

March 22, 1960

H. J. KUEHNLEIN
WINDOW CONSTRUCTION

2,929,446

Filed Dec. 30, 1957

4 Sheets-Sheet 1

FIG. 1.

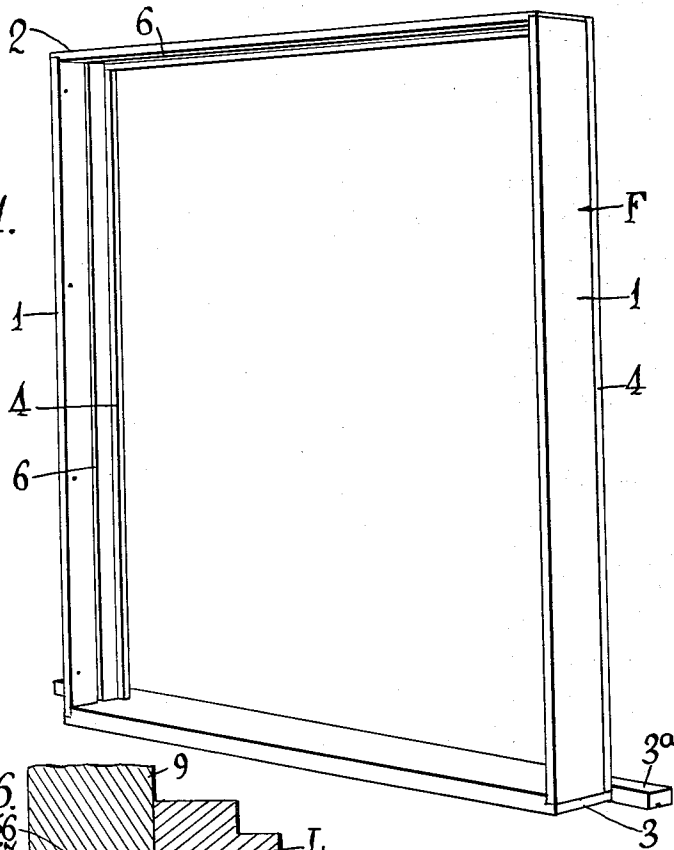


FIG. 16.

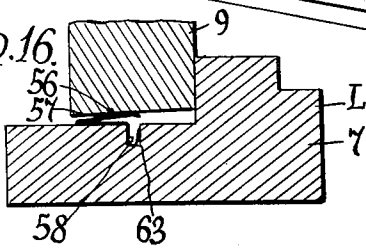


FIG. 14.

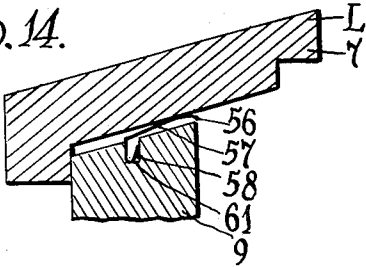


FIG. 15.

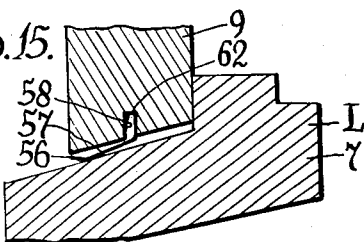


FIG. 13.

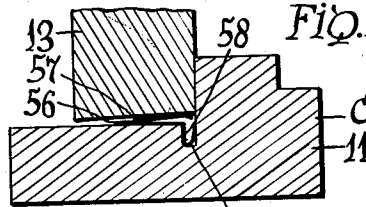
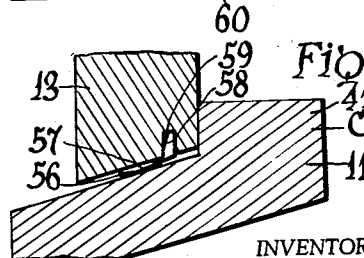


FIG. 12.



INVENTOR.
Herman J. Kuehnlein,
BY
John Lawrence
ATTORNEY.

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FIG. 2.

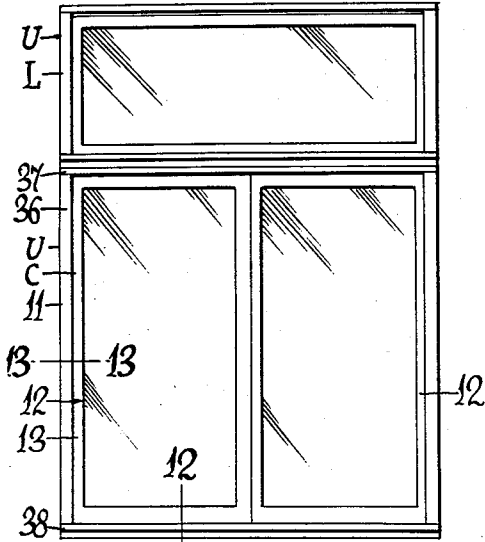


FIG. 3.

