Nov. 2, 1954 J. T. BONGIOVANNI 2,693,257

METAL FRAME CONSTRUCTION

Filed Sept. 23, 1949 2 Sheets-Sheet 1

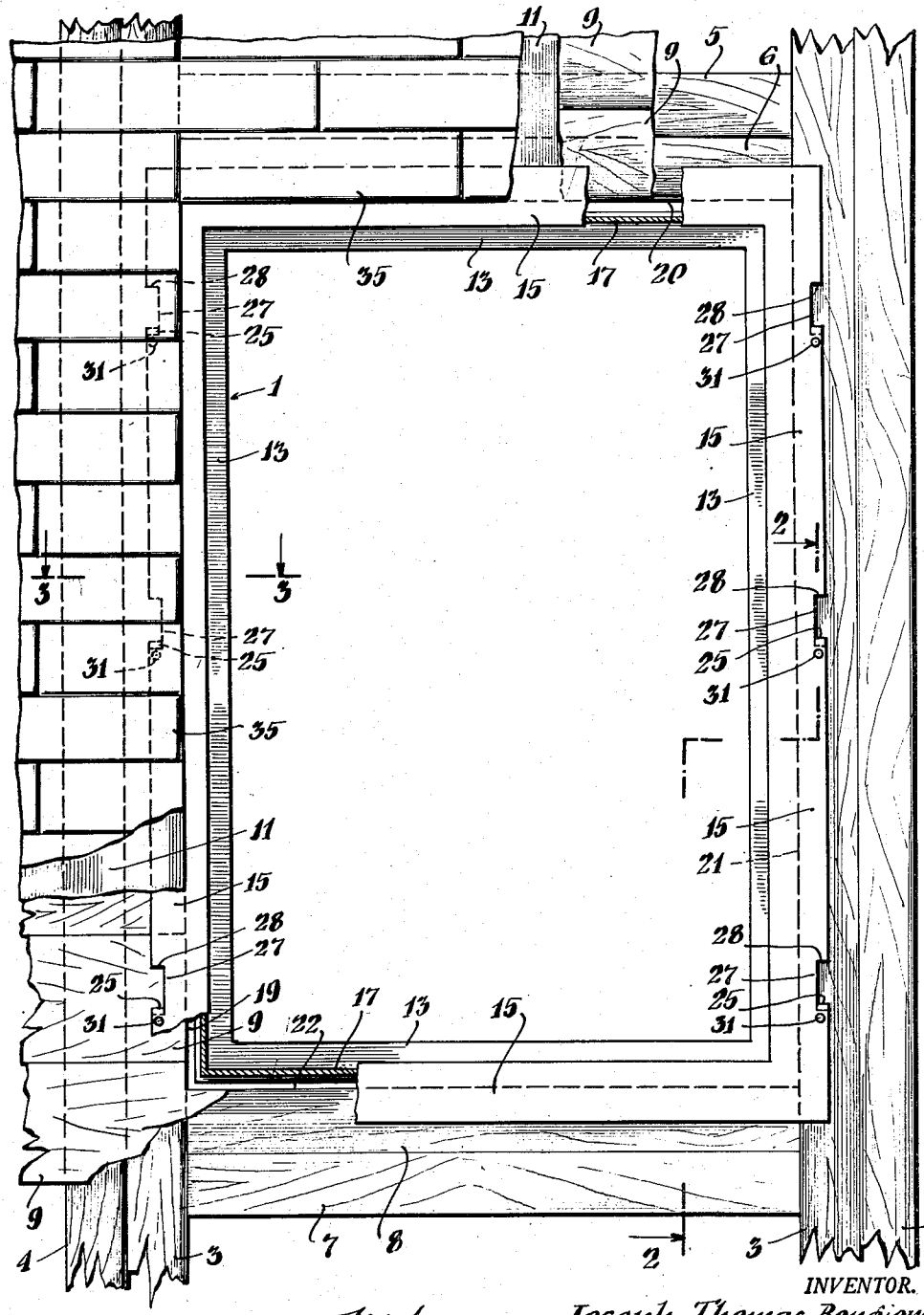


Fig. 1

INVENTOR.
Joseph Thomas Bongiovanni
BY
George Abarey
ATTORNEY

Nov. 2, 1954 J. T. BONGIOVANNI 2,693,257

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Filed Sept. 23, 1949 2 Sheets-Sheet 2

