said sash coacting with said guides, said last members being flexed upon endwise movement of said sash and receiving the thrust from said rollers.

7. In a window construction, the combination with a frame having side jambs with a sash arranged to slide vertically therebetween, of guiding and weather stripping means for said sash comprising vertically disposed removable members secured to said side jambs at one side of said sash, resiliently supported rollers carried by said sash and engaging portions of said members constituting tracks, vertically disposed channel members secured to said side jambs at the other side of said sash, vertically disposed sealing members received in said channels and resiliently supported from said sash for lateral flexure, the resiliency of support of said rollers and sealing members retaining said sash in a firm yet freely slidable state.

8. In a window construction, the combination with a frame having side jambs with a sash arranged to slide therebetween, of guiding means for said sash including an elongated casing secured to said side jambs contiguous with the sash and having a portion thereof constituting a vertical track, sash counterbalancing means housed within said casing, and means carried by said sash and coacting with said tracks for laterally tensioning the operation of the sash.

9. In a window construction, the combination with a frame having a sash slidable therein, of tensioning and guiding means comprising a roller

supported transversely upon the outer end of a resilient cantilever shaft, said shaft being supported in one part of the construction with the roller engaging another part, said parts being relatively movable.

10. In a window construction, the combination with a frame having a sash slidable therein, of tensioning and guiding means comprising an elongated casing having a resilient shaft cantilevered therein, said casing being supported within a recessed portion of one part of the construction, and a tensioning roller supported transversely upon the outer end of said shaft for engaging with another part, said parts being relatively movable.

11. In a window construction, the combination with a frame having side jambs and a sash slidable therebetween, of weather stripping and guiding means comprising vertically disposed channel members constituting a slideway secured to and opening along said side jambs, vertically disposed cantilevered strips of resilient material carried by said sash, extending laterally and being substantially coextensive therewith, said strips being provided with enlarged heads at the free ends slidably engaged within said channel members to provide a weather seal, said heads having a ball and socket action in said channel members upon endwise movement of the sash.

12. In a window construction, the combination with a frame one side of which lies substantially within a single plane, of a sash positioned in said frame with its sides thereof spaced from said frame, means for guiding said sash for vertical movement in said frame comprising vertically disposed members secured at one side of said plane to said frame and spaced at opposite sides of said sash, and resiliently supported means between said members and sash rendering said sash capable of in and out and endwise movements yet floating said sash free from sliding contact with said frame.

13. In a window construction the combination of a frame having side jambs, of a sash slideable therebetween, of weather stripping and guiding means comprising vertically disposed channel members constituting a slideway secured to and opening along said side jambs and laterally extending cantilevered resilient guiding means secured to said sash and having the free edges thereof disposed in said channel members for resiliently maintaining said sash in spaced relation to said jambs.

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