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METAL WINDOW FRAME CONSTRUCTION WITH LINER BOARD CHANNEL

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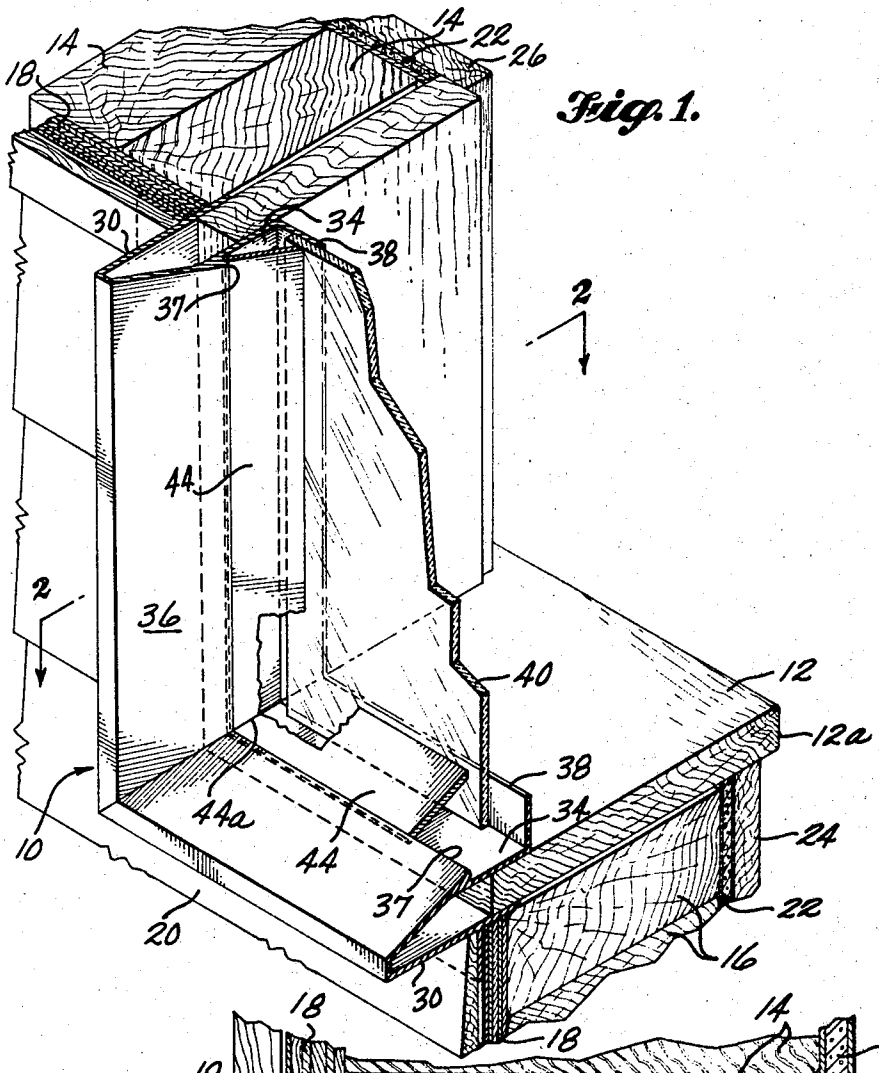


Fig. 1.

