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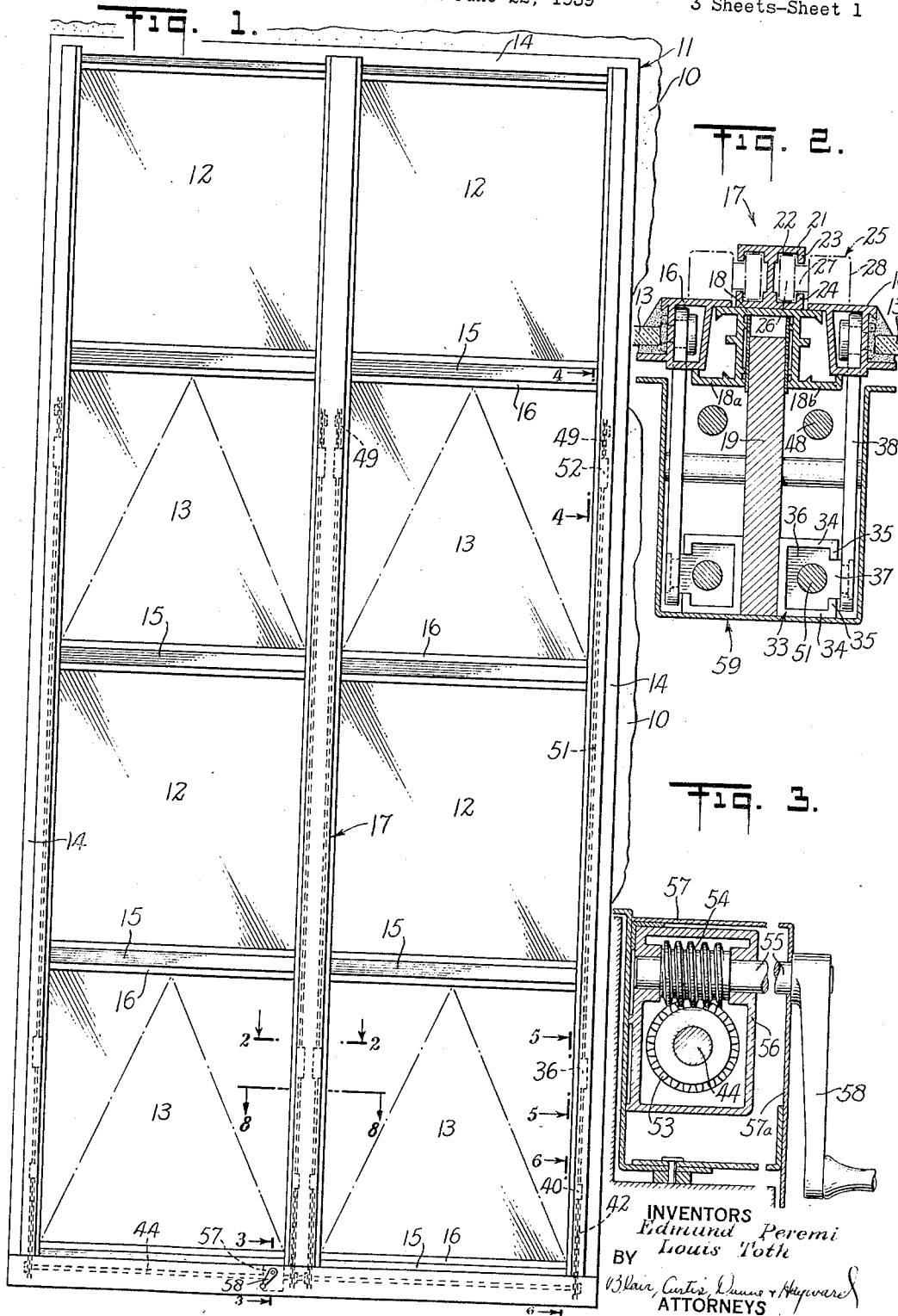
E. PEREMI ET AL

2,315,542

WINDOW

Filed June 22, 1939

3 Sheets-Sheet 1



April 6, 1943.

