

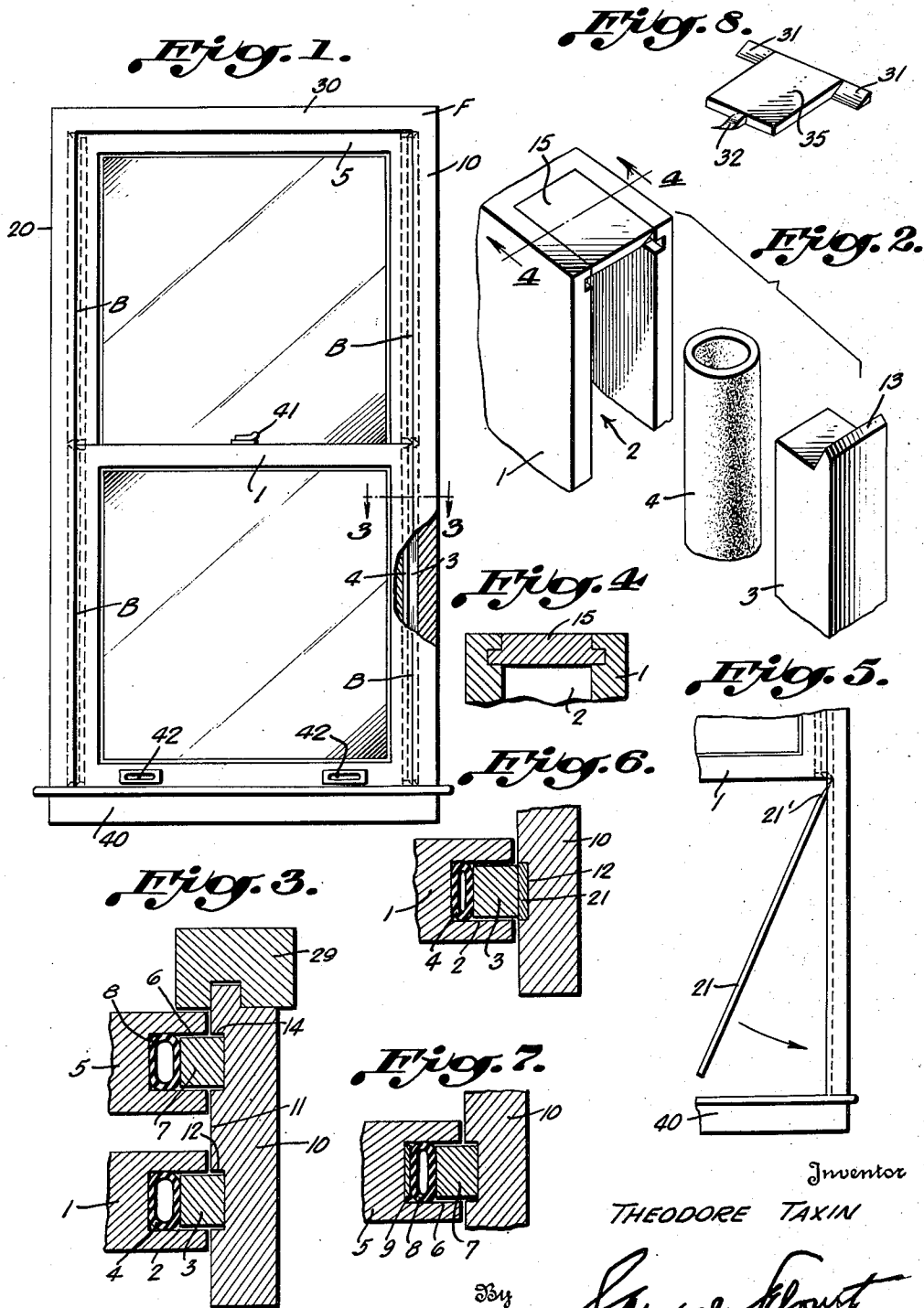
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WINDOW FRAME AND SASH ASSEMBLY

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WINDOW FRAME AND SASH ASSEMBLY

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This invention relates to a window frame and window sash assembly and more particularly to such an assembly embodying a friction balance.