Fig. 2

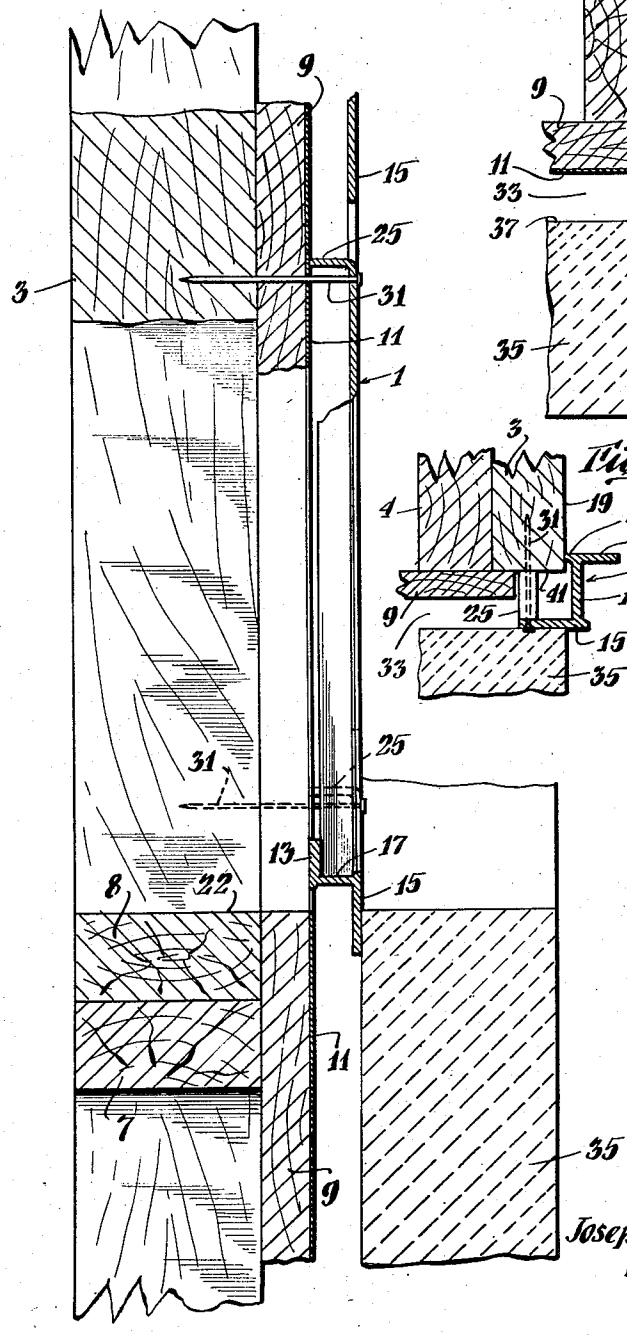


Fig. 3

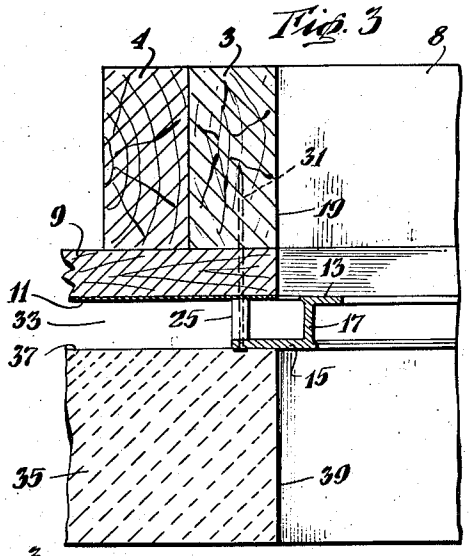
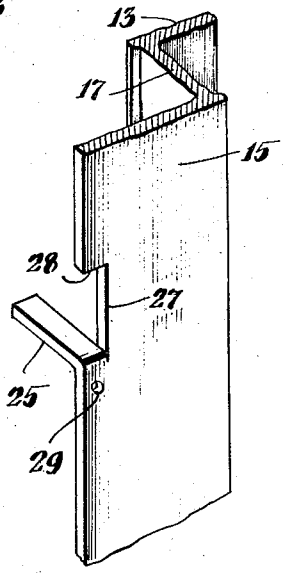