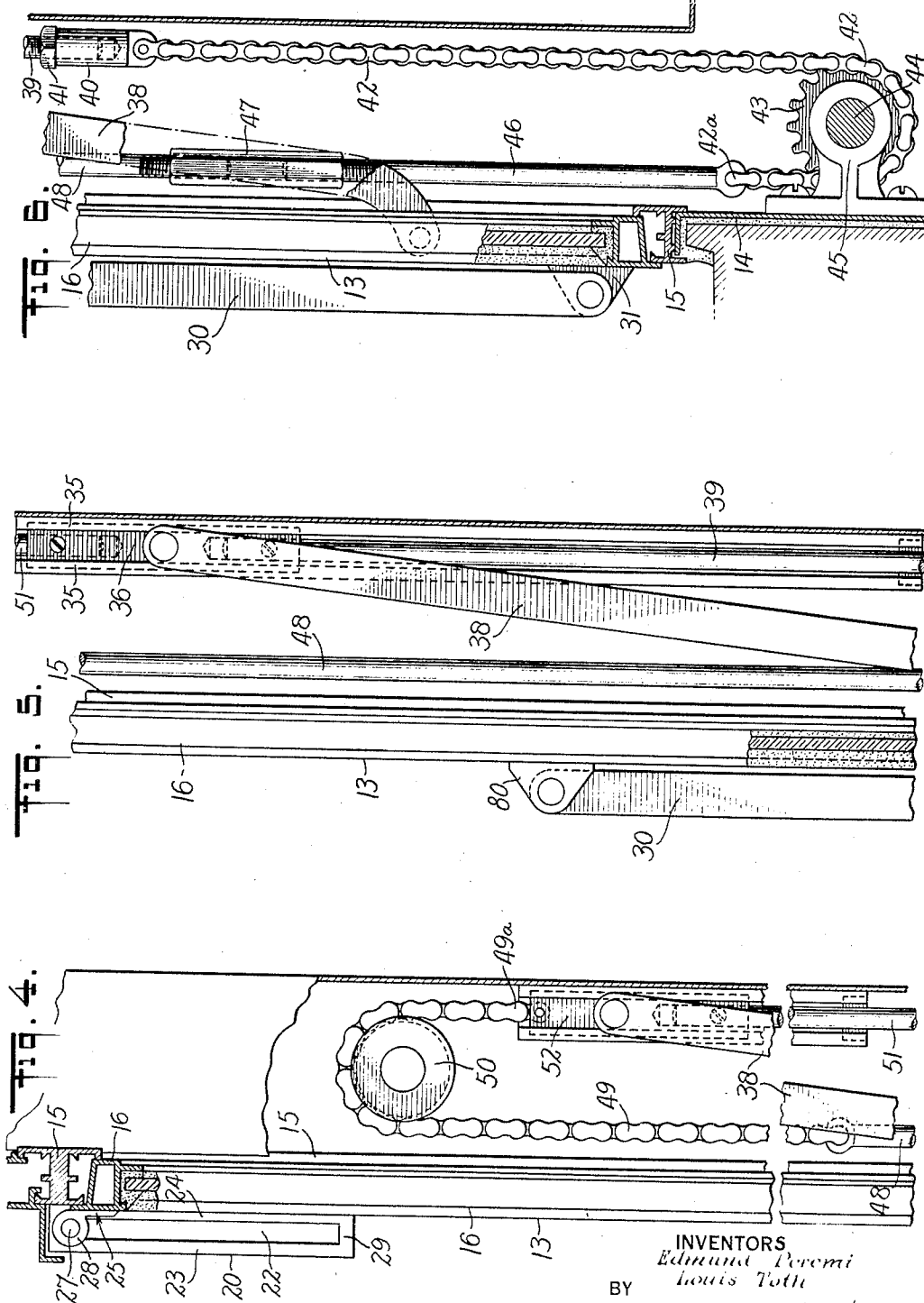
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WINDOW