It is the object of the invention to provide a window jamb or frame construction which is rugged and economical in construction and one which may have associated therewith one or more movable window sashes which may be adjusted within the window frame at any desired positions without need for any expensive balancing sash weights or springs.

It is a further object of the present invention to provide a sash balance which is of simple construction, of few parts and which requires but few simple fabricating procedures. The friction-type balance in accordance with the invention is self-aligning, is capable of smooth and easy operation despite imperfect setting of the window frame in the course of installation or as a result of warpage and shrinkage of the parts, and is widely adaptable to window sashes having a large range of weights.

It is another object of the invention to provide a window frame assembly with movable window sashes therein which fit tightly within the frame to occasion no rattling of the windows, and which are weather-tight to prevent drafts or the transmission of hot or cold air currents around the edges of the assembly.

Another object of the invention is to provide for the easy removal and replacement of the window sashes from the frame for the purpose of repair or for the purpose of proper maintenance, such as washing, cleaning, painting or repairing. The window sashes are easily removable from the inside of the building to facilitate the washing of outside surfaces of the windows if such a procedure is preferred.

The invention also contemplates a convenient adjustment of the relative positioning between the parts of the assembly in order to compensate for wear between these parts as well as for variations in dimensioning of the parts, without necessitating an accurate interfitting of the constituent elements of the assembly in the course of their initial fabrication.

The invention proceeds upon the principle of providing a simple window jamb or frame having the opposite sides thereof or stiles formed with shallow grooves for the purpose of guiding the window sashes in the frame in the course of their opening and closing movements. These shallow guide grooves are adequate to confine the window sashes in the course of their movements without need for any other parting strips between the

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sashes. The window sashes in turn may be provided with recesses in the vertical edges thereof in each of which may be disposed a length of hollow flexible tubing of rubber or like material, which is superposed by a guiding strip extending within the recess and which is forced outwardly therefrom by the compression of the length of tubing towards the vertical side of the window frame and against the base of the shallow groove along which it slides. The length of rubber tubing extending for the whole length of each recess acts as a continuous length of spring material pressing against the inwardly disposed edge of the guiding strip to force the same tightly against the base of the corresponding shallow groove. The frictional force exerted between the sash and the frame depends upon the specific character of the hollow rubber tubing and its wall thickness and this tubing may be varied to obtain desired frictional effects in dependence upon the weights of the sashes being handled, although any one type of tubing is effective for a wide range of weights. At the same time, the tubing in its compressed state spans the complete width of the recess in the edge of the window frame, and thereby operates as an effective weather-stripping element to exclude dirt, dust and air currents from one side of the window to the other. As an additional refinement, one or more lengths of spacers of wood, plastic, cardboard, fiber-board or other suitable material of small thickness may be interposed in the base of any recess in the window sash which may require it, to operate as a shim therein, and to compensate for the wear of the parts or the decrease in resilience of the rubber tubing.

The invention contemplates a convenient and rapid mode of assembling and removing the window sashes from the frame. Such operations are performed with the aid of a removal strip or camming bar of a thickness corresponding to the depth of the shallow grooves in the window frame. This bar is wedged in between the base of the groove and the outer edge of the guiding strip in the window sash so that the sash, when moved along the window frame with the removal strip within the guide groove, acts to press the guiding strip inward into the window sash so that the same becomes flush with the inner boundaries of the window frame and may be rocked out therefrom, since the guiding strip no longer engages within the groove. This manipulation permits one or both sashes to be removed easily from the frame from the inside of

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the building so that the windows can be washed or serviced very conveniently.

Other objects and purposes will appear from the detailed description of the invention following hereinafter, taken in conjunction with the accompanying drawing, wherein

Fig. 1 is a front elevation of the window frame with sashes therein, with a small part thereof shown in section;

Fig. 2 is a perspective view showing the assembly of the guiding strip and resilient backing therefor adapted to be disposed in one of the edges of the window sash;

Fig. 3 is a horizontal sectional view along line 3—3 of Fig. 1 when both sashes are in their lowered positions;

Fig. 4 is a vertical sectional view along line 4—4 of Fig. 2;

Fig. 5 is a front elevation of a portion of the window shown in Fig. 1 with the lower window sash in raised position preparatory to the removal thereof from the frame;

Fig. 6 is a horizontal sectional view of a part of the window corresponding to Fig. 3, with the removal strip in place within the guide groove preparatory to the rocking movement of the window sash around a vertical axis;

Fig. 7 is a horizontal sectional view corresponding to Fig. 3 showing the provision of a shim-ming plate behind the resilient tubing to compensate for wear of the parts; and

Fig. 8 is a perspective view of an alternative form of metal capping for the ends of the vertical recesses in the window sashes.

