

Feb. 5, 1963

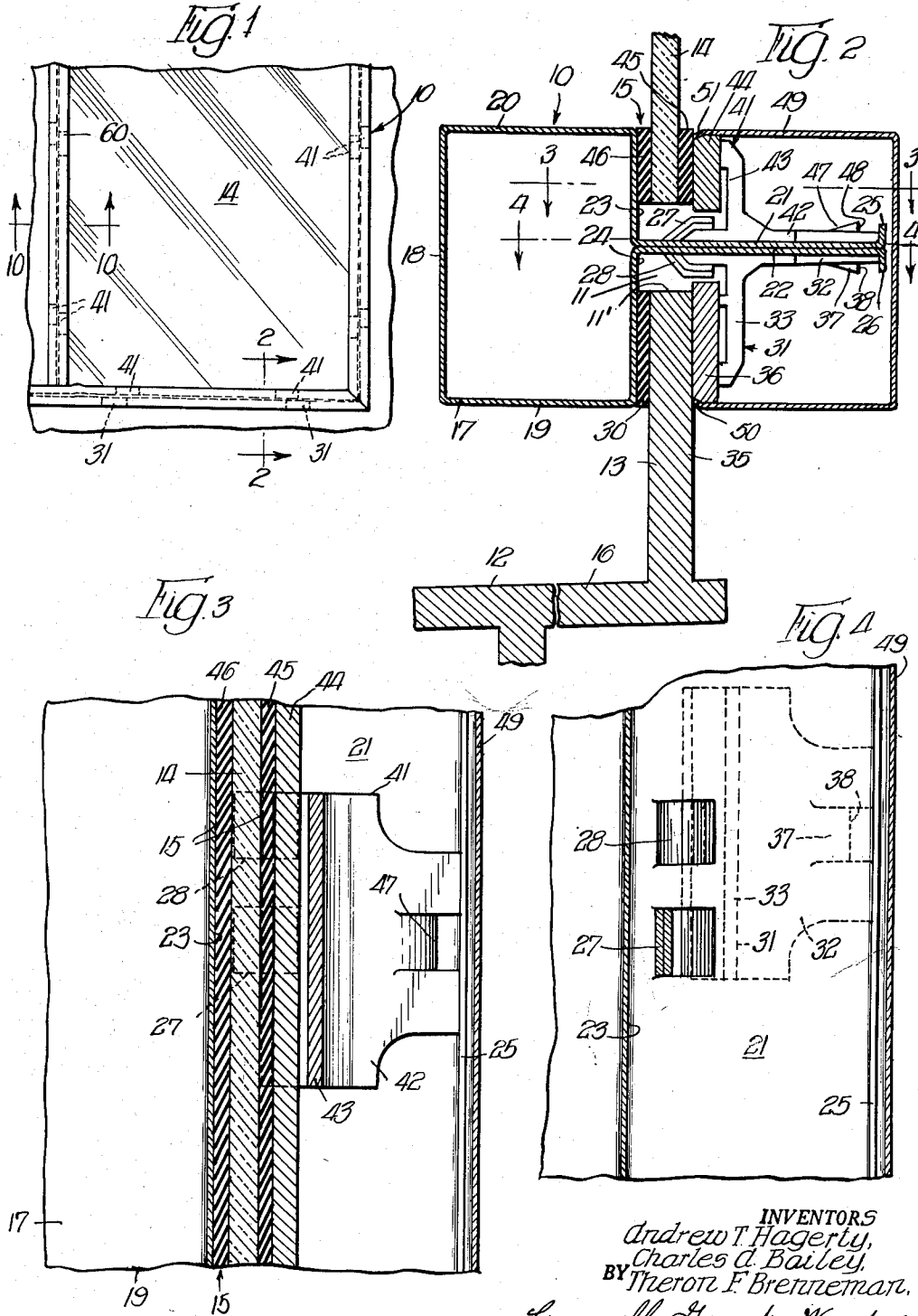
A. T. HAGERTY ETAL

3,076,535

WINDOW CONSTRUCTION

Filed July 17, 1961

3 Sheets-Sheet 1



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