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3 Sheets-Sheet 2



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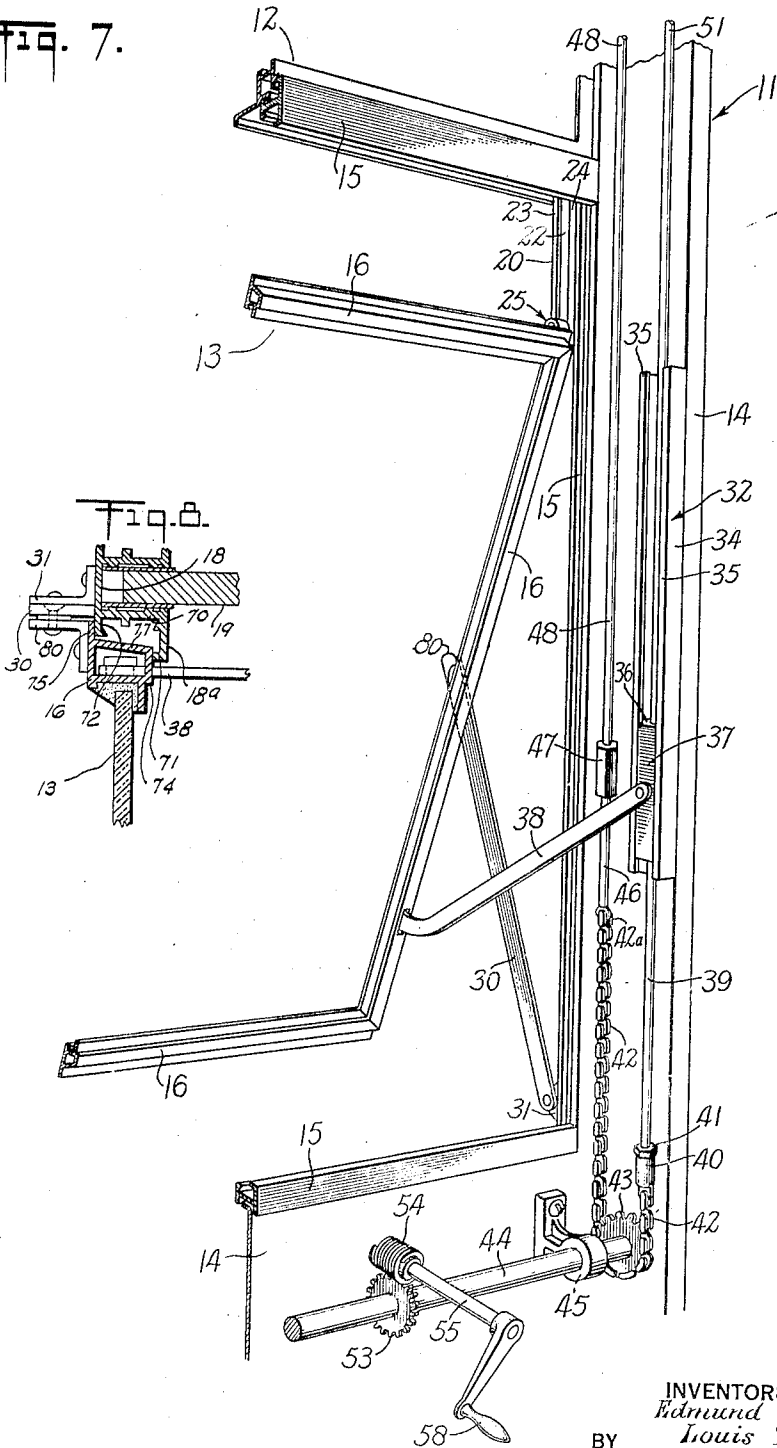
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Fig. 7.



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WINDOW

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7 Claims. (Cl. 268—21)

This invention relates to a window construction of either projected or top hinged type, and more particularly to the operation thereof.