Fig. 5

Fig. 4



INVENTOR.
Joseph Thomas Bongiovanni
BY
George H. Casey
ATTORNEY

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METAL FRAME CONSTRUCTION

Joseph Thomas Bongiovanni, Rocky Point, N. Y.

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9 Claims. (Cl. 189—75)

This invention relates to a building construction and more especially to a wall structure and a metal frame for a window or door opening in such wall structure of the building. The invention particularly relates to a metal window or door frame for a wall structure in which a brick or similar veneer provides an outer facing in the wall about the window or door opening.

Metal window or door frames, for the most part in combination with metal sash or doors, heretofore have been utilized extensively in both solid brick and solid masonry structures. More recently they have been used also in so-called "frame" constructions utilizing structural members of wood or similar materials penetrable by fasteners, such as nails. Ordinarily frame constructions may be built at less cost than structures of solid brick or concrete. In order to provide such frame buildings with the exterior appearance and texture of the wall afforded by a solid brick or other masonry construction and at the same time to increase the insulation of the exterior walls of the frame construction, veneers of brick or similar masonry elements have been combined with the exterior walls of the frame construction.

In such brick veneer constructions, in order to provide the desired insulation and, as well, to minimize or prevent access of moisture absorbed by the brick to the wood or similar structural members which might cause dry rot or otherwise damage the "frame" construction and the interior finish of the wall, it is common practice to space the brick veneer from the frame structure exteriorly thereof. To this end spacers, ordinarily in the form of wood strips, are fastened to the exterior face of the frame wall structure adjacent the window and door openings for bearing of the window and door frames thereon. The strips may be fastened to the exterior face of the conventional sheathing members, such as boards of wood or other materials supported by the studs and other framing members of the frame wall structure. These spacing strips may be applied over a building paper which in accordance with common practice is attached to the exterior surface of the sheathing.

In order to close the space between the brick veneer and the frame wall structure adjacent a window or door opening and to bring the window and door frame into proper relation to such opening in many cases a filler piece or a "surround" of wood or similar material is utilized against which a flange of the metal window or door frame may bear when such metal frames are used in the type of structure being described. Such surrounds may serve also to provide a trim around the metal frame but they have the disadvantage that they are exposed to the weather and that the joints between them and the metal frame as well as between the brick veneer and the metal frame must be caulked with mastic or similar material and may not remain weather-tight because of shrinkage of the surround. Moreover, in keeping with the character of a solid brick wall construction it is desirable that the brick veneer be brought closely adjacent to the metal frame of the window or door opening so as to secure the appearance of the solid construction and to cooperate directly with the metal frame to secure the desired weather-tightness. The veneer constructions ordinarily utilized heretofore have not satisfactorily accomplished these desirable results or have involved increased cost of construction.

It is an object of the invention to provide a brick veneer wall construction of simplified form utilizing metal window and door frames.

It is another object of the invention to provide such a wall construction in which the brick veneer may cooperate directly with the metal frame to secure weather-tightness.

A further object of the invention is to provide a metal window or door frame for use in brick veneer constructions which, while adapted to be positioned in proper relation to the brick veneer and to the frame wall structure, makes unnecessary the conventional spacing strips.

