

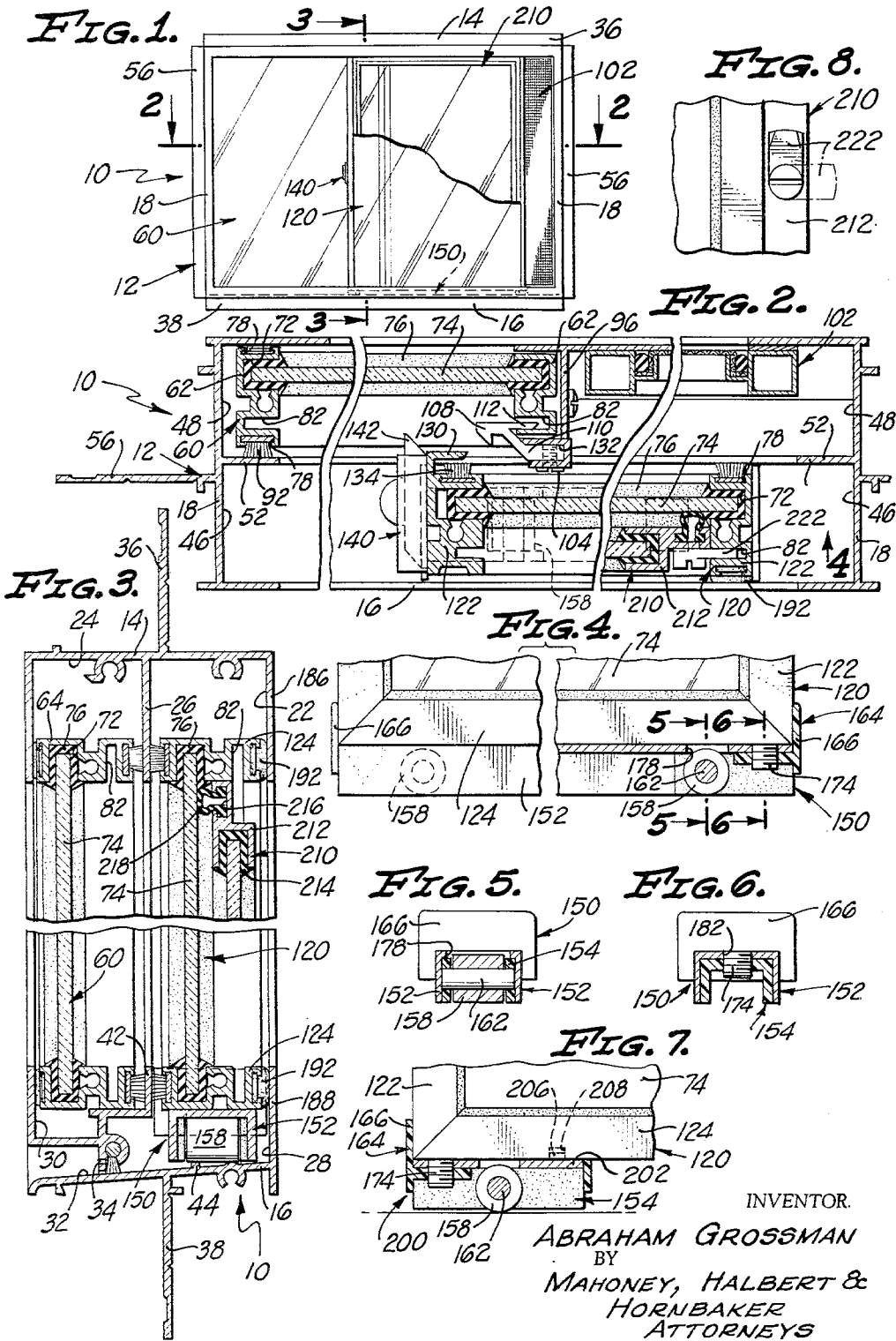
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CLOSURE WITH LONGITUDINALLY MOVABLE SASH

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CLOSURE WITH LONGITUDINALLY  
MOVABLE SASH

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This invention relates to a closure having a longitudinally movable sash mounted in the frame thereof and, more particularly, to a closure which is characterized by the fact that the longitudinally movable sash of said closure is freely movable within said frame despite the fact that it does not incorporate supporting rollers, wheels, or the like.