It is among the objects of this invention to provide a window the frame of which may be narrow, but of great strength to support large panes of glass without deflection. Another object of the invention is to provide a window operator having pairs of links on either side of the sash controlling the opening and closing thereof and supporting said sash in open position, one link of a pair being entirely outside the sash when the sash is in closed position and the other link of the pair being entirely inside the sash whereby the seal between the sash and frame is not broken by the connection of the links to the sash, or the links themselves when the sash is in closed position and a weather tight window is provided. Another object is to provide a window of the above nature which can be installed with a number of others of the same nature, and all of which may be operated simultaneously. Another object is to provide operating mechanism for a single window or for a group of windows of the character referred to. A further object is to provide a window operator particularly for pivoted sliding type windows in which only a small operating member extends inside of the plane of the frame and laterally outside of the area of the window openings irrespective of the position of the sash whereby screens, Venetian blinds, blackout curtains or the like may be conveniently mounted on the inside of the frame and will not be interfered with by the operator. Other objects will be in part apparent and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combination of elements, and arrangements of parts as will be exemplified in the structure to be hereinafter described, and the scope of the application of which will be indicated in the following claims.

In the drawings, in which is shown one embodiment of our invention,

Figure 1 is an inside elevation of a group arrangement of the window;

Figure 2 is an enlarged horizontal section of a mullion taken along the line 2—2 of Figure 1;

Figure 3 is an enlarged fragmentary vertical section of a portion of the operating mechanism taken along the line 3—3 of Figure 1;

Figure 4 is an enlarged fragmentary elevation taken along the line 4—4 of Figure 1;

Figure 5 is an enlarged fragmentary elevation taken along the line 5—5 of Figure 1;

Figure 6 is an enlarged fragmentary elevation taken along the line 6—6 of Figure 1; and,

Figure 7 is an enlarged fragmentary perspective view of the window and its operating mechanism.

Figure 8 is an enlarged fragmentary horizontal section taken on the line 8—8 of Figure 1.

Similar reference characters refer to similar parts throughout the views of the drawings:

Referring first to Figure 1, the building wall 10 has mounted therein a frame generally indicated at 11, divided into fixed windows 12 and operable windows 13. Windows 13 may be installed singly in groups or alternately with fixed windows 12, as shown, or in any other desirable combination, and being of the projected casement type, as better shown in Figure 7, may be pivoted outwardly by operating mechanism which will be described below.

As shown in Figure 1, frame 11 comprises sub-sill, jamb and header members 14 (see also Figure 7) which preferably are steel angle bars of suitable weight mounted in the wall of the building. These bars 14 surround the frame proper, and accordingly constitute a rigid reinforcement therefor. The frame proper, in turn, for a single window, comprises as shown in Figure 7, head, sill and jamb bars 15 of suitable cross section formation to receive in sealing engagement the top, bottom and side bars 16 of window sash 13.

In the particular construction shown each bar 15 includes the base 70, the inside striking flange 71 and outside striking flange 72. The sash bars 16 include inside striker surface 74 and outside striking flange 75. The flange 75 and the striker surface may conveniently be joined by web 77.

When the window is in closed position, the base 70, flange 71, web 77, flange 75 and flange 72 form a closed or dead air space which effectively prevents seepage of air from the outside to the inside of the window there being two complete seals about the four sides of the window. Other constructions of sash and frame having other forms of sealing contact may be used with the operator of this invention as it will be seen that in no case does the operator interfere with the seal between the frame and the sash.

As shown in Figure 1, projected casement sashes 13 are arranged in pairs horizontally and each horizontal pair of projected casement sashes is separated by adjacent pairs of fixed sashes 12. Projected casement sashes 13 and also fixed sashes 12 are separated by a mullion generally indicated at 17. Mullion 17 (Figure 2) includes a mullion bar 18 suitably secured to a steel sup-

porting and reinforcing strip 19, the vertical extent of which is co-extensive with the entire window panel. Mullion bar 18 includes opposite side portions 18a and 18b which are similar in conformation to side frame bars 15 (Figures 7 and 8), and which accordingly receive side bars 16 when the sashes 13 are closed. It should be understood at this point that our window is not to be limited to the arrangement shown in Figure 1, but may be advantageously used as a single window or in any desirable grouping arrangement.