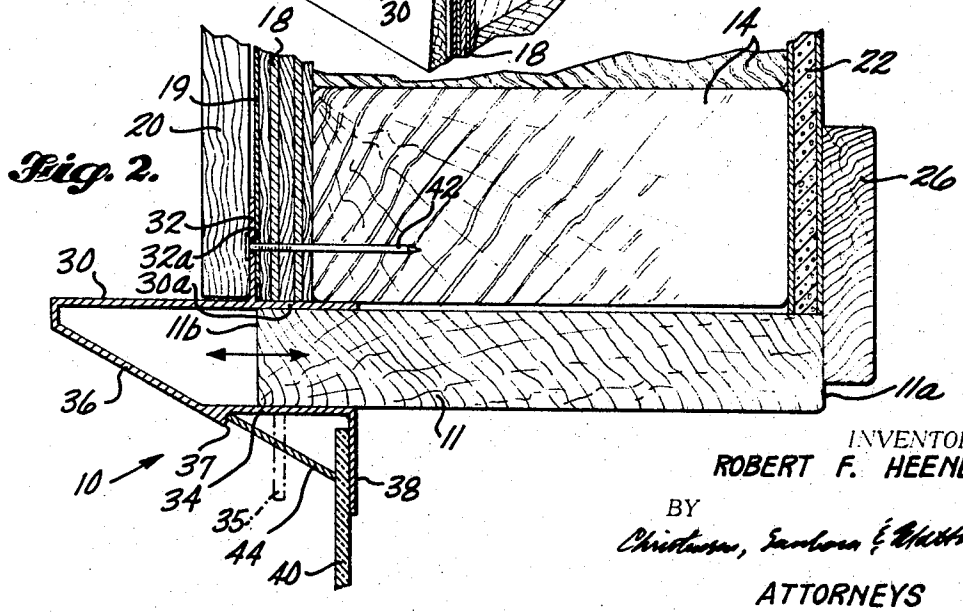


Fig. 2.

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METAL WINDOW FRAME CONSTRUCTION WITH LINER BOARD CHANNEL

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ABSTRACT OF THE DISCLOSURE

A metal window frame construction of the aluminum extrusion type wherein the top, bottom and side frame members include parallel outer and inner side pieces interconnected by an outer facing member and mounted on a flange adapted to abut the outer face of outer wall sheeting surrounding a window frame opening, the interconnected outer and inner side pieces forming a channel adapted to receive the edge of a liner board whose opposite edge extends inwardly of the opening as a finish member for the window. The frame further includes a reveal flange fastened to the inner side piece to receive the glass for the window, and an additional inwardly extending flange cooperable with conventional means for securing the glass to the outer face of a reveal flange, or with a special snap-in frame adapted to be inserted between the glass and the additional flange.

Background of the invention

This invention relates to window frames and in particular to a metal window frame construction, preferably of the aluminum extrusion type, having a channel therein opening inwardly of a building to receive the edge of a liner board which is a finishing member for the completed window. While the invention is described herein in terms of a particular preferred form thereof, it will be recognized by those skilled in the art that various changes and modifications may be made therein without departing from the principal features involved.

There is a continuing effort in the construction industry to simplify construction components, such as window frames, so as to reduce their cost. Particularly, in view of increased labor costs, the emphasis is on simplification of components to reduce the number of manual steps required and the time consumed in installing them. Accordingly, various metal window frame constructions have been devised which are relatively easy to manufacture as a unit. Some have included combinations of wood and metal in an effort to prefabricate an entire window assembly adapted to be set within a preconstructed window opening and nailed in place, rather than cutting and fitting various parts of the window to fabricate the unit on the building site.

Many such metal window constructions have been patterned after traditional wooden constructions and have been designed to be installed according to time-consuming carpentry techniques. For example, most prior metal window frame constructions have been designed on the assumption that the outside wall sheeting is not placed flush with the wall stud members surrounding the window opening and hence have utilized strips or flanges positioned in stair-step fashion to fit the outside wall sheeting and the outer face of the wall stud member around the opening. Others of the metal-wood combination type suffer from inadaptability to different wall thicknesses and have been relatively complex. Still others have included metal extensions which take the place of wooden liner boards, overlapping both outside and inside wall sheeting so that the entire window frame unit is constructed of metal strips and flanges.

It is the chief object of this invention to provide a simplified metal window frame construction which overcomes the aforementioned disadvantages by a simplified design which not only reduces material and manufacturing costs but reduces the cost of installation markedly by eliminating the need for rip cutting the finishing linear board to adapt the construction to different wall thicknesses.

A related object hereof is to provide a metal window frame construction having means for permitting positive positioning of the liner board therein at different depths to adapt the construction to variations in installation conditions and thereby simplify installation.

A related object hereof is to provide a simplified window frame construction having means for accommodating a simplified joinder of the frame with the outside wall sheeting, the wall stud members surrounding the opening, and the liner board finishing members.

A further object is to provide a metal window frame construction having thermal insulative value in providing for minimum exposure of metal inside the glass of the window to reduce the conduction of heat from within the building to the outer metal window frame portion.

A still further object is to provide a window frame construction which minimizes the effect of expansion or contraction of liner board members with age or seasonal variations in temperature and humidity.

Summary of the invention

To achieve the above objects and purposes, the invention provides a metal window frame structure comprising top, bottom and side frame members adapted for installation in a window opening in a building. Each of the side frame members, and preferably the top and bottom frame members as well, includes a mounting flange adapted for securement in face-to-face abutment with outside wall sheeting surrounding the window opening or casing. An outer side piece integrally secured to the mounting flange extends perpendicular thereto both inwardly of the opening and outwardly beyond the mounting flange. An inner side piece parallel to the outer side piece and extending inwardly substantially the same distance is secured to the outer side piece by an outer facing member interconnecting the inner and outer side pieces to form a channel therebetween adapted to receive the edge of a liner board whose opposite edge extends inwardly of the opening as a finished member for the window. A reveal flange is integrally secured to the inner side piece and adapted to carry the glass for the window.