It is a feature of the invention that the metal frame, which otherwise may be of usual form and constructed with conventional framing elements, such as Z bars, itself is provided with a spacing means adapted to cooperate with the exterior face of the frame wall structure or a member thereof to position the metal frame in the required spaced relation to the frame wall outwardly thereof. Preferably the spacing device of the metal frame of the invention is adapted to bear against the outer surface of the conventional sheathing members which are fastened at the exterior faces of the studding and similar structural members of the frame structure of the wall. Where, as is usual, the metal window or door frame is formed with a flange, for example, the flange of a Z bar providing a framing element thereof, a lug may be formed from the material of the flange of such framing element, this lug being bent transversely of the flange so that the end thereof may be brought into engagement with the exterior surface of the sheathing or, if desired, with another outwardly disposed surface, for example, the face of a supporting stud which is adjacent the window or door opening. It will be understood that the framing elements of the metal window or door frame may be of other sections than Z bar sections which provide portions overlapping the wall adjacent the window or door opening and are adapted to carry a sash in weather-tight relation thereto.

When the metal frame is fastened in position in the opening of the wall structure by suitable means the brick veneer in the usual spaced relation to the "frame" wall structure may be carried over upon the laterally extending flange of the metal window or door frame in the approved manner for brick wall construction. Preferably for the purposes of the invention the metal window or door frame is formed of framing elements, such as Z bars, having a wide flange providing for considerable lap of the brick veneer upon this flange without encroaching thereon to the extent of approaching the web of such framing element of the window or door frame. The brick veneer around the window or door thus may be kept back sufficiently to expose the surface of the metal frame sufficiently to give the proper architectural effect as well as to provide proper clearance between a window or door hinged or otherwise supported within the opening of the metal window or door frame.

Other objects and features of the invention will be understood more clearly from the description to follow of the drawings in which:

Fig. 1 shows in elevation a metal window frame constructed according to the invention and supported in a brick veneer wall construction;

Fig. 2 shows a section on line 2—2 of Fig. 1;

Fig. 3 shows a section on line 3—3 of Fig. 1;

Fig. 4 shows in perspective a detail of the metal frame and spacing means of the invention.

Fig. 5 shows a modification.

In Fig. 1 a metal window frame is supported within the opening formed by the vertical studs 3 and 4 at either side of the opening which in the conventional manner are fastened together to reenforce the structure adjacent the window opening. At the head of the frame 1 the two wood framing members 5 and 6 are cut in between the studs 3 and are fastened together and to studs 3, 4 to form a strong structure at the head of the opening. At the bottom of the opening the members 7 and 8 are similarly cut in between the studs 3 and are fastened together and to the vertical studs 3, 4. Fastened upon the studs 3, 4, 5, 6, 7 and 8 and other framing members are the sheathing members 9, which, for example, may be of wood boards as in the conventional frame house construction, the ends and edges of the boards being cut flush with these members to leave the window opening as

shown in Figs. 1 and 3. Sheathing paper **11** may be applied to the boards **9** as in conventional frame constructions.

In the particular embodiment of Figs. 1, 2 and 3 the metal frame **1** is constructed with framing elements of **Z** bar section providing inner flanges **13** and outer flanges **15** extending laterally from the web **17**. The flange **15** in this embodiment is wider than the flange **13** and has such a width that it extends a substantial distance in overlapping relation upon the sheathing members **9** and upon the studs and framing members **3, 6** and **8**. In the particular embodiment shown in Figs. 1, 2 and 3, the metal frame **1** is constructed so that the webs **17** thereof lie somewhat within the inner faces **19, 20, 21** and **22** of the opening while providing the requisite overlapping relation of the flange **15** upon the sheathing boards **9** and the structural members **3, 6** and **8**.

The metal frame **1** is provided with spacing lugs **25** which in the embodiment being described are formed by making incisions in the flange **15** along the lines **27, 28**, Figs. 1 and 4, and bending the portion of the flange **15** thus severed at right angles to the plane of the flange **15**. As shown in Figs. 2 and 3 the length of the incision along the lines **27** may be such as to determine the length of the lugs **25** in the direction transversely of the flange from the outer face thereof to the face of the sheathing elements **9**. Thus the frame **1** may be supported in the window opening with the ends of the lugs **25** bearing directly upon the sheathing boards or the sheathing paper **11** carried thereby.