Longitudinally movable sashes of conventional closures may be generally classified into two categories; that is, those in which the lower rail of the sash is frictionally engaged upon the bottom of a track and slides thereupon, or those in which the lower rail is provided with rollers or wheels engageable with the track to facilitate longitudinal movement thereof. In both cases, removal of the longitudinal movable sash for cleaning or reglazing purposes entails considerable manipulation of the sash by lifting it up with respect to the frame in order that it may be displaced from operative engagement with the upper and lower tracks of the frame.

It is therefore, an object of my invention to provide a closure having a longitudinally movable sash whose upper and lower rails are mounted for movement in corresponding upper and lower tracks, there being carriage means disposed in said lower track adapted to receive and support said lower rail and to move concomitantly and equidistantly with said sash in order that said sash may freely move in said lower track despite the absence of rollers or wheels thereupon.

Another object of my invention is the provision in a closure of the aforementioned character of carriage means which provides an elongated bed engageable with the lower track of the associated frame, said carriage means including connecting means which are engageable with the lower rail of the aforesaid sash to facilitate concomitant and equidistant movement of said sash and said carriage means.

The frames of conventional closures of the general type of that under discussion here are characterized by relatively deep headers which are necessitated by the fact that the sash must be pushed upwardly a substantial distance in the upper track formed in the header to facilitate the removal thereof. Therefore, the headers of frames of conventional closures are characterized by a depth which is substantially equivalent to, and sometimes greater than, the depth of the sill. This results in a monotonous appearance which is inherently contrary to the design principles customarily utilized in other arts.

A further object of my invention is the provision, in a closure of the aforementioned character, of a header which is of substantially the same vertical dimension as the sill due to the fact that the longitudinally movable sash can be removed from operative relationship with the upper and lower tracks by a relatively slight vertical movement thereof, since only a very small portion of the lower rail of the sash is located in the lower track and the sash need merely be raised a vertical distance equivalent to the extent to which the lower rail penetrates in the lower track.

A further object of my invention is the provision of carriage means of the aforementioned character wherein said carriage means includes leveling means for said sash.

Other objects and advantages of the invention will be

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apparent from the following specification and the accompanying drawing, which is for the purpose of illustration only, and in which:

FIG. 1 is a front elevational view of a closure constructed in accordance with the teachings of the invention;

FIG. 2 is a longitudinal, sectional view taken from the broken line 2—2;

FIG. 3 is a vertical, sectional view taken from the broken line 3—3 of FIG. 1;

FIG. 4 is a fragmentary, sectional view of the longitudinally movable sash of the closure taken in the direction of the arrow 4 of FIG. 2;

FIG. 5 is a vertical, sectional view taken on the broken line 5—5 of FIG. 4;

FIG. 6 is a vertical, sectional view taken on the broken line 6—6 of FIG. 4;

FIG. 7 is a fragmentary, sectional view of an alternative form of the carriage utilized to convey the movable sash of the closure; and

FIG. 8 is an enlarged, fragmentary view showing the manner in which the storm sash adapted to be utilized in conjunction with the closure is affixed in operative relationship with the movable sash thereof.

Referring to the drawing, and particularly to FIGS. 1—3 thereof, I show a closure 10 constructed in accordance with the teachings of the invention and including a frame 12 which is adapted to be installed in a corresponding opening, not shown, in a building structure, said frame including a head 14, a sill 16, and spaced jambs 18 adapted to maintain said head and said sill in operative relationship with each other.

All of the elements of the frame 12 are formed from aluminum extrusions, but it will be obvious to those skilled in the art that the teachings of the invention may be applied with equal cogency to frames and closures constructed of alternative materials such as wood, and the like. The head 14, as best shown in FIG. 3 of the drawing, includes an inner channel 22 defining an upper track and an outer channel 24 defining a corresponding upper track. The upper tracks 22 and 24 are separated from each other by an intermediate integral, depending rib 26.