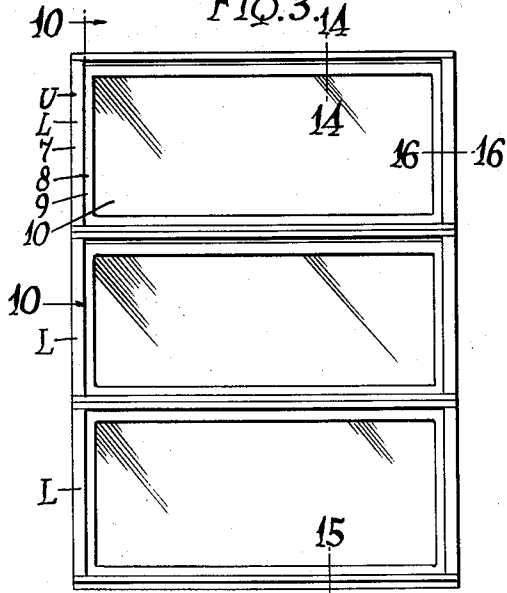
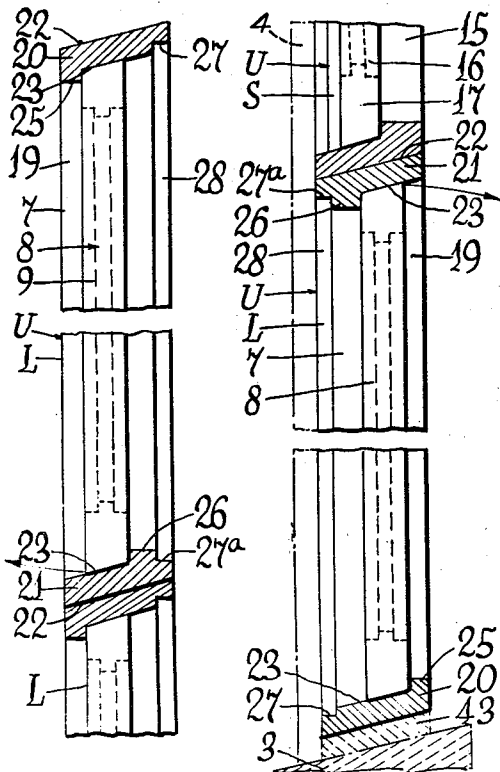
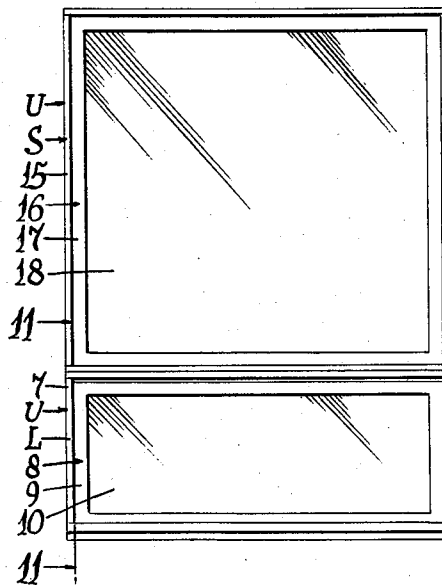


FIG. 10.

FIG. 11.

FIG. 4.



INVENTOR.
Herman J. Kuehnlein,
BY *John A. Lours*
ATTORNEY.

March 22, 1960

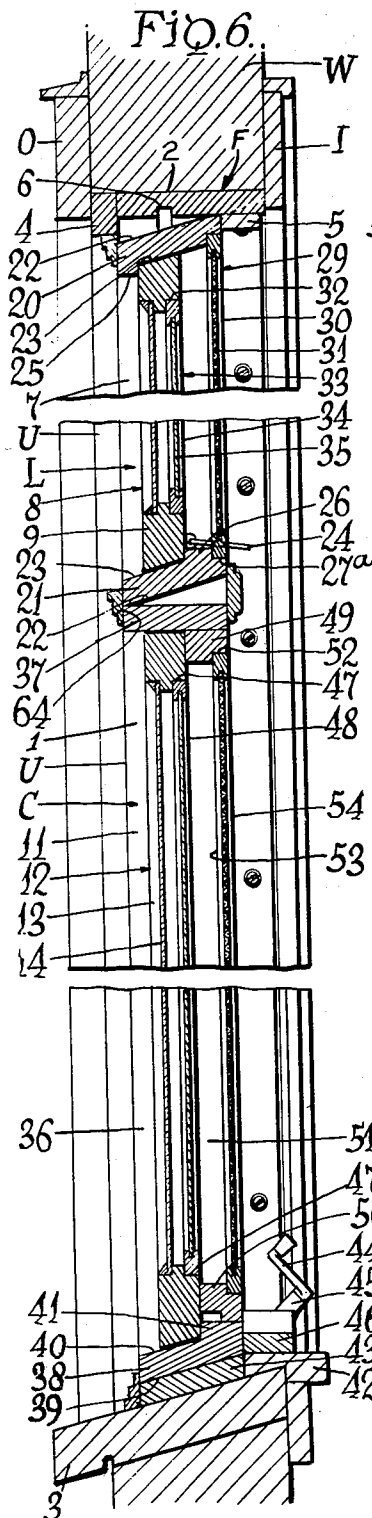
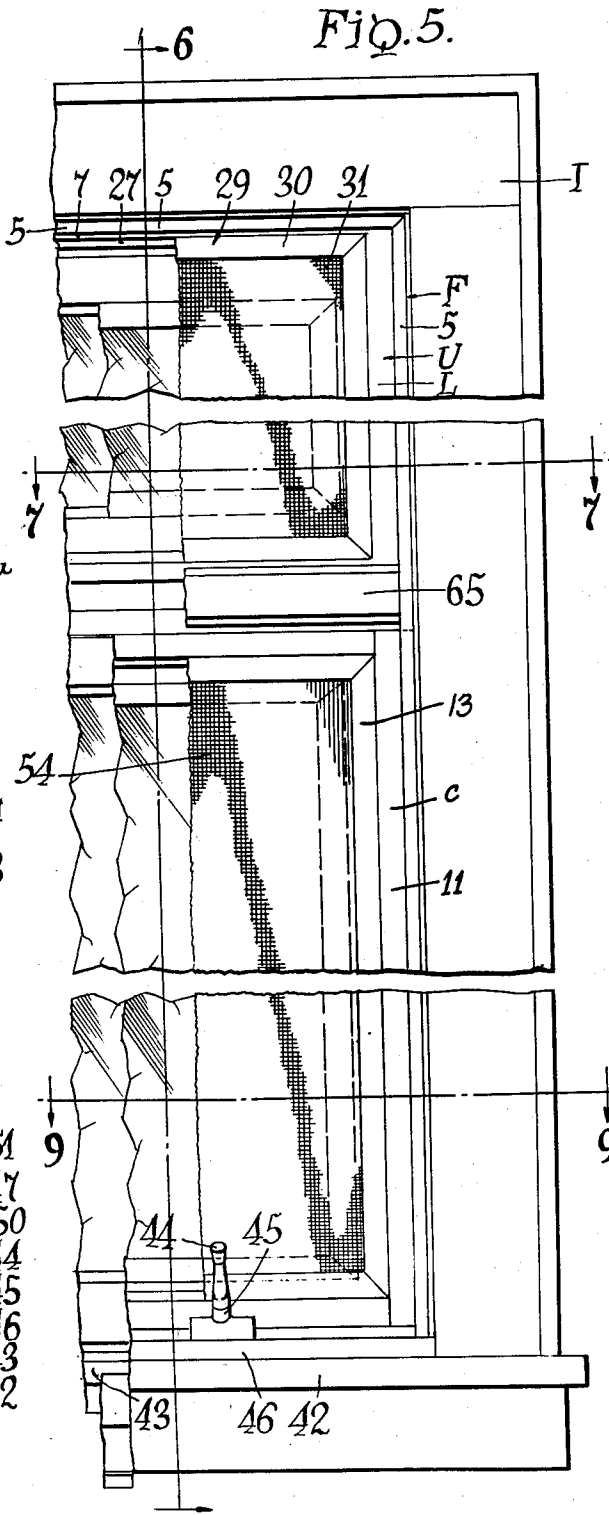
H. J. KUEHNLEIN