In order to hold the frame **1** in position in this relation to the sheathing boards **9**, the flange **15** has formed therein holes **29**, Fig. 4, adjacent and directly behind the lugs **25** as shown to receive a nail **31** or similar fastening which is passed through the hole **29** and is adapted to enter the framing members **3**, passing also through the sheathing elements **9** in the embodiment of Figs. 1, 2 and 3. In the particular metal window frame shown in Fig. 1 the vertical side elements thereof have three lugs formed therein and three holes respectively adjacent these lugs. In window frames of ordinary size, two or three such lugs and the corresponding fasteners or nails may be utilized at each side securely to support the window frame in position, no lugs or fasteners being required in the upper and lower frame elements. Such lugs and fasteners, however, may be formed in these upper and lower frame elements if desired or required in order to obtain secure fastening of the window frame to the wall structure.

For the purposes of the invention, in window frames of ordinary size the framing elements thereof may be formed, for example, with a **Z** bar section having a dimension of one inch between the outer face of the flange **15** and the corresponding face of the flange **13**, this dimension representing the overall thickness of the frame. The width of the flange **13** may be approximately one inch and the width of the flange **15** may be approximately one inch and a half transversely of the web **17** of the **Z** bar. The thickness of the web **17** and of the flanges **13** and **15** may be approximately one-eighth of an inch. These dimensions, however, may vary with different constructions of the window frame and with different dimensions of the window opening in which the frame is disposed.

If, in the construction shown in the drawings, the metal frame is constructed with such dimensions that the web **17** thereof is spaced approximately five eighths of an inch from respective adjacent faces **19, 20, 21** and **22** of the structural members **3, 6** and **8** of the wall, the flange **15** will overlap the edge of the sheathing elements **9** and the structural members **3, 6** and **8** approximately three quarters of an inch. The nail or similar fastener, therefore, may be driven into the structural member generally centrally thereof and this nail may have sufficient length and diameter securely to hold the frame **1** in position. When ordinary wire nails are used as fasteners the hole **29** may be approximately three sixteenths of an inch in diameter to receive an eight-penny or a ten-penny nail, such a nail being of sufficient length and rigidity to extend across the space between the flange **15** and the sheathing boards and well into the structural members **3, 6, 8** and securely to hold the window frame against the face of the frame wall structure and to prevent lateral movement of the metal window frame.

Where, as in the construction shown in Fig. 3, the frame **1** is of such size that a space is left between the web **17** and the adjacent faces of the structural members **3, 6, 8**, this space may be filled in any convenient manner with packing material, such as mineral wool, to restrict or prevent movement of air into and out of the space **33** between the brick veneer **35** and the paper **11** on sheathing boards **9**. As shown in the drawing the brick veneer **35** is positioned so that the inner face **37** of this veneer bears upon the outer face of the flange **15** in overlapping relation and so that the end face **39** of the brick veneer in the particular embodiment illustrated is substantially in line with the faces of the structural members **3, 6, 8**, as shown in Figs. 1 and 3. The amount of overlap of the brick veneer upon the flange **15** may be varied, however, to secure ample surface contact between the veneer and the flange to restrict or prevent entrance of air and water into the space **33**. If necessary to secure a weather-tightness the corner formed between the face **39** of the brick veneer and the outer face of the flange **15** may be caulked with suitable mastic or other caulking material. It will be understood, moreover, that the dimensions of the metal frame **1** may be varied so that the rib **14** of the **Z** bar where the flange **13** joins the web **17** may be brought into engagement with the end edge of the sheathing boards **9** to provide resistance to or to prevent passage of air into and out of the space **33** past the frame.

The lug **25**, if desired, may be formed within the area of the flange **15** instead of along the edge thereof in order that this lug shall bear upon the face of the sheathing boards **9** at or adjacent a stud when the flange **15** is in greater overlapping relation to the sheathing boards and studs than that shown, for example, in Fig. 3. It also will be understood that the lug **25** may be formed as shown in the drawings and, in order to maintain the fastening **31** in proper position generally centrally with respect to a stud when the flange **15** is wider or the metal frame is larger, the hole **29** may be disposed nearer the web **17** of the **Z** bar framing member, that is, for example, toward the right of its position as shown in Fig. 4.