The sill 16 incorporates a channel 28 defining an inner track and a channel 30 defining an outer track. Weep holes 32 are provided in the sill 16 which communicate through orifices 34 with the inner track constituted by the channel 28 to permit the drainage of water therefrom. Both the head 14 and sill 16 have projecting mounting flanges 36 and 38, respectively, adapted to be engaged with a corresponding portion of the building structure, not shown, in which the closure 10 is installed. It will be noted that the inner channel 28 of the sill 16 is separated from the outer channel 30 by means of an angular web 42 and that the bottom of the inner channel 28 is provided with an upstanding rail 44, for a purpose which will be described in greater detail below.

Each of the jambs 18 is of identical cross section and includes an inner channel 46 separated from an outer channel 48 by means of an intermediate web 52, as best shown in FIG. 2 of the drawing. The jambs 18 are provided with an installation flange 56 to facilitate the installation of the frame 12 in operative relationship with the structure in which the closure 10 is located.

A fixed sash 60 is, as best shown in FIGS. 2 and 3 of the drawing, secured in the upper track constituted by the channel in the head 14 and the lower track constituted by the channel 30 in the sill 16. The fixed sash includes a pair of stiles 62, FIG. 2, which serve to maintain a pair of rails 64 in operative relationship with each other. The left-hand stile 62, as viewed in FIG. 2 of the drawing, and the upper and lower rails 64 are fabricated from an identical extrusion, while the right-hand stile 62 is basically similar to the aforesaid extrusion with

minor structural variations which will be adverted to hereinbelow. The rails 64 and stiles 62 are connected in operative relationship with one another by screws, not shown.

The extrusion from which the left-hand stile 62 and rails 64 is fabricated includes a glass receiving channel 72 which is adapted to receive the glass pane 74 and associated vinyl or rubber glazing strip 76, as best shown in FIGS. 2 and 3 of the drawing. Weatherstrip receptacles 78 are provided on the opposite faces of the extrusion and the inner one of the receptacles is adapted to receive a length of weatherstrip 92, as best shown in FIG. 2 of the drawing. The extrusion is also provided with a relatively deep, narrow channel 82, for a purpose which will be described in greater detail below. The only difference between the extrusion constituting the left-hand stile 62 and upper and lower rails 64 and that constituting the right-hand stile 62, as viewed in FIG. 2 of the drawing, is the fact that the weatherstrip receptacles 78 on the opposite faces of the extrusion have been eliminated from the extrusion constituting the right-hand stile 62.

The fixed sash 60 is maintained against movement in the frame 12 by means of a tie bar 96 which is affixed to the head 14 and the sill 16 in the manner disclosed in my co-pending application Serial No. 58,000, filed September 23, 1960, and entitled Fixed and Movable Sash Window Construction, now Patent No. 3,111,726 patented November 26, 1963. Therefore, the details of securement of the tie bar 96 to the frame 12 will not be disclosed herein. A screen 102 is adapted to be mounted in operative relationship with the channels 28 and 30 in the head 14 and sill 16, respectively, and since the screen constitutes no part of the disclosed invention, its construction will not be adverted to herein detail.

Mounted in operative relationship with the tie bar 96 by means of a screw 104, as best shown in FIG. 2 of the drawing, is a latch keeper 108 which incorporates a mounting leg 110 adapted to be received in a corresponding receptacle in the tie bar 96 and a securement leg 112 which is engaged in the corresponding channel 82 of the extrusion constituting the right-hand stile 62. Thus, the keeper 108 serves the dual function of a latch keeper and retention means for the fixed sash 60 by preventing the fixed sash 60 from being shifted to the left, as viewed in FIG. 2 of the drawing, by the provision upon said keeper of the securement leg 112.

Operatively associated with the frame 12 is a longitudinally movable sash 120 which, as best shown in FIGS. 2-4 of the drawing, includes vertical stiles 122 which serve to maintain horizontal upper and lower rails 124 in operative relationship with each other. The right-hand vertical stile 122 and the upper and lower rails 124 are all formed from an extrusion which is identical in configuration with the extrusion constituting the left-hand stile 62 and the upper and lower rails 64 of the fixed sash 60, and the corresponding portions of said extrusions are, therefore, designated by identical reference numerals to facilitate the disclosure of the invention.