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FIG. 7.

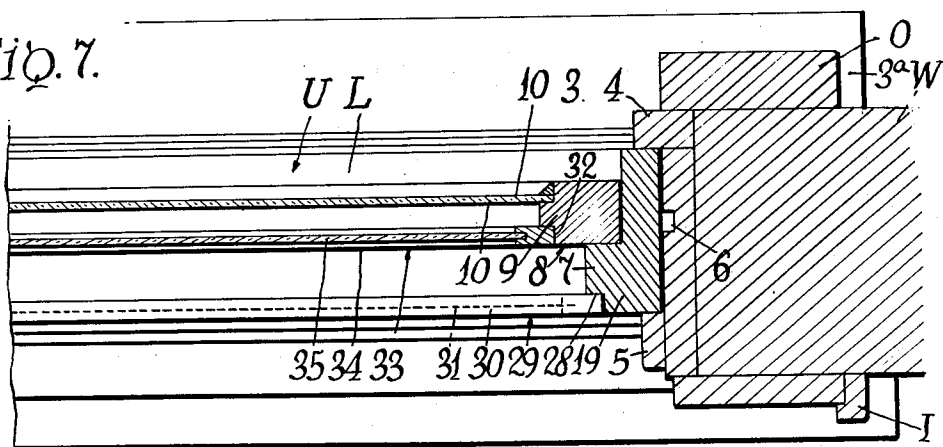


FIG. 8.

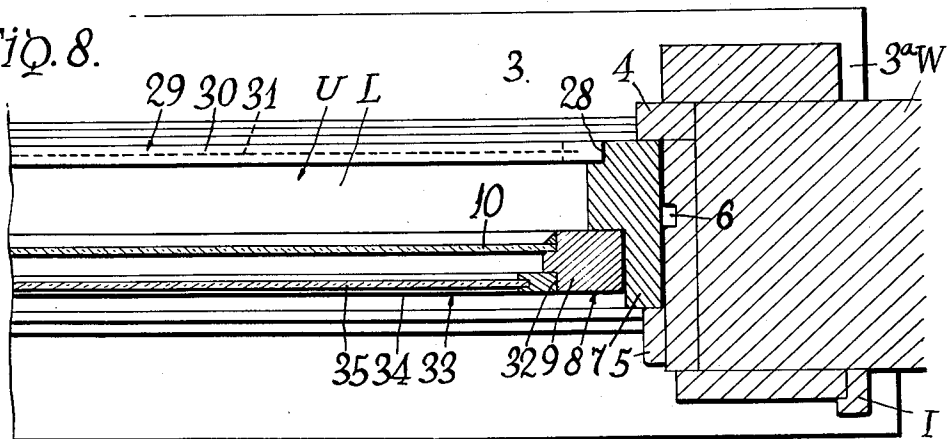
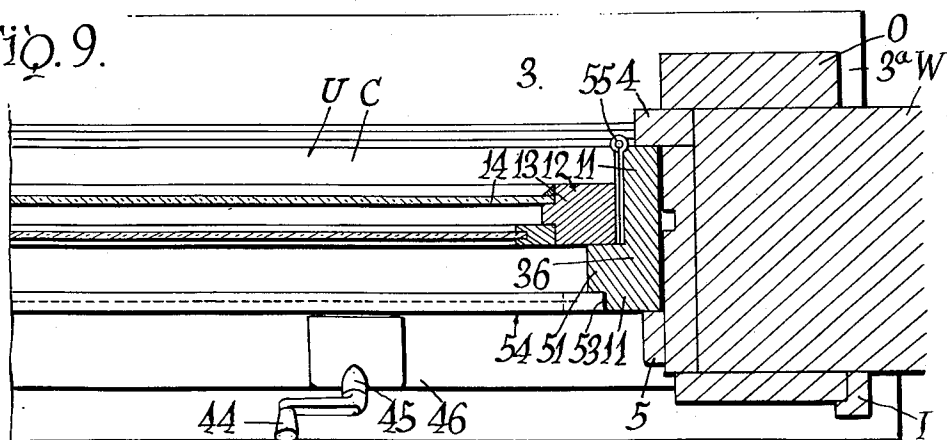


FIG. 9.



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2,929,446

WINDOW CONSTRUCTION

Herman J. Kuehnlein, Corfu, N.Y.