Preferably, the facing member is secured to the inner and outer side pieces along lines located outwardly of the opening beyond the mounting flange whereby the liner board receiving channel extends outwardly in depth beyond the mounting flange. The liner board channel is thus deep enough to accommodate the liner board in various positions depending upon the width of the liner board and the thickness of the wall. That is, for thinner wall constructions the liner board is positioned farther into the channel and for thicker walls it is positioned with its edge fitting into the channel a lesser distance, eliminating the need for rip cutting the liner board to finish the window. The metal portion of the window frame is mounted in the opening by nailing the mounting flange to the outside wall sheeting, with nails of sufficient length, typically, to extend into the wall stud forming the window casing. Since the mounting flange is perpendicular to the outer wall piece forming one side of the liner board receiving channel, the outside wall sheeting can be cut flush with the wall stud member forming the window opening or casing, thus simplifying the construction of the opening.

The frame construction further includes an additional

flange secured to the inner side member and extending toward the center of the opening in opposed relation to the reveal flange to accommodate the window glass between itself and the outer face of the reveal flange. Preferably this flange comprises an extension of the facing member which is inclined inwardly of the opening toward the center thereof and the frame construction includes a snap-in glass holding frame including elongated side members also inclined inwardly of the opening toward the center thereof on an angle substantially the same as the facing member. Parallel edges of the side members are adapted respectively to snap between the additional flange and the glass to hold the latter against the reveal flange.

The invention further resides in certain details of construction which, along with the other features, objects and advantages of the invention, will become more apparent from the following detailed description of a preferred embodiment illustrated in the accompanying drawing.

Brief description of the drawing

FIGURE 1 is an isometric view of the corner of a window assembly according to the invention, with certain portions cut away and cross sectioned to indicate detailed features of the invention as installed in a window opening.

FIGURE 2 is a sectional view of the window frame construction as installed, taken downwardly in a plane indicated by the arrows 2—2 in FIGURE 1.

Description of the preferred embodiment

A window frame **10** of aluminum extrusion type construction is shown in part in FIGURES 1 and 2 seated in a typical window opening in a building. The window opening is surrounded by conventional casing construction wherein vertical casing members or studs **14** and horizontal casing members or studs **16** (2 x 4's) define the size of the opening and are covered on the outside of the building by plywood sheeting **18** and lapped siding **20** and on the inside by wall board or paneling **22**. The vertical liner board **11** and sill liner board **12**, as well as the opposite vertical liner board and a top liner board not shown, are received in the metal window frame **10** and are nailed to studs **14** and **16** in the usual manner. The inside edge **11***a* of the vertical liner board is typically made flush with the wall board **22**, while the inside edge **12***a* of the sill board **12** extends inwardly beyond the wall board a sufficient distance to accommodate a trim strip **24** under the sill in conventional fashion. Vertical trim strips **26** on both sides of the window and a comparable horizontal top trim strip (not shown) are nailed over the edge of the liner boards and over the adjacent portion of the wall board **22**.

The invention involves the construction of only the basic window extrusion, apart from various accessories, attachments or adaptations thereof to different sliding or swinging type window frame members which may be attached to the frame. Those skilled in the art will recognize ways in which such accessories and movable parts may be attached to the basic frame construction.

The basic metal frame includes an outer side member or strip **30**, a mounting flange **32** secured perpendicular thereto in position to abut the outer sheeting **18** surrounding the window opening, with extension **30***a* of side member **30** reaching inwardly of the opening beyond the mounting flange **32** preferably far enough to contact the face of stud **14**. Inner side member **34** connected parallel to the outer side member **30** by a facing member **36** carries a reveal flange **38** which supports the glass **40** on its outer face. Facing member **36** is preferably joined to inner and outer side members **30** and **34** along joints located outwardly beyond the mounting flange **32** to form a re-entrant space or channel extending in depth beyond mounting flange **32** and adapted to receive the outer edge **11***b* of liner board **11** (or the outer edge of sill board **12**) inserted any suitable distance therein depending upon the wall thickness.

Inner side member **34** extends into the window opening a distance substantially equal to extension **30***a* of outer side member **30**, and reveal flange **38** is secured to its inner extremity to form a trim edge at its junction with the finished face of liner board **11**.