Referring now to Figure 7, jamb bar 15 has secured thereto a channeled guide 20 adapted to pivotally and slidably support one of the upper corners of sash 13, the other upper corner thereof being similarly connected to another guide 21 (Figure 2) secured to mullion bar 18 of mullion 17. Guides 20 and 21 are substantially identical, and include a channel 22 partially closed by a pair of flanges 23 and 24 (see also Figure 4). At each end of upper sash bar 16 (Figures 4 and 7) is secured a sliding pivot generally indicated at 25, comprising a roller 26 (Figure 2) mounted on a stud 27 extending from the body 28 of the part. Roller 26 is shaped to fit within channel 22 of guide 21 so that sash 13 (Figure 7) may be pivoted with respect to its frame, and may also be slid vertically with respect thereto. To prevent sash 13 from dropping completely out of its frame, the bottoms of guides 20 and 21 are closed as at 29 (Figure 4). It may now be seen that sashes 13 are of the projected casement type, but we do not mean to be limited to this type of construction as the pivoted projected casement window is within the contemplation hereof.

Referring back to Figure 7, each side bar 16 of sash 13 has an ear 30 mounted on the outer face thereof; pivotally connected to ear 30 is one end of carrier link 30 the lower end of which is pivoted to a lug 31 connected to and extending from the outside of the window frame 15. At all positions of the sash 13 in the frame 15 the carrier link 30 will lie outside of the window opening defined by the frame and laterally outward therefrom and in the closed position of the sash will be as shown in Figures 5 and 6 in position substantially parallel to the plane of the closed sash and outside the frame. Carrier link 30 and the bottoms 29 of guide channels 20 (Figure 4) limit the pivotal and vertical movement of the window, respectively. It will appear that by variation in the dimensions of the guide channels and links, the extent to which the window may be opened may be varied.

As shown in Figure 7, jamb 14 has secured thereto inside the plane of the sash when closed, a channel generally indicated at 32, a substantially similar channel generally indicated at 33 being secured to reinforcing bar 19 of mullion 17 (Figure 2). Channels 32 and 33 are identical, and accordingly include sides 34 and inwardly extending flanges 35 which together comprise a guide for a block 36 or the like having an extension 37 extending outwardly of the channel between flanges 35. The bottoms of channels 32 and 33 are suitably closed to prevent blocks 36 from falling therefrom. Each of blocks 36 has pivotally connected thereto an operator link 38 (Figures 2 and 7) the other end of which is pivotally connected to side bar 16 of window 13 through striker surface 74 but laterally inward of the sash so as not to interfere with the seal between striker 74 and flange 71 of the frame (see also Figures 5, 6 and 8). Thus, upon ver-

tical downward movement of block 36 (Figure 7) window 13 is not only lowered vertically, but is also pivoted outwardly, the extent of its movement being limited by the vertical travel of block 36. The link 38 being pivoted to the block inside the innermost position of the sash and thru the striker surface of the sash bar will thus lie at all times inside of the sash in all positions thereof. When the sash is closed the link 38 lies in the position shown in Figures 5 and 6, substantially parallel to the closed sash and in conveniently disposed position flat against the frame but extending inward no further than the channel 32. This arrangement permits the operating parts inside of the closed sash to be conveniently enclosed in the side frame casing 59 (see Figures 1 and 2) and in any event such parts do not extend inside of the innermost portion of the frame (see Figure 7) whereby screens, blinds, blackout curtains and the like may be mounted on the frame in close relation to the sash without interfering with the operator.

As shown in Figure 7, a rod 39 is connected to the bottom of block 36 (see also Figure 5) and the bottom end of this rod is adjustably threaded into a suitable coupling 40 (Figures 6 and 7) being held in its adjacent position by a nut 41. The lower end of coupling 40 is suitably machined so that the top link of a link belt 42 may be attached thereto. Link belt 42 is trained around a driving sprocket 43 mounted on the end of an operating shaft 44 rotatably mounted in a hanger 45 or the like. The other end 42a of link belt 42 is connected to another rod 46, the upper end of which is threaded into a nut. The upper end of nut 47 threadably receives another rod 48, the upper end of which (see Figure 4) is connected to a flexible chain or the like 49. Chain 49 is trained over an upper pulley 50.

Referring to Figure 5, the upper portion of block 36 is formed to receive a rod 51 which extends upwardly therefrom as shown in Figure 7, and has its upper end (Figure 4) connected to another block 52 similar to block 36 but operatively arranged in relation to the upper window 13 (Figure 1). The upper end of block 52 (Figure 4) is connected to end 42a of flexible chain 49.