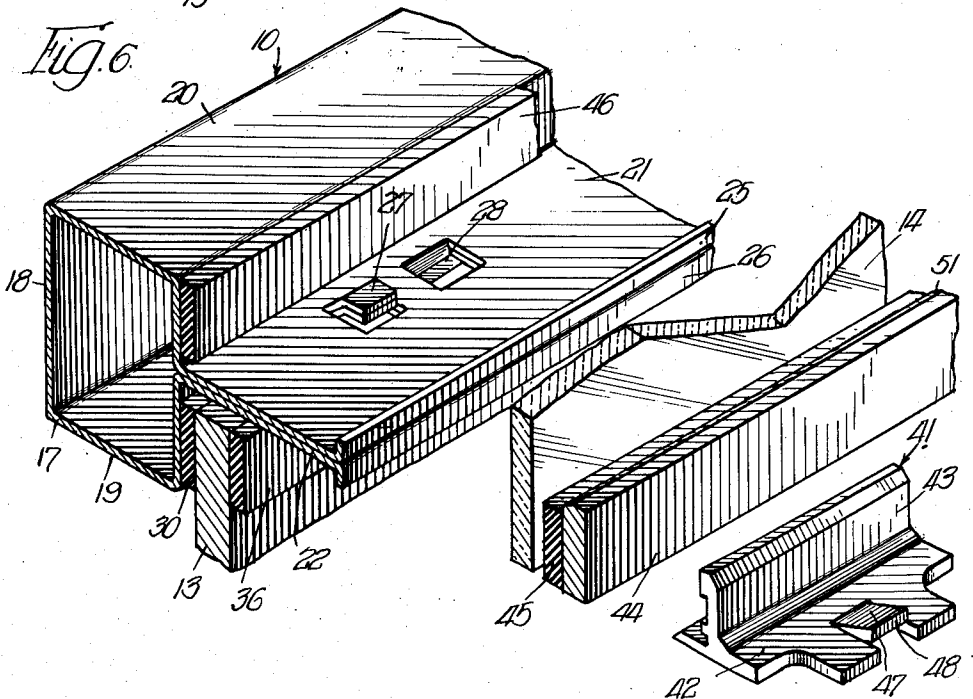
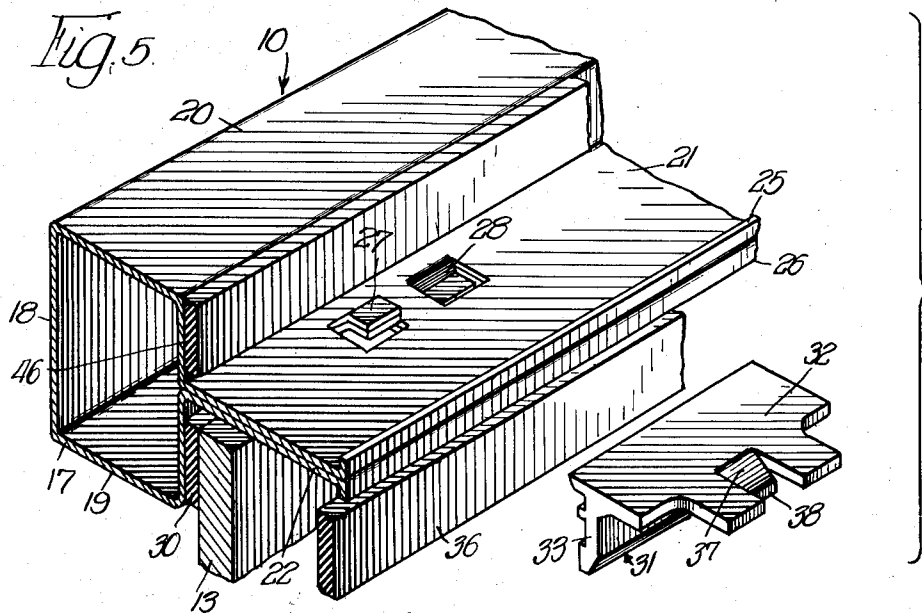
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3 Sheets-Sheet 2