The left-hand stile 122 of the movable sash 120 differs slightly from the extrusion constituting the remainder of the sash in that it is provided, as best shown in FIG. 2 of the drawing, with an interlocking flange 130 adapted to co-operate with the corresponding receptacle 132 in the tie bar 96 to provide, in conjunction with weatherstripping 134, a weather-tight seal, between the right-hand stile 62 of the fixed sash 60 and the left-hand stile 122 of the movable sash 120. In all other respects, the extrusion constituting the left-hand stile 122 of the movable sash 120 is basically similar to the extrusion constituting the remainder of the components of the movable sash.

Mounted in operative relationship with the left-hand stile 122 of the movable sash 120 is a latch 140, which includes a spring-biased bolt 142 adapted to engage the

keeper 108 and to lock the movable sash 120 in operative relationship with the fixed sash 60.

To facilitate the movement of the longitudinally movable sash 120 within the frame 12 of the closure 10, the bottom rail 124 of said sash is mounted upon carriage means 150 which, as best shown in FIGS. 3-6 of the drawing includes a elongated, inverted channel-shaped chassis 152 which may be formed from an aluminum extrusion or shaped part, the flat upper surface of the channel constituting a bed, and which has mounted in its opposite extremities an insert 154 which is also of channel-shaped configuration and conforming to the corresponding shape of the chassis 152.

The insert 154 incorporates a roller 158 mounted upon an axle 162, connecting means 164 constituted by an upwardly directed flange or prong 166 adapted to engage the corresponding portion of the longitudinally movable sash 120, and leveling means constituted by a leveling screw 174 adapted as best shown in FIG. 4 of the drawing, to extend upwardly into engagement with the underside of the lower rail 124 to permit said rail to be adjusted upon the chassis 152 to properly orient the longitudinally movable sash 120 with respect to the corresponding frame 12. It will be noted that the chassis 152 is provided with clearance openings 178 adjacent its opposite extremities to permit the associated rollers 158 to roll freely and that a corresponding aperture 182 is provided in the chassis 152 adjacent its extremities to permit the leveling screws 174 to extend upwardly therethrough into engagement with the underside of the corresponding rail 124 of the longitudinally movable sash 120.

The rollers 158 are engaged both upon the bottom of the associated track constituted by the channel 28 in the sill 16 of the frame 12 and upon the upwardly extending rail 44 formed integrally with the sill 16 so that the carriage means 150 will be maintained in a level orientation during its movement in the channel 28.

Therefore, when the latch bolt 142 is released from operative engagement with the keeper 108 to permit free movement of the longitudinally movable sash 120 of the closure 10, the movable sash 120 is translated in the channel 28 upon the carriage means 150. Because of the positive connection established by the connecting means 164 at the opposite extremities of the chassis 152 of the carriage means 150, the carriage means 150 moves equidistantly and simultaneously with the sash 120. Therefore, the necessity for providing rollers, wheels or other types of attachments in the lower rail itself is eliminated and all of the advantages of the conventional construction incorporating such rollers or wheel as inherent portions of the movable sash structure are achieved in addition to certain advantages not attainable by conventional constructions of the character adverted to immediately hereinabove.

For instance, the provision of the carriage means 150 permits the movable sash 120 to be removed from operative relationship with the associated channel 28 because, as best shown in FIG. 3 of the drawing, the lower rail 124 penetrates a relatively short distance into the channel 28 and, thus, the movable sash 120 need merely be raised very slightly in order that it be released from operative engagement with the channel 28 of the sill 16. The movable sash 120 is freely releasable from the elongated carriage 150 because it need merely be lifted upwardly to disengage the connecting means constituted by the flange 166 from the adjacent extremities of the movable sash 120. This is in contradistinction to conventional constructions where the addition of rollers, wheels or other means of translating the movable sash in the associated channel necessitates the relatively extensive upward movement of the movable sash in order to release it from operative engagement with the associated frame.

Another advantage of the provision of the carriage means 150 is that the vertical exterior walls 186 and 188 of the channels 22 and 28, respectively, can be of approxi-

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mately the same height since it is not necessary to provide the relatively deep upper channel previously entailed to accomplish the removal of the conventional roller-incorporating movable sashes from the associated frames.

Another feature of the provision of the carriage means 150 lies in the fact that the movable sash 120 can be readily leveled to accommodate it to the corresponding frame 12. This is accomplished by the mere expedient of upward or downward adjustment of the leveling screw 174 which adjusts the vertical position of the lower rail 124 with respect to the top of the chassis 152 of the carriage means 150.