In the modification shown in Fig. 5, the sheathing boards **9** do not extend so as to be flush with the face **19** of the stud **3**. The lug **25** in this embodiment is made of such length as to bear against the outer face **41** of the stud **3** and to pass by the end edge of the sheathing boards **9**. The length of the lug **25** may be such as to maintain the desired width of the air space **33** between the brick veneer **35** and the paper **11** on sheathing boards **9**. In the embodiment of Fig. 5 the frame **1** is constructed in the manner referred to above and the web is of such depth that the web **17** is closely adjacent the face **19** of the stud **3** and the rib **43** conventionally formed in the **Z** bar section in the plane of the flange **13** bears against the face **19** of the stud **3** to close the space **33**. In the particular embodiment of Fig. 5 the flange **15** is somewhat shorter than the flange **15** of the metal frame element shown in Fig. 1, the lug **25** and the nail **31** being generally centrally positioned with respect to the stud **3** as in the embodiment of Fig. 3. The sheathing boards, however, may be cut so as to lap upon the studs **3, 4** to any suitable degree and the flange **15** then may be made of greater or less length to bring the lug **25** into proper bearing relation to the studs **3, 4**. The nail **31** and the hole **29** in the flange **15** through which the nail is passed may remain in the position shown with respect to the web **17** so that this hole becomes positioned toward the right of the lug **25** in the manner referred to above, thereby maintaining the nail in position for good fastening in the stud **3**.

Other variations in the form, dimensions and relations of the metal frame to the structural members and to the sheathing as well as to the brick veneer and in the dimensions and the position of the lug **25** and of the hole **29** may be made within the scope of the invention to suit particular conditions of a frame wall construction which is provided with a veneer of brick or similar material at the exterior thereof. All such variations are intended to be within the scope of the appended claims.

I claim:

1. In a building construction having an outer facing of brick or similar veneer, the combination with a wall structure of said building providing an outwardly disposed face of said wall structure adjacent a window or door opening of said structure, said brick veneer being supported in spaced relation to said face of said wall structure outwardly thereof adjacent said window or door opening of said structure, of a metal frame for said

window or door opening, said frame having a flange extending generally parallel to said face of said wall structure in overlapping relation thereto and in spaced relation thereto outwardly thereof, a lug carried by said flange and projecting therefrom transversely thereof toward said face of said wall structure with the end of said lug in engagement with said face to determine said spacing of said flange of said metal frame from said face of said wall structure, said brick veneer being supported in lapping relation upon the exterior of said flange of said metal frame.

2. In a building construction having an outer facing of brick or similar veneer, the combination with members of a wall structure of said building disposed adjacent opposite sides of a window or door opening of said structure, said members being of wood or similar penetrable material and providing an outwardly disposed face of said wall structure adjacent said window or door opening of said structure, of a metal frame for said window or door opening, said frame having flanges at said opposite sides of said opening extending generally parallel to said face of said wall structure in overlapping relation thereto and in spaced relation thereto outwardly thereof, said flanges being provided with lugs spaced along said flanges and projecting therefrom transversely thereof toward said face of said wall structure and bearing endwise against said face of said structure to determine the spaced relation of said flanges of said metal frame from said face of said wall structure, said flanges being provided with apertures therethrough respectively adjacent said lugs, and fasteners passing through said apertures and penetrating said members to hold said frame in position in said opening with said lugs bearing against said face of said wall structure and with said flanges of said metal frame in said spaced relation thereto, said brick veneer being supported in lapping relation upon the exterior of said flange and said fasteners.

3. In a frame building construction, the combination with a stud of a wall structure of said building adjacent a window or door opening, sheathing boards fastened upon said stud to provide the outwardly disposed closure elements of said wall structure and providing an exterior face thereof adjacent said window or door opening, of a metal frame disposed in said window or door opening and having a flange extending generally parallel to said face of said wall structure adjacent said stud in overlapping relation thereto and in spaced relation outwardly with respect to said face of said sheathing boards, said flange being provided with a lug formed of a portion of said flange and projecting therefrom transversely thereof toward said sheathing boards with the end of said lug engaging said face of said boards to determine said spacing of said flange of said metal frame from said face of said boards, said flange being provided with an aperture therethrough adjacent said lug, and a nail passing through said aperture and across the space between said flange and said face of said sheathing boards and entering said stud to fasten said frame to said structure with said flange spaced by said lug from said face of said boards.