Application December 30, 1957, Serial No. 706,136

10 Claims. (Cl. 160—91)

This invention relates to improvements in window constructions and proposes a construction which is characterized by a series of novel window units of structurally independent manufacture for economical assembly in a vertical tier in a window opening and which is available, in accordance with modern design, for various combinations of louver sashes having inward or outward opening movements, louver and outwardly opening casement sashes, such louver or casement sashes and fixed sashes, or for various multiples of such louver sashes.

The construction has added merit in that it is economically available for mounting in attached window frames of the double hung type where window modernization is required. The designation "double hung window frame" as used herein connotes the known wall attached window frame heretofore used in connection with sliding sashes and having side walls, a top wall and a downwardly and outwardly inclined subsill with the side walls extending downward from the top wall to the subsill and having a part in the nature of an inwardly projecting flange which is attached at the outer sides of the side and top walls and is known as an "outside stop."

No economically satisfactory provision has been heretofore known for enabling the mounting in building attached window frames of the double hung type of combinations of hinged or pivoted sashes which are required by modern demands. Throughout the country there are literally many hundreds of thousands of buildings originally constructed with double hung window frames adapted for operative combination with upper and lower sliding sashes and which require modernization in order that their value may be maintained, such modernization including sashes of the louver and casement type in various multiples or combinations. Heretofore in such window modernization it has been necessary at great expense of labor and parts to remove and discard the double hung window frames and to install entirely new windows with specially adapted frames for attachment to the walls of the building. In the case of buildings having walls of masonry this expense is greatly increased by the necessity for keying the substituted frames to the walls and by the required calking.

One object of the invention is to effect great economy, with wide latitude for the selection of a particular window design embodying some one or more of the combinations of window units above suggested, in the manufacture and installation of the series of units of which the window is composed.

Another object is to effect great economy in window modernization involving the installation of window units of the louver or casement type in any of the combinations above suggested. This economy involves the utilization of the original double hung frame which saves the great expense of a replacement frame; it involves great reduction in the cost of labor as based on hours of work; and the limitation of the major item of expense to the cost of the units of which the window is composed, such

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cost being favorably comparable, dollarwise, to the present cost of sliding sashes with their various adjunctive features including spring or weight counterbalances.

Further objects, consonant with the foregoing objects, are to provide a construction in which each of the units is formed to effect appropriate drainage of water and the several units are economically available for weather stripping in the several areas in which weather proofing may be required; and to provide a construction in which the units may include some windows and screens, either or both, which may be easily and quickly fitted in position and are easily accessible for removal as occasion may require.

A further object, applicable to louver units, is to provide sash mounting frames formed for reversal of position and which, by their particular positioning, and without any structural alteration, enable the selection of either outward or inward opening movements of the sashes or a combination of the two.

A further object, applicable to the window modernization of existing buildings, is to provide a window construction available for the various sash combinations above suggested and which may be positioned within, and for cooperation with, a double hung window frame wholly from the inside of the building, the work thereby being possible under weather conditions which preclude satisfactory work on the outside of the building.

The invention, generally stated, is a window construction in which a plurality, i.e., two or more, of window units of original structurally independent manufacture are arranged in a vertical tier and wherein each window unit comprises a mounting frame having a fixed position in the window opening, and a window sash arranged within and connected to the mounting frame; in which the arrangement of the window units is with the lower cross bar of the mounting frame of an upper unit in adjoining relation to the upper cross bar of the mounting frame of the unit next below; in which the lower cross bar of each mounting frame is formed for outside drainage; in which the sash frame of each unit is available for holding the sash of a storm window and the mounting frame of each unit which has a movable sash frame is available for holding the sash of a screen; in which one or more of the window sash frames is movable pivotally with relation to the associated mounting frame and may be a louver sash frame having selectively an inward or outward opening movement or a casement sash frame having outward opening movement; in which, assuming movable sash frames, the mounting frame and the associated sash frame are weather proofed by weather stripping in the closed position of the sash frame, the elements of the weather stripping being carried by appropriate bars of one or the other of the frames; and in which the mounting frames of the louver units may have either of two positions within the window opening, according to vertical and horizontal movement from one position to another through angles of 180°, thereby, without alteration of structure, to accord with the selection of either inward or outward opening movement of the louver sash frame.

The invention as applied to the window modernization of existing buildings having double hung window frames also consists generally in the combination of such a frame as a mounting element for the window construction and the aforesaid plurality of window units characterized as stated. In accordance with this aspect of the invention, in the mounting of the units within the double hung frame the units are abutted against the outside stop (known in the trade as a "blind stop"); the lowermost unit utilizes the subsill of the double hung frame as a support; and the upper cross bar of the mounting frame of each lower unit serves as a support for the unit next above by co-

operation with the lower cross bar of its mounting frame, the upper cross bar of the uppermost unit adjoining the top wall of the double hung frame.

The invention is disclosed herein as including the double hung window frame as an element of the combination and as available for the window modernization of existing buildings.

The construction admits of the use of the usual hardware features, namely the crank operated mechanism for opening and closing the sashes of casement windows, the louver hinging features, and the mechanism for opening and closing the louver sashes as mounted for outward movement, the illustration of these hardware items being deemed unnecessary since in each instance they are well known and in common use.

In the drawings:

Figure 1 is a perspective view of a double hung window frame, viewed from the inside of the room.

Figures 2, 3 and 4 are elevations viewed from the inside of the room and showing by way of example, different combinations of window units of structurally independent character in manufacture.

Figure 2 shows a window consisting of an upper louver sash and two lower casement sashes.

Figure 3 shows a window composed entirely of louver sashes.

Figure 4 shows a window consisting of an upper fixed sash and a lower louver sash.

Figure 5 is a view in partial elevation of a window construction (with parts broken away) having a sash arrangement in accordance with Figure 2.

Figure 6 is a vertical sectional view on the line 6—6 of Figure 5.

Figure 7 is a fragmentary horizontal sectional view looking in the direction of the arrow on the line 7—7 of Figure 5, this figure assuming an outwardly opening louver sash.