It will be noted that the movable sash 120 is provided with anti-friction buttons 192, formed from plastic or other materials, and, as best shown in FIGS. 2 and 3 of the drawing mounted in the weatherstrip receptacles 78 of the associated extrusions. The provision of the anti-friction buttons 192 facilitates the movement of the movable sash 120 in the associated channels 22 and 28 of the head 14 and sill 16, respectively.

An alternative form of carriage means 200 is illustrated in FIG. 7 of the drawing. Instead of being incorporated in a continuous chassis, separate chassis 202 are provided at the opposite extremities of the lower rail 124 and are adapted to receive inserts 154 identical with the inserts 154 described hereinabove. The chassis 202 is provided with auxiliary connecting means constituted by a prong 206 adapted to be received in a corresponding recess 208 provided in the lower rail 124, which serves to prevent the chassis 202 from being displaced from operative relationship with the lower rail 124 while still permitting the movable sash 120 to be removed from operative relationship with the carriage means 200.

A storm sash 210 is, as best shown fragmentarily in FIGS. 2 and 3 of the drawing, adapted to be mounted in operative relationship with a movable sash 120. The storm sash 210 is fabricated from one extrusion 212 which, as best shown in FIG. 3 of the drawing, includes a glass receiving channel 214 and a weatherstrip receiving receptacle 216 for a weatherstrip 218 which impinges upon the corresponding surface of the pane 74 of the movable closure 120. Mounted upon the extrusion 212 of the storm sash 210 is a plurality of rotatable latch blades 222 which are adapted to be rotated into operative engagement with the corresponding deep channel 82, as best shown in FIG. 2 of the drawing. In this manner, the storm sash 210 can be readily mounted in operative engagement with or dismounted from operative engagement with the extrusions constituting the movable sash 120.

I thus provide by my invention a closure which incorporates a longitudinally movable sash adapted to be supported upon separate carriage means which is designed to be moved simultaneously and equidistantly with the movable sash. Although the invention has been described as incorporated in a closure having one longitudinally movable sash, it will be apparent to those skilled in the art that a plurality of movable sashes or one fixed and one movable sash can be incorporated in the closure without departing from the teachings of the invention. Of course, the teachings of the invention can be applied

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with equal cogency to both windows and doors and it is not intended that they be limited to any specific type of closure.

I claim:

1. In a closure, the combination of: a frame consisting of a header, said header incorporating an upper track and a sill, said sill incorporating a lower track, said sill and said header being maintained in operative and spaced relationship with each other by jambs connected between the opposite extremities thereof; a longitudinally movable sash located in said frame and having upper and lower rails engageable, respectively, with said upper and lower tracks and stiles at the opposite sides thereof for maintaining said upper and lower rails in operative and spaced relationship with each other; and carriage means located in said lower track externally of said lower rail and extending the full length of said lower rail, said carriage means including a bed engageable with said lower rail, said bed having rollers connected thereto to facilitate movement of said carriage means in said lower track and connecting means operatively connecting said bed to said lower rail to prevent relative longitudinal movement therebetween, said connecting means being constituted by upwardly directed members on the extremities of said bed engageable with the corresponding extremities of said sash at the lower edge of said sash, said sash being freely movable in an upward direction to free it from said connecting means for removing said sash while said carriage means remains in said lower track.

2. In a closure, the combination of: a frame including a header incorporating an upper track, a sill incorporating a lower track, and jambs disposed between the opposite extremities of said sill and header adapted to maintain said sill and header in operative relationship with each other; a longitudinally movable sash mounted in said tracks and including upper and lower rails and stiles operatively connecting the opposite extremities of said rails; a carriage disposed in said lower track externally of said lower rail and extending the full length of said lower rail and including an elongated bed supporting said lower rail by engagement with the underside of said lower rail and a plurality of rollers connected to said bed, said carriage having connecting means thereupon securing said bed to said sash but permitting said sash to be freely lifted out of said frame while leaving said carriage in said lower track; and leveling means incorporated in said bed and engageable with the underside of said lower rail for adjusting said sash in said frame.

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