4. In a frame building construction, the combination with studs of a wall structure of said building adjacent a window or door opening, sheathing boards fastened upon said studs to provide the outwardly disposed closure elements of said wall structure and providing an exterior face of said wall adjacent said window or door opening, of a metal frame disposed in said window or door opening having a flange extending generally parallel to said face of said wall structure in overlapping relation to a stud thereof and in spaced relation outwardly with respect to said face of said sheathing boards, said flange being provided with a lug formed of a portion of said flange and projecting therefrom transversely thereof toward said face of said wall structure with the end of said lug engaging said stud adjacent said window or door opening to determine the spacing of said flange of said metal frame from said face of said boards, and means cooperating with said flange and said stud to hold said metal frame in position in said window or door opening with said lug engaging said stud.

5. In a building construction, the combination with a wall structure of said building providing an outwardly disposed face thereof adjacent a window or door opening in said structure, of a metal frame for said window or door opening constructed with an elongated framing element having a flange overlapping said face of said structure and extending lengthwise of said element in a plane generally parallel to said face of the wall structure and with its length generally parallel to a side of said window or door opening, and a lug carried by said flange of said framing element and projecting from said flange transversely of the plane of said flange in endwise engagement with said face of said wall structure and providing a spacer spacing said flange from said face of said wall structure, the dimension of said lug parallel to the length of said framing element along said side of said window or door opening being of the degree of the thickness of said flange, the dimension of said lug transversely of said length of said element in the plane of the flange being sufficient in relation to said first dimension of said lug to define said lug as said spacer.

6. In a building construction the combination as defined in claim 5 in which said framing element comprises a web disposed in a plane transverse to said plane of said flange and joined to said flange adjacent the edge of said flange opposite to the edge of said flange which overlaps said face of said wall structure, said web extending along the length of said framing element and having a dimension transverse to said length thereof in the plane of said web extending substantially across said space between said flange of said framing element and said face of said wall structure.

7. A metal frame for a window or door opening constructed with an elongated framing element having a flange extending lengthwise of said element in a plane generally parallel to the plane of said frame and so as to be disposed with the length of said element generally parallel to a side of said window or door opening and with said flange in overlapping relation to an outwardly disposed face of a wall structure extending about said window or door opening when said frame is in position in said opening, and a lug carried by said flange and projecting from said flange transversely of the plane of said frame and adapted to engage in endwise engagement said outwardly disposed face of said wall structure and providing a spacer to dispose said flange in spaced generally parallel relation to said face of said wall structure, the dimension of said lug parallel to the length of said framing element being of the degree of the thickness of said flange, the dimension of said lug transversely of the length of said element in the plane of the flange being sufficient in relation to said first dimension of said lug to define said lug as said spacer.

8. A metal frame for a window or door opening as defined in claim 7 in which said flange of said framing element is formed of bendable material, said lug being provided by a portion of said flange defined by an incision in said flange generally parallel to the length of said framing element and by an incision transversely of and adjacent one end of said first incision and extending from said first incision to the edge of the flange adapted to overlap said face of said structure, said portion being bent into and disposed in position with its length transverse to said plane of said flange to provide said spacer spacing said flange from said face of the wall structure when the end of said lug bears against said face of said structure, the width of said lug between the first incision and said overlapping edge of the flange being substantially less than the width of said flange tranverse to its length in said plane of the flange to maintain unsevered a substantial part of said flange.

9. A metal frame for a window or door opening as defined in claim 7 in which said framing element comprises a web disposed in a plane transverse to said plane of said flange and joined to said flange adjacent the edge of said flange opposite to said edge thereof adapted to overlap said face of said wall structure, said web extending along the length of said framing element and having a dimension transverse to said length thereof in the plane of the web sufficient to provide a substantial rigid framing element.

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