It will now appear that where windows are arranged in vertically aligned groups, as shown in Figure 1, each window is provided with operating mechanism such as that shown in Figure 7, and these mechanisms are interconnected so that only one operator such as will be hereinafter described is needed to operate both windows simultaneously.

By way of summation, and with reference to Figures 4, 5 and 6, upper and lower sashes 13 respectively are operated by blocks 52 (Figure 4) and 36 (Figure 5), these blocks being interconnected by rod 51. The upper end of block 52 (Figure 4) is connected to the lower end of block 36 (Figure 5) as follows: Chain 49 (Figure 4), rod 48 (Figures 4, 5, and 6), nut 47 (Figure 6), rod 46, link belt 42, coupling 40 and rod 39 (Figures 5 and 6). Thus, upon operation of sprocket 43 in one direction or another, vertical movement is imparted to blocks 36 and 52, and in accordance with the direction of movement sashes 13 are opened or closed. To maintain the various rods, chain 49 and link belt 42 in proper operative tautness, nut 47 (Figure 6) and also nut 41 may be adjusted. Also, to preclude blocks 36 (Figure 5) and 52 (Figure 4) from traveling out of their respective channels upon operation, the

channels are suitably blocked at top and bottom.

As viewed in Figure 7, operating shaft 44 (see also Figure 3) carries a gear 53 which meshes with a worm 54 suitably mounted on a shaft 55 journaled in a bracket 56. Shaft 44, gear 53, worm 54 and its shaft 55 comprise the operator for the mechanism above described, and may be housed, if desired, in a suitable casing 57 through the side 57a of which shaft 55 may extend to receive an operating crank 58. A casing similar to casing 57 may be provided, if desired, to enclose the operating mechanism shown in Figure 7, a casing of this nature being indicated at 59 in Figure 2.

Upon rotation of crank 58, sprocket 53 is rotated clockwise or counterclockwise to operate sash 13. Upon counterclockwise rotation, block 36 is slid upwardly in its channel 32 and by reason of the connection between the block and sash 13 by link 38, the sash is both lifted and pivoted toward its closed position until at the upward extent of travel of the block the sash is securely shut in its frame. Similarly, upon clockwise rotation of sprocket 43, block 36 slides downwardly permitting sash 13 also to slide downwardly within its frame and also to pivot outwardly therefrom. At the same time, by reason of the connection between blocks 36 and 52 afforded by rods 48 and 51 (Figure 4) the upper sashes 13 are operated at the same time, and in the same manner.

Thus, it will appear that an indefinite number of vertically arranged sashes of the nature described may be operated simultaneously through one simple mechanism. As the upper bar of the sash is constrained to slide within the plane of the window frame, the advantages of a projected casement window are attained without the disadvantages resulting from the usual complicated structure generally used in casement windows of the projected type. It will also appear that the operating mechanism described is equally applicable to a casement window of the pivoted type.

Accordingly, we have provided a window construction by which we attain the various objects set forth hereinabove in a thoroughly practical and efficient manner.

As many possible embodiments may be made of the above invention and as many changes might be made in the embodiment above set forth, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

We claim:

1. An operator for a window sash mounted for pivotal and sliding movement within a frame comprising, in combination, means forming a vertically extending channel on said frame, a block slidably mounted in said channel, a link pivotally connected to said block and to said sash adjacent a lower corner thereof, the body of said link lying inside of the plane of said window and adapted upon vertical movement of said block to effect pivotal and slidable movement of said window, a second link having one end pivotally connected to the outside of a lower corner of said frame and its other end pivotally connected to the outside of said sash at a point spaced above the pivotal connection between the window and said first-mentioned link whereby said links are crossed when the sash is open and lie one inside of the sash and one outside of the sash respectively when the sash is closed, means for operating said block to pivot said first-mentioned link and ac-

cordingly operate the window, sprocket and chain means connected to said block and operable to effect slidable movement thereof and means for rotating said sprocket means.