Figure 8 is a similar sectional view in the same plane as Figure 7 and assumes an inwardly opening louver sash.

Figure 9 is a detail horizontal sectional view on the line 9—9 of Figure 5.

Figure 10 is a detail sectional view showing a unit for a louver sash, this figure being taken on the line 10—10 of Figure 3 and showing the mounting frame of the unit positioned for the outward opening movement of the sash.

Figure 11 is a view similar to Figure 10 but taken on the line 11—11 of Figure 4, this figure showing the mounting frame of the unit positioned for the inward opening movement of the sash.

Figure 12 is a detail vertical sectional view on the line 12—12 of Figure 2 showing the weather stripping between the lower bar of the lower frame of the mounting frame and the adjacent bar of the sash.

Figure 13 is a detail horizontal sectional view on the line 13—13 of Figure 2 showing the weather stripping between a side bar of the sash frame and a side bar of the mounting frame.

Figure 14 is a detail vertical sectional view on the line 14—14 of Figure 3.

Figure 15 is a similar view on the line 15—15 of Figure 3.

Figure 16 is a detail horizontal sectional view on the line 16—16 of Figure 3.

The double hung window frame F is of the usual construction and is shown per se in Figure 1. It comprises the side bars 1, the cross bar 2 extending between the side bars at their upper ends and the subsill 3 to which the side bars extend and which has the usual downward and outward inclination for the purpose of drainage. The frame F is also provided with the outer stop 4 located adjacent the outer edges of the bars 1 and 2. In this figure the frame is assumed to be viewed from inside

the room and to be ready for the mounting of the window units U.

In Figure 6 the frame F is assumed as having been used in an existing building for cooperation with the usual sliding sashes and as provided with the usual inwardly projecting inner stop 5 removably secured to the side walls and top wall. To enable the assembly of the window units U the stop 5 is removed, being replaced, as shown in Figure 6, when the assembly has been completed. As formed to cooperate with the usual sliding sashes the frame F was provided along its bars 1 and 2 with inwardly projecting sash guide strips (not shown) which were mounted in grooves 6, these guide strips requiring permanent removal to enable the mounting of the window units U.

The window units U are severally characterized by louver sashes, casement sashes and fixed sashes and as so characterized are severally distinguished as L, C and S. Figure 2 shows a window composed of an upper louver unit L and two lower casement units C, each casement unit of course including a casement sash. Figure 3 shows a window composed entirely of louver units L. Figure 4 shows a window composed of an upper fixed sash unit S and a lower louver unit L. It will be understood that these views are merely suggestive of different combinations and arrangements of units of which the window may be composed and that various other combinations and arrangements involving a greater number of units may be provided, according to preference.

Each louver unit L (Figures 10 and 11) includes a rectangular mounting frame 7 and a louver sash 8 composed of a rectangular sash frame 9 movably mounted with respect to the frame 7 and a glass pane 10 secured within the frame 9. Each casement unit C (Figure 6) includes a rectangular mounting frame 11 and two casement sashes 12, each composed of a rectangular sash frame 13 movably mounted with respect to the frame 11 and a glass pane 14 secured within the frame 13. Each fixed sash unit S (Figures 4 and 11) includes a rectangular mounting frame 15 and a sash 16 composed of a rectangular sash frame 17 fixedly mounted within the frame 15 and a glass pane 18 secured within the frame 17. The mounting frames 7, 11 and 15 and the sash frames 9, 13 and 17 are preferably constructed of wood.

Each louver frame 7 includes vertical side bars 19 and cross bars 20 and 21. Each cross bar has outer and inner faces 22 and 23, for convenience designated "horizontal planar faces," in parallel planes which, in the two cross bars, are inclined outwardly and downwardly at the same angle to the horizontal, namely an angle of approximately fifteen degrees.

Each louver frame 7 is available for mounting in the two positions shown respectively in Figures 10 and 11, the louver sash being opened by an outward movement when the louver frame 7 is in the position shown in Figure 10 and by an inward movement when the louver frame 7 is in the position shown in Figure 11. In the position of the louver frame shown in Figure 10 the cross bar 20 is the upper bar and the cross bar 21 is the lower bar. In the position of the louver frame shown in Figure 11 the cross bar 21 is the upper bar and the cross bar 20 is the lower bar. The reversal of the louver frame 7 from one position to another involves its movements through 180° in vertical and horizontal planes. In the positions of the louver frame shown in Figures 10 and 11 the inner face 23 of the lower cross bar (the bar 21 in Figure 10 and the bar 20 in Figure 11) serves for water drainage. When the frame 7 is to be positioned for the outward opening movement of its louver sash 9 it carries adjacent its lower bar any well known mechanism (illustration of which is deemed unnecessary) having a manual actuating feature schematically suggested by the arm 24 shown in Figure 6. Louver sashes which open inwardly do not require opening and closing mechanism, such

sashes being simply grasped manually and pulled to open position or pushed to closed position.