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Fig. 10

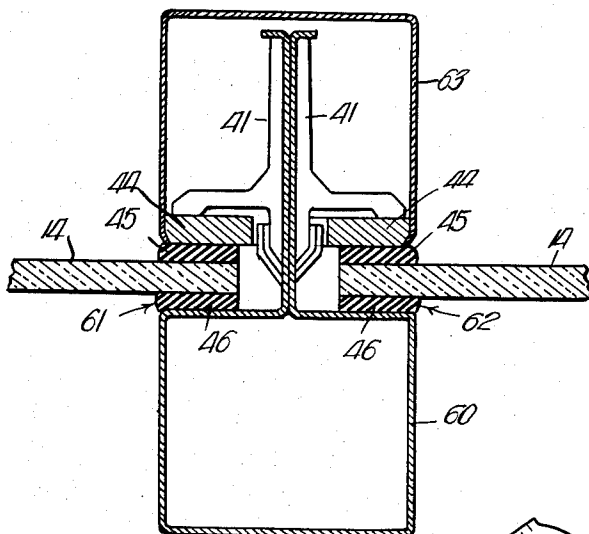


Fig. 8

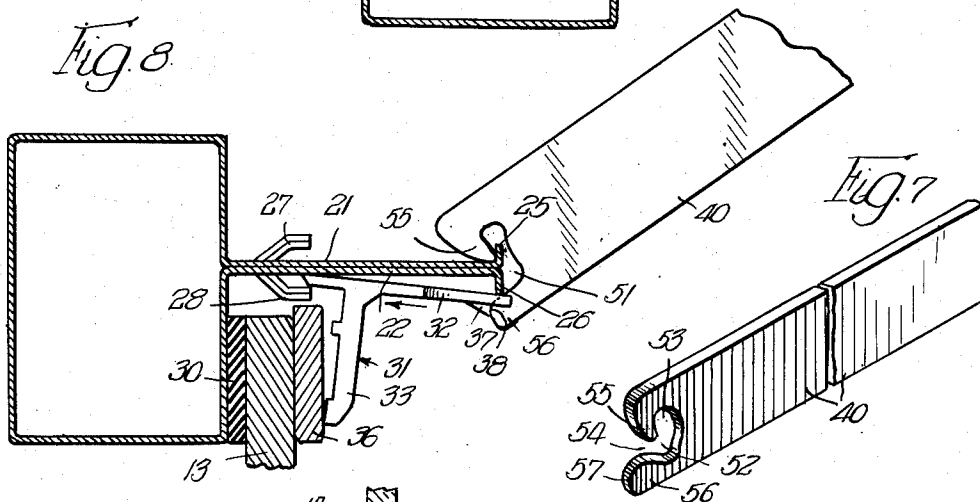


Fig. 7

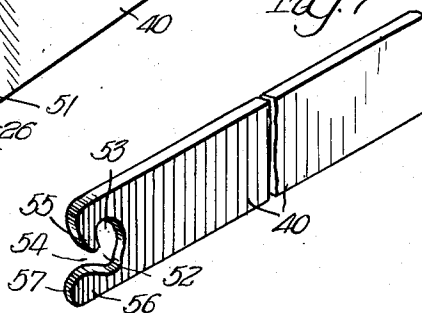
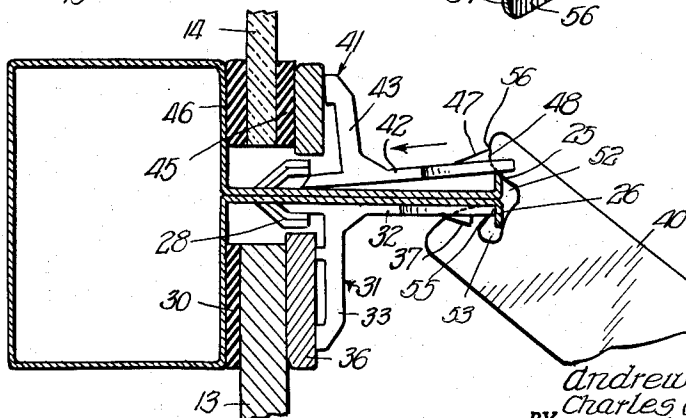


Fig. 9



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3,076,535

WINDOW CONSTRUCTION

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10 Claims. (Cl. 139-64)

This invention relates to window constructions and is more particularly concerned with improvements in a window of the fixed sash type which is adapted to be installed in an opening provided in the wall of a building or the like.

It is a general object of the invention to provide in a fixed sash type window which has a metal frame for receiving a glass pane, an improved fastening arrangement for mounting the frame in an opening in a wall and for securing the glass in a glazing channel formed in the frame.

It is a more specific object of the invention to provide an improved fixed sash window construction wherein a metal frame having an inwardly opening glazing channel for receiving a glass pane is secured in leakproof relation in an opening of fixed dimensions by a series of fastening elements while the pane is clamped in the glazing channel with its marginal edges seated in a compressible glazing strip by another series of fastening elements, the glazing strip being compressed so as to permanently seal the glass pane in the glazing channel.

It is a still more specific object of the invention to provide an improved window installation wherein a rigid metal frame having an inwardly opening glazing channel is secured in leakproof relation in an opening of fixed dimensions provided therefor in a wall by a series of peripherally spaced fastening elements, and a glass pane having its marginal edges encased in a glazing strip of rubber-like material is permanently fastened in the glazing channel by a series of peripherally spaced clamping elements which are associated with the frame and which engage in clamping relation with a clamping bar seated in the glazing channel and forming a movable inner wall for the glazing channel so as to compress the glazing strip and provide an airtight seal, with the clamping bar and the fastening and clamping elements being covered by a snap-on trim strip.