In Fig. 1 is shown a complete window assembly consisting of a rectangular frame F formed by vertical sides or stiles 10 and 20, upper capping strip 30 and lower sill 40. The frame may be assembled, according to known wood-working procedures which constitute no part of the present invention.

A pair of window sashes 1 and 5 are adapted to move up and down within the window frame and remain in the position to which they are moved without the aid of any counterbalancing sash weights or springs. The retention of the window sashes in any of their fixed positions is effected by means of the frictional force exerted by guide strips formed on one or both sides of each window sash acting against one or both of the inner vertical walls of the window frame. These friction balances are the same for each window sash, and on each side of the window sashes when such are employed on both sides, so that the description of these friction balances as they are shown at the four places B indicated in Fig. 1 will be unnecessary.

Shallow grooves 12 and 14 (Fig. 3) are provided on the inner faces of the vertical stiles 10 and 20 in order to provide trackways for the cooperating parts of the lower sash 1 and the upper sash 5 which, of course, are provided with panes of glass and which are also fitted with suitable hardware for locking the two sashes against relative movement and raising the lower sash, as designated by elements 41 and 42, respectively. A longitudinal recess is cut along substantially the complete edge of each window sash, this recess being designated 2 for the lower sash and 6 for the upper sash. In order to simplify the woodworking operations, these recesses are cut within the edge of the window sash for the complete extent thereof and are then capped at the ends thereof by a capping element such as 15, shown in Fig. 2, which en-

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gages the opposite faces of the window sash by means of a mortise and tenon joint, as is more clearly shown in Figs. 2 and 4. An alternative form of capping the longitudinal recesses in the extremities of the window frame is shown in Fig. 8. In this modification of the invention the capping element is made of metal having a main closure surface 35 which is forced into place at the ends of the window frame by lateral prongs 31 being forced into the opposite edges of the recess and the central prong 32 engaging the window frame at the base of the recess.

The recess thus formed in each window frame receives a piece of flexible hollow tubing, 4 in the lower sash and 8 in the upper sash, this tubing being formed of synthetic or natural rubber having sufficient wall thickness and resilience so that the same may exert a substantial resilient force when the same is distorted from its normal cylindrical cross-section to that of the general oval cross-section shown in Fig. 3. A guiding strip 3 is inserted within the recess 2 and extends therefrom by virtue of the spring action exerted by the piece of tubing 4 when the same is compressed, so that the outer edge of the guiding strip 3 engages within the base of the shallow groove 12 with a predetermined degree of tightness which will enable the window sash to be raised and lowered within the frame without undue difficulty and yet will remain in set position without dropping as a result of the weight of the window sash.

The length of tubing 8 in the recess 6 of the upper sash 5 is backed up by the guiding strip 7 which is adapted to slide along and within the shallow groove 14 on the inner face of the vertical stile 10. The intermediate portion 11 between the grooves 12 and 14 requires no parting strip to maintain the proper spacing between the window sashes in the course of their raising and lowering movements.

While in the preferred embodiment of the invention the provision of movable guiding strips backed up by pieces of resilient tubing is provided on the opposite side of each window sash as shown at B in Fig. 1, some of the advantages of the invention may be realized when fixed guiding strips on the respective opposite sides are employed which are maintained in proper co-operative position with the corresponding guide grooves in the vertical stile 20 by the pressure exerted on the opposite side of the window frame by the resilient tubing in the respective window sashes as described above.

As shown in Fig. 3, the rear wall of the window frame is provided with a framing border 29 which overlies the upper sash 5 so that the same can not be removed from the outside of the building, but only from the inside thereof as explained below.