The bars 20 and 21 are provided adjacent relatively opposite edges with flanges or shoulders 25 and 26 respectively which extend vertically in relatively opposite directions. In the position of the louver mounting frame L shown in Figures 6 and 10 the flange 25 is adjacent the outer edge of the bar 20 (which in such position is the upper bar) and extends downward and the flange 26 is adjacent the inner edge of the bar 21 (which in such position is the lower bar) and extends upward. When the position of the louver mounting frame L is reversed, as shown in Figure 11, the flange 26 is adjacent the outer edge of the bar 21 (which in such position is the upper bar) and extends downward and the flange 25 is adjacent the inner edge of the bar 20 (which in such position is the lower bar) and extends upward. In either position of the louver frame L the flanges 25 and 26 provide abutment or stops for the upper and lower bars of the sash frame 9. The bar 20 is preferably formed along its corner remote from the flange 25 with a rabbet 27 and the bar 21 is similarly formed along its corner adjacent the flange 26 with a rabbet 27a, similar matching rabbets 28 being formed along corresponding corners of the side bars of the mounting frame 7. The rabbets 27, 27a and 28 are located inwardly of the bars of the sash frame and accommodate a screen sash 29 which consists of a frame 30 and a panel 31 of suitable mesh material, the upper, lower and side bars of the frame 30 fitting within the rabbets 27, 27a and 28. The screen sash is readily removable and replaceable and as fitted in position, as shown in Figure 6, is held against displacement by any suitable latch means of well known construction, illustration of which is deemed unnecessary. With the louver mounting frame 7 in the position shown in Figure 6 the arm 24 is at the lower side of the louver sash frame 9 and projects through a suitable recess (not shown) in the lower bar of the screen sash frame 30, this arrangement of course being in accordance with the usual practice and therefore being unnecessary to illustrate. The upper, lower and side bars of the sash frame 9 are also preferably formed along their corners remote from the pane 10 with rabbets 32 to accommodate a storm sash 33 consisting of a frame 34 and a glass pane 35 secured within the frame 34, the bars of the frame 34 fitting within the rabbets 32. The storm sash is readily removable and replaceable and is fitted in position, as shown in Figure 6, is held against displacement by any suitable latch means of well known construction, illustration of which is deemed unnecessary.

It will be noted from the foregoing description that the louver unit mounting frame 7 is of the same construction, whether the louver sash is to have outward or inward opening movement and the adaptation of the frame 7 specifically to the outward or inward opening movement of the louver sash 8 involves merely a selection between two positions effected by vertical and horizontal movements of the frame 7 through an angle of 180°. Whether the screens be located interiorly or exteriorly is immaterial to their function. The screen sash frame 30 is initially fitted and secured in the rabbets 27, 27a and 28. If the frame 7 be positioned for outward opening movement of the louver sash 8 the screen sash 29 is interiorly located; and if the frame 7 be positioned for inward opening movement of the sash 8 the screen sash 29 is exteriorly located.

The upper and lower cross bars of the louver sash frame 9 have their respective upper and lower faces in substantially adjoining relation to the faces 23 of the bars 20 and 21 and hence at the same angle of inclination. This relation is in aid of weatherproofing which is completed by weather strips to be later described in sufficient detail.

The rectangular mounting frame 11 of each casement unit C includes vertical side bars 36, an upper cross bar 37 and a lower cross bar 38. The upper cross bar 37

occupies a true horizontal plane. The lower cross bar 38 is generally similar to the cross bar 21 of the louver frame 7 in its position (Figures 6 and 10) in which the cross bar 21 is the lower bar. Thus the lower cross bar 38 of the frame 11 has outer and inner faces 39 and 40 in parallel planes which are inclined outwardly and downwardly at the same angle to the horizontal, namely an angle of approximately 15°. The bars 38 project suitably beyond the casement sashes 12, assuming their closed positions (Figure 6), and the face 40 of the bar 38 serves a drainage function. The lower cross bar of the casement sash frame 13 has its underface in substantially adjoining relation to the inner face 40 of the cross bar 38 and hence at the same angle of inclination. This relation is in aid of weatherproofing which is completed by weather strips to be later described in sufficient detail. The cross bar 38 is provided adjacent its inner edge with an upwardly extending flange or shoulder 41 which is generally similar to the flange 26 of the louver frame cross bar 21, the shoulder 41 providing an abutment or stop for the lower bars of the casement sash frames 13.

The double hung window frame F includes an inside sill 42, known in the trade as a "stool," which is located above the subsill 3 to which it is attached and from which it projects. The subsill 3 provides bottom support for the mounting frame 11. Although the casement mounting frame 11 could be dimensioned for the direct seating of their lower cross bars 38 upon the subsill 3 it is preferred that their lower faces 39 extend outward from the upper face of the sill 42 and that they have direct supporting bearing upon the upper face of a filler piece 43 attached to the subsill 3 and functioning as a shim.

It is to be noted that when the lower window unit is a louver unit L (Figures 3 and 4) the filler piece 43 is similarly used (Figure 11) for the direct support of the louver unit mounting frame 7.

The reason for the provision of the filler piece 43 in connection with a casement unit C or a louver unit L as the lower unit of the window is to position the lower cross bar of the mounting frame, 11 or 7 as the case may be, for cooperation with the mechanism by which the sash frames are moved to open and closed position, such mechanism having an actuating feature which is located within the room and above the stool 42.

The casement sash frames 13 can be individually moved to various open positions or to closed position by direct manual effort, that is to say without the use of mechanism, in which case latching devices of well known construction and unnecessary to illustrate will be used to hold them in the positions desired. However it is generally preferred that the casement sashes be moved to open and closed positions by means of actuating gearing, various forms of which are well known in the trade. Such actuating gearing is suggested in Figures 5 and 6 by the showing of the operating crank 44, the shaft of which has a bearing 45 carried by a supplemental stool or pedestal 46 mounted upon the stool 42.

The bars of the casement sash frames 13 are preferably formed along their inside corners, i.e. their corners remote from the panes 14, with rabbets 47 to accommodate storm sashes 48 similar in construction and arrangement to the storm sashes 33 above described.

For the support of screen sashes in association with the casement units C cross bars 49 and 50 are attached to the upper and lower cross bars 37 and 38 of the mounting frame 11, the cross bar 49 extending downward from the upper bar 37 and the cross bar 50 extending upward from the lower bar 38. The cross bars 49 and 50 are in common vertical planes and are located adjacent the inner vertical faces of the cross bars 37 and 38, the cross bar 50 being attached to the flange 41 of the cross bar 38. As above noted this flange provides an abutment for the lower bar of the adjacent casement sash frame 13. A similar abutment for the upper bar of the sash

frame 13 is provided by the upper cross bar 49. Lateral abutments are provided by flanges or shoulders 51 on the side bars of the casement unit mounting frame 11. The cross bars 49 and 50 are formed along their inside corners with rabbets 52 and the side bars of the frame 11 are formed with matching rabbets 53, these rabbets accommodating a screen sash 54, similar in construction and arrangement to the screen sash 29.