Since liner board **11** is free to be positioned to any depth in the liner board channel, the frame construction is adaptable to different wall thickness as may depend on the thickness of the outer sheeting **18** and underlayment of insulative paper **19** laid over the sheeting, or upon the thickness of wall board **22** or paneling used in place of wall board. The window frame may be sold as an aluminum preconstructed frame alone, or as a metal-wood window unit with top, side and sill liner boards preconstructed in box form slidable into their respective channels in the metal frame. In either case, the liner boards may be positioned in the channel at the proper depth so that their inner edges extend the desired distance inwardly through the opening.

A typical installation would involve first nailing the metal window frame in place against outside wall sheeting **18**, with nails **42** driven through holes **32***a* provided in the mounting flange **32**. The siding **20** may be applied either before or after the inside finishing work is done, of course. The liner and sill boards are placed flush with or overlapped by wall board or paneling **22**, or may even be notched to receive the edge thereof.

The reveal flange **38** is of width sufficient to hold the window glass **40** which may be secured thereto by means of putty or other conventional means. The frame preferably includes an additional inwardly directed flange **37** outstanding from the inner side member **34** and cooperable with means for holding the glass **40** against reveal flange **38**. In the illustrated embodiment of the invention the facing member **36** is inclined inwardly of the window opening toward the center thereof, extending inwardly beyond inner side member **34** to form the flange **37**. A snap-in glass securing frame is provided according to the invention, having four sides **44** comprising flat strips secured together at an angle at the corners **44***a* and beveled along their inner glass-contacting edge to press the glass against reveal flange **38**. The glass securing frame is flexible enough to be snapped into place under the flange **37** after the glass is inserted. Thus a tight fit is provided along the full length of each side for a continuous, substantially airtight seal completely around the perimeter of the glass **40**. The glass may also be sealed against the reveal flange **38** by a suitable caulking or sealing compound (not shown). The angle of inclination of side pieces **44** of the glass securing frame is preferably equal to that of the facing member **36** to provide a pleasing esthetic appearance, but involving a very simple pattern to extrude.

Besides the simplicity of the frame construction according to the invention and adaptability to different types of construction and variations in wall thickness, other advantages include the insulative aspects of the small amount of metal surface area exposed within the building and the fact that the liner boards extend within the channel beyond the glass **40**, and the stability and referencing capabilities provided by perpendicular joinder of mounting flange **32** and extension **30***a* of side member **30** around the periphery of the window opening. Other advantages will be recognized, as well as various modifications which may be made within the scope of the principles defined in the appended claims.

What is claimed is:

1. A metal window frame structure comprising top, bottom and side frame members adapted for installation in a window opening in a building, said side frame members each including a mounting flange adapted for securement in face-to-face abutment with outside wall sheeting surrounding said opening, an outer side piece inte-

grally secured to said mounting flange to extend perpendicular thereto inwardly of said opening and outwardly beyond said mounting flange, an inner side piece parallel to the outer side piece and extending inwardly of said opening substantially the same distance, a facing member interconnecting said side pieces to form therebetween a channel adapted to receive the edge of a wooden liner board whose opposite edge extends inwardly of the opening substantially to the inside of the building, and a reveal flange integrally secured to said inner side piece and adapted to carry the glass for said window.

2. The metal window frame defined in claim **1** wherein said facing member is joined to the inner and outer side pieces along lines located outwardly of the opening beyond the mounting flange, whereby the liner board receiving channel extends outwardly in depth beyond said mounting flange.

3. The metal window frame defined in claim **2** wherein said frame structure further includes an additional flange secured along the inner side member and extending inwardly toward the center of said opening in opposed relation to the reveal flange to accommodate the window glass between itself and the outer face of the reveal flange.

4. The metal window frame defined in claim **3** wherein said structure further includes a detachable snap-in metal frame for securing the window glass to the outer face of said reveal flange, said snap-in frame including elongated side members having parallel edges adapted respectively to be resiliently snapped into place between said additional flange and said window glass inserted against the outer face of said reveal flange.

5. The metal window frame defined in claim **4** wherein said facing member includes an edge portion extending toward the center of said opening beyond the line of joinder between itself and the inner side piece to form additional flange, and wherein said facing member and the side members of said snap-in frame are sloped inwardly toward the center of said opening at substantially the same angle of inclination.

6. The metal window frame defined in claim **1** wherein said outer side piece extends inwardly of the opening beyond the mounting flange a distance sufficient to contact a wall stud member located behind the outside wall sheeting and flush therewith at the edge of said opening.

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