In Fig. 5 is shown the method of manipulation of the window sashes in order to effect their removal from the inside of the building. To facilitate this removal, the guiding strips 3 and 7 are provided with beveled extremities which are shown clearly in Fig. 2 at 13. A removal strip 21, of a length nearly that of the length of a window sash, is provided with a tapered end 21'. The lower sash 1 is moved to its raised position, as shown in Fig. 5, whereupon the end 21' of the removal strip 21 is wedged behind the beveled lower end 13 of the guiding strip 3 and thereafter the removal strip 21 is swung in a counterclockwise direction as shown in Fig. 5 to place this strip within the groove 12, as shown in Fig. 6,

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the same fitting flush with the inner wall of the vertical stile in view of the fact that the removal strip is of a thickness corresponding to at least the depth of the groove 12. Thereafter the sash 1 is lowered and the tapered extremity 21' of the removal strip 21 cooperating with the extremity 13 of the guiding strip 3, cams the latter inwardly as shown in the sectional view of Fig. 6, incidentally compressing the tube 4 to a greater degree. It is then possible to swing the window sash 1 around a vertical axis on the opposite side of the sash and to remove the same from the window frame.

The same procedure may be followed to remove the upper frame by first wedging the removal strip 21 into the corresponding guide groove 14, whereupon relative movement between the window sash and the strip forces the guide strip from the guide groove in order to free the same for rocking movement from the confines of the window frame after the lower sash has been removed.

In replacing the window sashes within the frame the guiding strips are pressed inwardly by hand as they are inserted within the frame and spring out when they become aligned with the guide grooves.

In the event that the window assembly experiences some wear between the parts, having the effect of decreasing the tightness of the friction balance, the invention provides a convenient mode of compensating for such wear by inserting within the base of any recess a thin plate of wood, cardboard, plastic, fiber-board or other suitable material, which may have a thickness of about $\frac{1}{16}$ ". This thickness of material gives rise to a greater degree of compression of the hollow tube of flexible material and results directly in a greater resilient force exerted thereby on the guiding strip fitted within the recess so that the same may engage the corresponding guiding groove more tightly.

The constituent parts of the assembly are of simple construction and require a minimum of maintenance.

While I have described my invention as embodied in a specific form and as operating in a specific manner for purposes of illustration, it should be understood that I do not limit my invention thereto, since various modifications will suggest themselves to those skilled in the art without departing from the spirit of my invention, the scope of which is set forth in the annexed claims.

I claim:

1. A window frame and sash assembly comprising a pair of vertical stiles on the opposite sides of the window frame provided with opposed inwardly facing grooves for a window sash movably mounted along said grooves and provided with a friction balance, said sash having a recess extending along a vertical edge thereof, resilient tubing housed within said recess extending along substantially the whole length thereof, and a guiding strip for covering said recess ex-

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tending therewithin and resiliently pressed outwardly therefrom by said tubing into the groove in the frame adjacent thereto.

2. A window frame and sash assembly comprising a pair of vertical stiles on the opposite sides of the window frame provided with a pair of opposed juxtaposed inwardly facing grooves for a pair of window sashes movably mounted along said grooves and each provided with a friction balance, each of said sashes having a recess extending along a vertical edge thereof, resilient tubing housed within each of said recesses extending in parallel to the vertical edges of said sash, and a guiding strip for covering each of said recesses extending therewithin and resiliently pressed outwardly therefrom by said tubing into the groove in the frame adjacent thereto.

3. A window frame and sash assembly comprising a pair of vertical stiles on the opposite sides of the window frame provided with opposed inwardly facing grooves for a window sash movably mounted along said grooves and provided with a friction balance, said sash having a recess extending along the opposite vertical edges thereof, flexible rubber tubing housed within each recess along substantially the whole length thereof, and a detachable guiding strip for covering each recess extending therewithin and resiliently pressed outwardly therefrom by said tubing into the groove in the frame adjacent thereto.

4. A window frame and sash assembly comprising a pair of vertical stiles on the opposite sides of the window frame provided with a pair of opposed juxtaposed inwardly facing grooves for a pair of window sashes movably mounted along said grooves and each provided with a friction balance, each of said sashes having a recess extending along the opposite vertical edges thereof, flexible tubing within each recess extending in parallel to the vertical edges of said sashes, and a detachable guiding strip for covering each recess extending therewithin and resiliently pressed outwardly therefrom by said tubing into the groove in the frame adjacent thereto.

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