The casement sash frames 13 have outward opening movement and are attached to the movable leaves of hinges 55 (Figure 9), the fixed leaves of which are attached to the side bars of the frames 11.

The mounting frame 15 of the fixed sash unit S (Figures 4 and 11) is identical in construction with the mounting frame 11 of the casement unit C and the provision for removable storm windows conforms to the like provision of the casement unit C.

The drawings assume a frame building with the double hung window frame F attached in the usual manner to the wall W, the provision of the usual outside trim O and the inside trim I and the usual lateral extensions 3a of the subsill 3, to which the vertical elements of the outside trim are connected. It will be understood that the parts W, O, I and 3a are not parts of the invention and that the double hung window frame F having the subsill 3 and utilized in the combination which constitutes the invention is applicable alike to frame buildings and to masonry buildings and is substantially of the same construction in either case.

The double hung window frame F is conditioned for use as an element of the invention, as shown in Figure 1, by the removal of the inner stop 5 and of the guide strips which were originally positioned in the grooves 6. The filler piece or shim 43 is thereupon attached to the subsill in the relation shown in Figure 6. The lowermost window unit (a louver unit L as shown in Figures 3, 4 and 11 or a casement unit C as shown in Figures 2, 5 and 6) is thereupon fitted within the frame F, the lower cross bar of the mounting frame of the unit resting upon the filler piece 43 as an immediate support and the vertical side bars of the mounting frame abutting the outer stop 4. The remaining units (or unit) are similarly fitted within the frame F in ascending order, the side bars of their mounting frames being abutted against the side bars of the outside stop 4 and the lower cross bar of each mounting frame being abutted against the upper cross bar of the mounting frame of the unit next below. In this relation each lower unit by means of its upper cross bar provides bottom support for the unit next above. When the units of which the window is composed have thus been fitted within the frame F the inner stop 5 is replaced, its vertical bars bearing upon the cross bars and side bars of the mounting frames and positively holding the units within the frame F. As above described in detail the louver units are positioned in the frame F in accordance with outward or inward opening movements of the louver sashes and, depending on their particular positioning, either cross bar may be the lower bar and available, as the case may be, for supporting bearing upon the subsill 3 or for supporting bearing upon the upper bar of the mounting frame of the unit next below. Thus in Figure 6 a louver unit L is arranged above the casement unit C and is positioned for the opening of the louver sash frame by an outward movement, the cross bar 21 of the frame 7 being the lower cross bar and having supporting bearing upon the upper cross bar 37 of the casement unit mounting frame 11. In Figure 11 a louver unit L is immediately below a fixed sash unit S and its mounting frame 7 is positioned for an inward opening movement of the louver sash frame 9, the bar 20 in such case being the lower cross bar of the frame 7 and having supporting bearing upon the shim 43. Figure 3 shows a window composed entirely of louver units and assumes the louver sashes to have outward opening movements in which case the bars 21 are the lower cross bars

of the mounting frames 7, the bar 21 of the lower unit resting upon the shim 43 and the bar 21 of each of the other units resting upon the cross bar 20 of the unit next below.

For weather proofing purposes weather strips 56 of any suitable form may be provided. The weather strips 56 are preferably composed of metal and in each instance have a resilient engaging leaf 57 and a resilient securing part 58, the details of their arrangement being shown in Figures 12 to 16 inclusive. Figures 12 and 13 show the weather strips for the casement sash frame 13 and assume its closed position. Figure 12 shows the weather strip 56 as carried by the lower bar of the frame 13 with its part 58 fitted in a recess 59 and its leaf 57 engaging the lower bar of the mounting frame 11. Figure 13 shows the weather strip 56 as carried by a side bar of the mounting frame with its part 58 fitted in a recess 60 and its leaf 57 engaging the adjacent side bar of the sash frame 13. The details shown in Figure 13 are duplicated for the other side bar and the top bar of the frame 13, the weather strip in the latter instance being carried by the upper cross bar 37 of the mounting frame 11. Figures 14, 15 and 16 show the weather strips for the louver sash frame 9 and assume its closed position. Figure 14 shows the weather strip 56 as carried by the upper bar of the sash frame 9 with its part 58 fitted in a recess 61 and its leaf 57 engaging the upper cross bar of the mounting frame 7. Figure 15 shows the weather strip 56 is carried by the lower bar of the sash frame 9 with its part 58 fitted in a recess 62 and its leaf 57 engaging the lower cross bar of the mounting frame 7. Figure 16 shows the weather strip 56 as carried by a side bar of the mounting frame 7 with its part 58 fitted in a recess 63 and its leaf 57 engaging the adjacent side bar of the sash frame 9, the details shown in Figure 16 being duplicated for the other sash frame side bar.

For the purpose of the attractive appearance of the window as viewed from the outside and also as an additional item of weather protection ornamental molding 64 may be provided as shown in Figure 6, vertical molding bars being attached to the outer stop 4 and covering the crevices between the side bars of the frame F and the side bars of the several mounting frames and horizontal bars covering the crevices between the upper bar of the frame F and the adjacent upper bar of the adjacent mounting frame, between the shim 43 and the adjacent lower bar of the adjacent mounting frame and between adjacent cross bars of adjacent mounting frames. It will be understood that the molding 64 is applicable alike in all the various combinations and multiples of window units of which the window may be composed.

For the purpose of the attractive appearance of the window as viewed from the inside transverse ornamental molding strips 65 may be used to cover the crevices between adjacent cross bars of adjacent mounting units, the strips 65 extending between the vertical bars of the inner stops 5.