It is another object of the invention to provide a window construction wherein a rigid metal frame is provided with inwardly opening channel-like recesses on opposite sides of an inwardly directed, web forming frame portion, the outermost recess in the direction of the outside edge of the frame being adapted to receive marginal portions of the wall defining the opening in which the frame is seated with the frame being secured in the opening by a series of peripherally spaced fastening elements which are secured to the inwardly directed web portion of the frame and engage with the inner face of the wall around the opening.

It is still another object of the invention to provide an improved window construction wherein a rigid metal frame is provided with inner and outer inwardly opening recesses which are separated by an inwardly extending web-like portion of the frame with the innermost recess forming a glazing channel and having the glass secured therein by a series of peripherally spaced fastening elements, the glass having its margins gripped between glazing strip members which are formed of compressible material and which are held in compressed relation by the fastening elements.

It is a further object of the invention to provide a window construction of the type described and a method of installing the same wherein the frame is first locked

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in the opening by a plurality of peripherally spaced frictional clamping elements which are anchored to the frame and engage the wall around the opening in which the frame is positioned, and thereafter the marginal edges of the glass pane and associated glazing elements are clamped in the glazing channel of the frame by a series of clamping elements, also peripherally spaced, which are anchored to an inwardly projecting portion of the frame and engage with a glazing bar of rigid material positioned on the inner face of the innermost one of a pair of compressible glazing strip elements so as to compress the strips and tightly clamp the glass between the same.

It is a still further object of the invention to provide a tool for use in installing a window sash and fastening elements thereof of the character described which tool is adapted to be engaged with the inwardly extending portion of the frame of the sash and with the fastening elements after the frame is installed in the opening provided therefor so as to seat the fastening elements in position on the frame to hold the frame in the opening, the tool being also adapted to be engaged with the clamping elements for the pane so as to seat the same on the frame and clamp the pane in the glazing channel with the glazing strips being in compressed condition upon the tool being disengaged.

These and other objects and advantages of the invention will be apparent from a consideration of the window construction and the method and means for installing the same which are shown by way of illustration in the accompanying drawings wherein:

FIGURE 1 is an elevation of a corner portion of a window installed in an opening in a vertical wall which incorporates the principal features of the invention;

FIGURE 2 is a cross section taken on the line 2-2 of FIGURE 1, to an enlarged scale;

FIGURE 3 is a cross section taken on the line 3-3 of FIGURE 2;

FIGURE 4 is a cross section taken on the line 4-4 of FIGURE 2;

FIGURE 5 is an exploded perspective view showing a portion of the sash frame as it appears when set in the wall opening and the elements for fastening the same therein;

FIGURE 6 is a view similar to FIGURE 5 showing a portion of the sash frame secured in the wall opening and the elements for securing the glass pane in the glazing channel;

FIGURE 7 is a perspective view of a tool for use in installing the sash and glazing the same;

FIGURE 8 is a cross section similar to FIGURE 2 illustrating the operation of the tool for securing the sash frame in the opening in the wall;

FIGURE 9 is a cross section as in FIGURE 8 illustrating the operation of the tool for installing the glazing elements; and

FIGURE 10 is a cross section taken on the line 10-10 of FIGURE 1 to an enlarged scale.

Referring to the drawings, there is illustrated a window construction embodying the invention which comprises a rigid metal sash frame 10 secured in an opening 11 of fixed dimensions which is provided therefor by means of a rigid supporting or mounting frame 12, the latter being also of metal and having a flange 13 extending around the opening 11. The mounting frame 12 is in turn secured in an opening (not shown) in the vertical wall of a building or like structure or the frame 12 may be a part of the wall structure itself. The sash frame 10 supports one or more panes of glass 14 each having the marginal edges thereof seated in an inwardly opening recess which constitutes a glazing channel 15. The sash frame 10 is adapted to be secured in the opening

11 of the mounting frame 12 by clamping the same to the flange formation 13 which extends inwardly of the sill 16 in the plane of the opening 11 and which provides a rigid support for mounting the sash.