2. An operator for a window sash mounted for pivotal and sliding movement within a frame comprising, in combination, a vertically extending channel on said frame adjacent a vertical side of said window, the length of said channel being substantially less than the height of said window, a block slidably mounted in said channel, a link pivotally connected to said block and to said sash on the inside of said sash, a second link pivotally connected to the outside of said frame and to the outside of said sash whereby sliding movement of said block effects pivotal and sliding movement of said sash, a rigid member secured to said block and extending downwardly therefrom parallel to that portion of the frame on which said channel is mounted, a link chain connected to said rigid member, a horizontal shaft rotatably mounted adjacent the lower portion of said frame and having a sprocket secured thereto, said sprocket meshing with said chain and means for rotating said shaft to drive said sprocket and effect sliding operation of said block to operate the sash.

3. An operator for a window sash mounted for pivotal and sliding movement within a frame, said sash and said frame including pairs of cooperating sash and frame bars, each of said bars having inside and outside cooperating sealing members forming a dead air space therebetween when the sash is in closed position, said frame having vertical channels thereon mounted inside of the plane of the sash when said sash is in closed position and blocks mounted to slide in said channels, a pair of links secured to the outside of the frame and the outside of the sash and a pair of links secured to the inside of the sash and said blocks and operating means for sliding said blocks in said channels to open and close the window.

4. An operator for a window sash mounted for pivotal and sliding movement within a frame, said sash and said frame having complementary engaging portions forming unbroken sealed contact around the entire window opening when said sash is in closed position, said frame having vertical channels thereon mounted inwardly of said engaging portion of said frame and blocks mounted to slide in said channels, operating links pivoted to said blocks and to the sash within the boundary of the window opening and laterally inwardly of said sealing engaging portions of the frame and sash, carrier links each pivoted at one of their ends to said frame outside said engaging portions and laterally outwardly of the boundary of the window opening, and at their other ends to said sash outside of said sealing engaging portions and operating means to move said blocks in said channels to open and close the sash whereby when said sash is opened said operating links will swing outwardly through the window opening without interference with sealing engaging portions of the frame or with the carrier links.

5. An operator for a window sash mounted for pivotal and sliding movement in a frame, said sash having a rail and said rail having a striking face, a complementary striking face on said frame, said frame having a vertical channel mounted thereon inside of the plane of said striking face, a block mounted to slide in said channel, an operator link pivoted to said block and

to said sash rail and projecting from the inside face of said rail, an ear on the outer side face of said sash rail, an ear on said frame outside of said striking face and laterally outward from said striking face, and a carrier link pivoted at its ends to said ears, and operating means to move said block in said channel to open and close said sash.

6. An operator for a window sash mounted for sliding and pivotal movement in a frame, said sash having side and top and bottom rails and said frame having a vertical channel mounted on said frame inside of said sash when said sash is in closed position, a block sliding in said channel, an operator link pivoted to said block and to a side sash rail near the junction of said rail and the bottom rail of said sash, operating means to move said block in said channel to open and close said sash, said link being at all times laterally inward from the outer edges of said sash and a carrier link pivoted on one end to said sash on the outside of said sash and above the pivot point of said operator link and on the other end to said frame near a lower corner thereof and on the outside of said frame and lying laterally outward of the side margin of the sash at all positions of the sash.

7. An operator for a window sash mounted for pivotal and sliding movement within a frame said

frame carrying a vertical channel inside of the plane of said sash, a block sliding in said channel, an operator link pivoted to said block, and to the inside of said sash and being completely inside said sash at all positions thereof, and a carrier link pivoted at one end to each side of said frame adjacent to and outside of said sash when said sash is in closed position, said last mentioned link being pivoted at its other end to the outside of said sash and being outside of said sash when said sash is in closed position and control means for moving said block in said channel to open and close said sash, said control means including a chain connected to said block, a horizontal shaft rotatably mounted in a plane parallel to and inside of the plane of the closed sash, a sprocket thereon engaging said chain and means for rotating said shaft including an operating handle extending inside of the inside face of the frame and below said face, said channels, sprocket and shaft all being mounted inside of the plane of the sash when closed but outside of the inner face of said frame, whereby the said inner face of said frame may be utilized for the mounting of screening and the window may be operated thereunder by said handle without opening or interfering with said screen.

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