I claim:

1. Window construction comprising, in combination: a window frame of the double hung type composed of vertical side walls, a horizontal top wall extending between the side walls, a transverse subsill at the lower ends of the side walls and an outer stop consisting of an inwardly projecting flange extending adjacent the outer edges of the side walls and the top wall, and a plurality of window units fitted within the double hung frame, each window unit comprising a rectangular mounting frame having upper and lower cross bars and connecting side bars, the lower cross bars being downwardly and outwardly inclined, and a window sash mounted within and secured to the mounting frame and consisting of a rectangular sash frame and a glass pane fitted within the sash frame; the bars of each sash frame in a position thereof within the associated mounting frame being in adjoining relation to the inner faces of the bars of the

mounting frame, the sash frame of at least one of the units being mounted relatively to the mounting frame of such unit for pivotal movement to and from open positions, the mounting frames being fixed in position in ascending order, the bars of the mounting frames as positioned within the double hung frame being in abutting relation to the outer stop, the mounting frame of the lowermost window unit having support from the subsill by means of its lower cross bar, and the mounting frame of each lower window unit serving as a support for the unit next above, the lower cross bar of the mounting frame of the unit next above having supporting bearing upon the upper cross bar of the mounting frame of the unit next below and the upper cross bar of the mounting frame of the uppermost window unit being in adjoining relation to the top wall of the double hung frame.

2. Window construction as set forth in claim 1 wherein the double hung window frame includes an inwardly projecting inner stop removably secured to its side walls and its top wall adjacent their inner edges, the inner stop as secured in position after the window units have been fitted in the double hung frame bearing against the side bars and the cross bars of the mounting frames of the several units and thereby positively confining the mounting frames within the double hung frame.

3. Window construction as set forth in claim 1 wherein the double hung window frame includes a horizontal stool attached to and extending inward beyond the subsill with its upper face in a plane above the subsill, and a shim is attached to the subsill and extends outwardly and downwardly from the stool, the shim providing direct support for the lower window unit, the lower cross bar of which has supporting bearing upon the shim and extends outwardly and downwardly from the shim.

4. Window construction as set forth in claim 1 wherein at least one of the window units is a louver unit, the window sash has a louver mounting within the mounting frame of the unit, and the cross bars of the mounting frame have outer and inner faces in parallel planes inclined outward and downward at an angle of approximately 15° to the horizontal and are each formed with a flanged or shoulder which extends vertically inward, the flanges of the two cross bars being adjacent relatively opposite edges of the bars and providing abutments or stops for the horizontal bars of the sash frame of the unit, the mounting frame by vertical and horizontal movements through 180° being selectively positionable within the double hung window frame to provide for selective outward or inward opening movements of the louver sash, one of the cross bars of the mounting frame in one position thereof being the upper bar and in the reverse position thereof being the lower bar, each cross bar of the mounting frame as the lower bar in a particular position of the mounting frame having supporting bearing upon the upper cross bar of the mounting frame of the unit next below.

5. Window construction as set forth in claim 1 wherein one of the window units is a casement unit and includes two casement sashes respectively hinged for outward opening movement to the vertical side bars of the mounting frame of the unit.

6. Window construction including a plurality of window units for arrangement one above the other in a window opening and each comprising a rectangular mounting frame having upper and lower cross bars and connecting side bars, the lower cross bars being downwardly and outwardly inclined, and a window sash mounted within and secured to the mounting frame and consisting of a rectangular sash frame and a glass pane fitted within the sash frame; the lower cross bar of the mounting frame of a unit in an upper position adjoining the upper cross bar of the unit next below; one of the units being a louver unit and its window sash having a louver

mounting within its mounting frame; the cross bars of the mounting frame of the louver unit having outer and inner faces in parallel planes inclined outward and downward at an angle of approximately 15° to the horizontal and being each formed with a flange or shoulder which extends vertically inward, the flanges of the two cross bars being adjacent relatively opposite edges of the bars and providing abutments or stops for the horizontal bars of the sash frame of the unit, the mounting frame of the louver unit by vertical and horizontal movements through 180° being selectively positionable within the window opening to provide for selective outward or inward opening movements of the louver sash, one of the cross bars of the mounting frame of the louver unit in one position thereof being the upper bar and in reverse position thereof being the lower bar.

7. Window construction as set forth in claim 6 wherein the louver unit is in an upper position relatively to an adjoining window unit and the cross bar of its mounting frame which is the lower bar in either of the selective positions of the unit adjoins the upper cross bar of the mounting frame of the unit next below.

8. Window construction as set forth in claim 6 wherein the louver unit is in an upper position relatively to, and is supported by, an adjoining window unit and the cross bar of its mounting frame which is the lower bar in either of the selective positions of the unit has supporting bearing upon the upper cross bar of the mounting frame of the unit next below.

9. Window construction as set forth in claim 6 wherein the louver window unit also includes a storm window and a screen, each having a sash frame, the bars of the louver sash frame are formed along their corners remote from the pane with rabbets and the sash frame of the storm window is fitted within such rabbets, the bars of the mounting frame are also formed with rabbets located inwardly of the bars of the sash frame, and the sash frame of the screen is mounted within the rabbets of the bars of the mounting frame.

10. Window construction including a louver unit for mounting in a window opening and consisting of a rectangular mounting frame having upper and lower cross bars and vertical side bars extending between the cross bars and a window sash including a rectangular frame having vertical side bars and upper and lower cross bars, the window sash having a louver mounting within the mounting frame, the cross bars of the mounting frame having outer and inner faces in parallel planes inclined outward and downward at an angle of 15° to the horizontal and being each formed with a flange or shoulder which extends vertically inward, the flanges of the two cross bars being adjacent relatively opposite edges of the bars and providing abutments or stops for the cross bars of the sash frame, the mounting frame by vertical and horizontal movements through 180° being selectively positionable within the window opening to provide for selective outward or inward movement of the louver sash, one of the cross bars of the mounting frame in one position of the mounting frame being the upper bar and in the reverse position of the mounting frame being the lower bar.

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