The sash frame 10 is formed of shaped sheet metal, for example stainless steel. Preferably, a single piece or plate is bent and welded as shown in the drawings so as to provide a hollow main frame section 17 of rectangular cross section having an outer face member 18, a peripheral outer edge face member 19 and an inside edge face member 20 with the marginal portions of the plate from which the frame is formed being brought together to form a double plate web section 21, 22 which extends inwardly normal to the two inside face forming sections 23 and 24 of the main frame section 17. The web forming plate portions 21 and 22 have their free edges turned in opposite directions to form hook-like shoulder members 25 and 26 defining the inner limits of the frame 10. The plate portions 21 and 22 may be welded together to form a relatively rigid web-like divider member between the glazing channel 15 which is formed by the inner wall section 23 and the plate portion 21 and the recess on the other side of the web formation 21, 22 which is defined by the inner wall section 24 and the adjacent plate portions 22 and which is adapted to receive the supporting flange member 13 of the mounting frame 12. The web section 21, 22 is provided with peripherally spaced pairs of struck-out tongues 27 and 28 with the tongues of each pair thereof struck-out in opposite directions so as to form hooks or anchor members for a purpose which will be described.

The frame 10 is constructed to be initially positioned in the opening 11 and is provided with a weatherstrip 30 of rubber or other compressible and resilient material which may be secured on the inside wall section 24 so that it is interposed between the wall section 24 and the outside face of the supporting flange 13, the weatherstrip 30 forming with the wall section 24 and the flange 13, when tightly drawn against the latter, a weatherproof seal.

The frame 10 is secured in rigid relation on the flange 13 with the outside face of the web plate 22 in confronting relation with the edge face 11' (FIGURE 2) which defines the opening 11 by means of a plurality of fastener elements 31 (FIGURE 5) which are arranged in spaced relation about the periphery of the frame. Each of the fastener elements 31 comprises a relatively short section of extruded aluminum or other suitable material which has a generally T-shaped cross section with a base plate forming member 32 having portions of unequal size on opposite sides of an angularly related stem or flange member 33. The fasteners are seated as shown in FIGURE 2 with the base plate member 32 having the edge of the short portion engaged beneath a downwardly struck tongue 28 in the web plate 21, 22 and the opposite edge on the longer portion thereof engaged behind the hook or shoulder formation 26 at the inner edge of web plate 21, 22. The stem or flange member 33 extends parallel with the inside face 35 of the supporting flange member 13 and engages against a filler strip 36. The base plate member 32 is provided with a struck-out tongue 37 adjacent the edge thereof which is inclined in the direction of the member 33 and cut back to provide an abutment edge 38 for cooperation with a tool 40 (FIGURE 7) by means of which the fastener 31 is forced into position on the web member 22 in a manner which will be hereinafter described and which results in compressing the weatherstrip 30. The outside corners of the base plate member 32 may be cut away as shown.

After the sash frame 10 is installed in the opening and secured to the supporting flange 13, the glass pane 14 is positioned in the glazing channel 15 and secured therein by a plurality of peripherally spaced fastening or clamping elements 41 which are of substantially the same construction and may be the same material as the fastening elements 31, having a generally T-shaped cross section

with a base plate member 42 and an angularly related stem-forming flange member 43. The base plate member 42 is adapted to be hooked beneath an upwardly struck tongue 27 in the web member 21, 22 and having its opposite edge hooked behind the edge flange 25 of the plate member 21. The upstanding stem or flange member 43 (as shown in FIGURE 2) of the fastener 41 engages against a glazing bar member 44 of metal or other rigid material which forms the inside wall of the glazing channel 15. The glass pane 14 has its edge seated in the glazing channel 15 between a pair of glazing strips 45 and 46 which are compressed sufficiently to grip the glass and hold the glass pane 14 in position when the fasteners 41 are properly seated relative to the frame 10. Each of the fasteners 41 is provided with a struck-out tongue 47 adjacent the edge of the base plate member 42 which is cut off at the edge to form an abutment 48 for cooperation with the tool 40, which is used to install the fastener elements 41 as well as the fastener elements 31. The outside corners of the base plate member 42 may be cut away as shown. A channel-shaped inside cover or trim member 49 is provided which has its edges toed inwardly so as to snap over the rounded edge portions 50 and 51 of the filler strip 36 and the glazing bar member 44.

The tool 40 which is provided for use in installing the fastener elements 31 and 41 is illustrated in FIGURE 7. It comprises a flat metal strip having a generally L-shaped slot 52 in the one end with the one leg 53 of the slot extending transversely of the long axis of the tool and the other leg 54 extending longitudinally and forming a mouth or opening therefor with the end portions of the tool at 55 being tapered or rounded as shown to form a hook-shaped portion and the opposite portion 56 being rounded on its inside edge at 57. The tool 40 is employed as illustrated in FIGURE 8 to install the fastener elements 31. The fastener element 31 is placed in the position shown in FIGURE 8 with the inner margin of the base plate 32 in position to slide beneath the anchoring tongue 28 and the stem or flange member 33 engaging the filler strip 36. The tool is positioned as shown in FIGURE 8 with the hook portion 55 inside the flange 25 and the end portion 56 engaged against the abutment edge 38 of the tongue 37. The tool is rotated about the flange 25 as a pivot to force the base plate member 32 into the position shown in FIGURE 2 so that its edge engages the inside face of the flange 26 thereby compressing the weatherstrip 30 and securing the frame in tightly sealed relation to the flange 13 when all of the fastener elements 31 are installed about the periphery thereof.

Fastener elements 41 are positioned and moved into their final location by use of the tool 40 by a similar operation as illustrated in FIGURE 9. After the fastener 41 is positioned as shown in FIGURE 9, the hook portion 55 of the tool 40 is engaged behind the downwardly turned flange and the opposite end portion 54 is engaged with the abutment edge 48 of the upwardly struck tongue 47 on the base plate member. The tool is pivoted about the flange 26 to force the fastener into position thereby compressing the glazing strips 45 and 46.

The frame 10 may be employed in an opening of substantial size so as to make it desirable to divide the sash for installation of panes of a size smaller than the opening. As shown in FIGURE 1, the sash may be divided by vertical rails 60 which may have the same configuration as the exterior portion of the frame 10 (FIGURE 10), except that two glazing channels 61 and 62 of equal size will be provided for receiving the glass panes 14 with the panes having their edges seated between compressible glazing strips 45 and 46 which are held under compression by the glazing bar member 44. A plurality of the fastener elements 41 are installed, with the use of the tool 40, in spaced relation along the rail and covered by a trim strip 63 of channel-shaped cross section.

While specific details of construction and particular

materials have been referred to in describing the illustrated form of the invention, it will be understood that different structural details and other materials may be resorted to within the spirit of the invention.

We claim:

1. A window sash for mounting in an opening in a supporting frame in a wall or the like, which supporting frame has an inwardly directed peripheral flange which extends into the opening and acts as a support for attaching thereto in fixed relation said window sash, said sash comprising a frame formed of metal plate which is bent on parallel, longitudinally extending lines to provide a generally rectangular hollow wall section comprising an exterior wall, inner and outer edge forming walls and an interior wall which is divided by an inwardly extending flange forming member of double plate construction, said double plate flange forming member having its inner edges extending in opposite directions and forming hook-like abutment shoulders, portions of the interior wall of the frame member cooperating with said double plate flange forming member to define an inwardly opening glazing channel on one side of said double plate flange forming member in which a glass pane is received when the sash is glazed with said pane having its marginal edges seated in a resilient compressible glazing assembly and a similar channel on the other side thereof which receives therein said inwardly directed peripheral flange when the sash is installed in said supporting frame, a series of generally T-shaped fastening elements positioned in spaced relation around the periphery of the sash frame with one leg thereof anchored to said double plate flange forming member between one of said abutment shoulders and a fastening element spaced inwardly of said shoulder and the other leg thereof extending in clamping relation along the inside of said inwardly directed peripheral flange, and a plurality of clamping elements of generally T-shaped section having one leg anchored to said double plate flange forming member and having the other leg engaging with and compressing the glazing assembly in which the marginal edges of the glass pane are seated.

2. A window for mounting in an opening in a wall or the like and which is characterized by a supporting frame fixed in the wall opening and having an inwardly directed member which extends into the opening and acts as a support for a fixed window sash, said sash comprising a frame formed of metal plate bent along parallel, longitudinally extending lines to provide a generally rectangular hollow exterior wall forming section and an inwardly extending flange of double plate construction which is in a plane normal to the inwardly facing surface of said exterior wall forming section and which has its inner edges extending in opposite directions to form relatively narrow abutment shoulders, said sash frame being constructed to provide an inwardly opening glazing recess on the inner side of said double plate flange in which a glass pane having its marginal edges seated in a resilient compressible glazing assembly is positioned when the frame is glazed and a similar recess on the other side of said double plate flange which receives therein said inwardly directed supporting frame member, a series of relatively short, rigid frame fastening elements positioned around the periphery of the sash frame, each of said frame fastening elements having a base plate and a flange plate, said base plate engaging said double plate flange and held thereon by one of said abutment shoulders and a tongue member spaced inwardly thereof which is struck from said double plate flange and said flange plate extending in pressure applying and clamping relation along the inside of said inwardly directed supporting frame member, and a plurality of relatively short, rigid clamping elements each having a base plate and a flange plate with the base plate engaging with said double plate flange on the opposite side thereof and held thereon by the other one of said abutment shoulders and a tongue member spaced inwardly thereof which is struck from said double plate flange and with the flange

plate engaging in pressure applying relation with the glazing assembly in which the marginal edges of the glass pane are seated.

3. A window sash construction for mounting in fixed relation in an opening in a wall comprising a metal frame having an inwardly opening glazing channel and an inwardly extending web having hook-like ledges at the innermost edge thereof, a pair of glazing strips of resilient compressible material seated in said glazing channel, a glass pane having its margins between said glazing strips, a relatively narrow rigid glazing bar positioned against the inside face of the innermost one of said glazing strips, a plurality of fastening assemblies comprising rigid members disposed about the periphery of said frame for securing said frame in said wall opening, which fastening assemblies engage between one of said ledges and portions of the wall around said opening and a plurality of clamping devices comprising relatively short rigid members engaging between one of said ledges and said glazing bar and holding said glazing strip in compressed relation so as to seal the glass pane in said frame.

4. A window sash for mounting in an opening in a wall, said window sash comprising a frame having a main wall forming member of generally rectangular cross section extending around the periphery thereof which faces the outside margins of the wall around the opening when the sash is mounted in said opening, a resilient compressible sealing member between the main wall forming member and the outside face of the wall around the opening, a flange extending inwardly of said main wall forming member and around said opening, said flange defining with said main wall forming member a glazing channel which opens toward the center of the wall opening, a glass pane having its edges encased between glazing strips and seated in the glazing channel with the outside glazing strip being of resilient and compressible material, a plurality of assemblies spaced about the periphery of the wall opening for securing said frame in said opening and the glass pane and its associated glazing strips in the said glazing channel, said assemblies each comprising a pair of rigid fastening devices, each of said fastening devices having a plate-like body member which is placed in flat engagement with a face of said flange and secured in interlocking relation therewith, each of said fastening devices of each pair thereof having an angularly related plate member which extends from the body member in a plane parallel with the plane of said wall opening, and said angularly related plate members of each pair of said fastening devices being forced into engagement with the inside glazing strip and the inside margin of the wall around said opening, respectively, so as to compress said sealing member and said compressible glazing strip and hold the same in compressed relation.

5. A window construction for mounting in an opening in a supporting wall wherein the opening is characterized by an edge surface extending around the periphery of the opening and the window is characterized by a frame having a peripheral wall member of greater width than the width of said edge surface and extending with a face thereof in confronting relation with and adjacent said edge surface when mounted in said opening, said wall member having peripherally spaced tongues cut in the inner marginal portions and bent out of the plane thereof to form a series of spaced anchor members for receiving plate-like portions of fastener elements, and a plurality of fastener elements each having a plate-like body portion which is engaged along one edge thereof with one of said anchor members, the opposite edge of said body portion being interengaged with a portion of the wall member when said body portion is moved into engagement with said anchor member so as to secure said body portion thereto, and an angular flange extending intermediate the edges of said body portion which projects along the margin of the inside surface of said supporting wall and which is proportioned so as to apply pressure to said inside wall

surface when said body portion is forced into engagement with said anchor and wall members.

6. A window for mounting in an opening in a wall or the like which is characterized by a mounting frame having an inwardly directed peripheral flange extending into the opening and acting as a support for a fixed window sash, said sash comprising a frame formed of metal plate which is bent on parallel, longitudinally extending lines to provide a hollow exterior wall forming portion with inner and outer parallel edge forming portions and inwardly bent portions parallel to said exterior wall portion and projecting on opposite sides of a flange forming member of double plate construction which extends within the opening and which has its inner edges extending in opposite directions to form hook-like abutment shoulders, said inwardly bent portions cooperating with the double plate flange forming member to define an inwardly opening glass receiving glazing channel on one side of said double plate flange forming member and a similar channel on the other side thereof receiving therein when the sash is installed in the supporting frame the inwardly directed flange of said mounting frame, a plurality of generally T-shaped fastening elements positioned in spaced relation around the periphery of the sash frame with one leg thereof engaging the double plate flange forming member at an abutment shoulder and also at a point spaced therefrom in the direction of said inwardly bent portions of said exterior wall of the sash frame and the other leg thereof engaging in clamping relation the inside of said inwardly directed peripheral flange, and a plurality of clamping elements of generally T-shaped section having one leg engaging the other side of said double plate flange forming member and the other leg engaging in compressing relation with a glazing assembly seated in said glazing channel.

7. A rigid metal window frame adapted to be permanently and rigidly mounted in an opening in a supporting wall, said frame being formed of a strip of metal plate bent to provide a tubular outer frame section and an integral inwardly extending web, said tubular outer frame section having an inner face extending from the outer edge and on opposite sides of said web so that, when the frame is mounted in the opening in the supporting wall, portions of the inner face of said tubular outer frame section overlie marginal portions of the outside face of the supporting wall and outer portions of said web are adjacent to and face the edge of the supporting wall, said web being formed from the side marginal portions of the metal plate and said marginal portions being disposed in face contacting relation so that said web is of a double thickness metal plate and transversely elongated into the opening, the edge portions thereof being bent in opposite directions to form abutment shoulders extending from the opposite faces of said web, said web and said inner face of said tubular frame section forming channels for receiving a glazing assembly and said supporting wall, respectively.

8. A window sash for mounting in an opening in a wall, said window sash comprising a frame having a main wall forming member of generally rectangular cross section extending around the periphery thereof which faces the outside margins of the wall around the opening when the sash is mounted in said opening, a resilient and compressible sealing member between the main wall forming member and the outside face of the wall around the opening, a flange extending inwardly of said main wall forming member and around said opening, said flange defining with said main wall forming member a glazing channel which opens toward the center of the wall opening, a glass pane and a glazing assembly seated in the glazing channel with the glazing assembly including a resilient and compressible glazing strip, a plurality of fastening and clamping assemblies spaced about the periphery of said wall opening for securing the frame in said opening and the

glass pane and its glazing assembly in the glazing channel, said fastening and clamping assemblies each having a relatively short plate-like body member which is placed in flat engagement with a face of said flange and secured in interlocking relation therewith and a stem member which extends in a plane parallel with the plane of said wall opening, said fastening and clamping assemblies being arranged on opposite sides of said flange and the stem members thereof being forced into engagement with the glazing assembly and the inside margin of the wall around the opening, so as to compress said sealing member and said compressible glazing strip and hold the same in compressed relation.

9. A window sash for mounting in fixed relation in an opening in a wall, said sash comprising a frame having a main wall forming member extending around the periphery thereof with one face having an outer portion which is positioned in confronting relation with marginal portions of the outside face of the wall around the opening when said frame is installed in said opening, a flange on said frame extending in angular relation to said main wall forming member and projecting inwardly of said frame so as to overlie the edge face of the wall surrounding said opening, a compressible weatherstrip between said main wall forming member and said outside face of the wall around said opening, said main wall forming member having inner portions which form with said flange a glazing channel for receiving a glass pane and glazing assembly, a plurality of relatively short rigid frame securing and clamping devices spaced about the periphery of said frame, said securing and clamping devices each having a plate-like base portion which is seated on the outside face of said flange, said flange having transversely spaced means for engaging opposite edges of said base portion to anchor the same thereon, said securing and clamping devices each having an outwardly projecting plate-like stem portion extending normal to said plate-like body portion and overlying marginal portions of the inside face of the wall around said opening, and said stem portion on each securing and clamping device being positioned so that when said plate-like body portion is forced into anchored position on said flange, said stem portion applies pressure on the inside face of the wall around said opening and permanently compresses said weatherstrip.

10. A window for mounting in an opening in a wall, said window comprising a metal frame having a web extending around the periphery thereof which faces the edge surface of the wall defining the opening when the frame is mounted therein, said frame having a face forming wall portion on the outside extending generally normal to said web and overlapping the margins of the outside surface of the wall surrounding said opening, said web being connected to said face forming wall portion intermediate the side edges thereof and extending inwardly of said wall opening adjacent said edge surface, said web and said face forming wall portion defining a glazing channel which opens inwardly toward the center of said wall opening, a glass pane having its marginal edges between resilient compressible glazing strip members seated in said glazing channel, a plurality of relatively short rigid frame fastening devices mounted on said web in spaced relation around the periphery of said frame, said devices being placed on the web so as to exert pressure against the inside surface of the wall surrounding said opening and an inward pull on the frame thereby to frictionally secure said frame in permanent relation in said wall opening and a plurality of relatively short rigid pane clamping devices mounted in spaced relation on the other side of said wall, said pane clamping devices having a body portion and an angular flange, and means including projections on said web for rigidly and detachably connecting the body portions of said clamping devices to said web with the angular flanges overlying the innermost glazing strip member so that said clamping devices apply

substantial pressure to the glazing strip members and hold the pane in the glazing channel with said glazing strip members compressed and tightly sealing the marginal edges of the pane in the glazing channel.

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