Oct. 29, 1940. A. LANG 2,219,594

METALLIC WINDOW AND DOOR FRAME

Original Filed Jan. 3, 1938 2 Sheets-Sheet 1

Fig. 1.

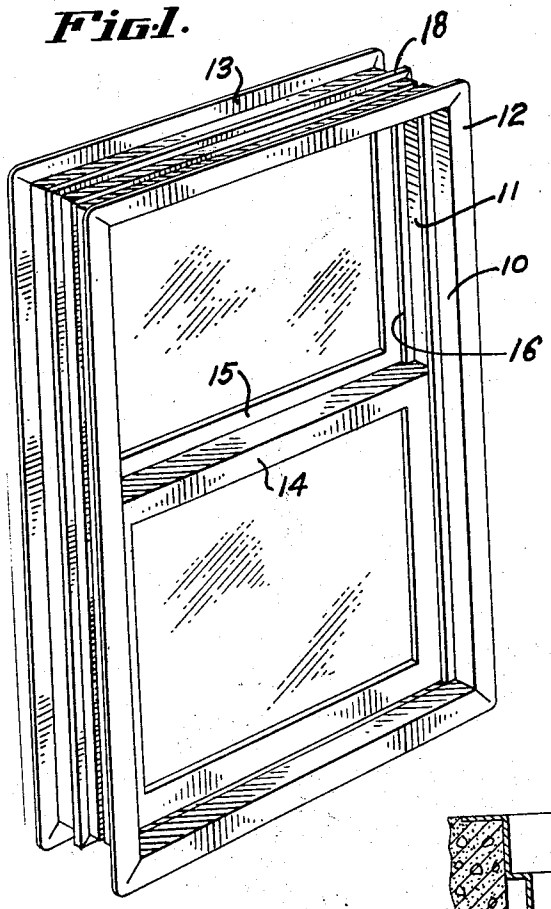


Fig. 4.

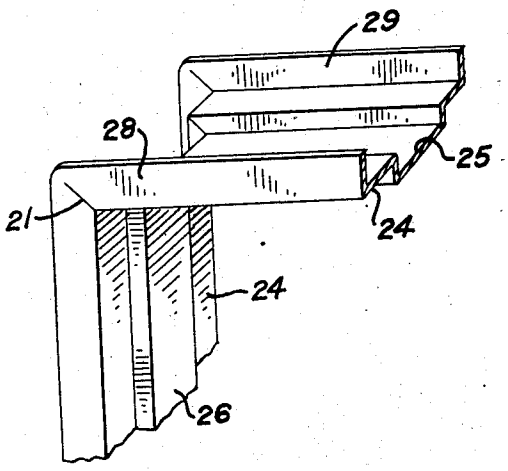


Fig. 5.

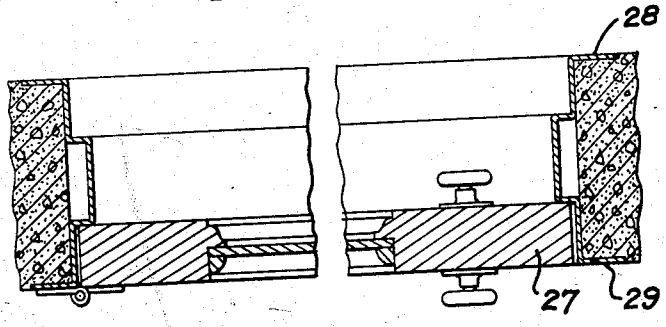
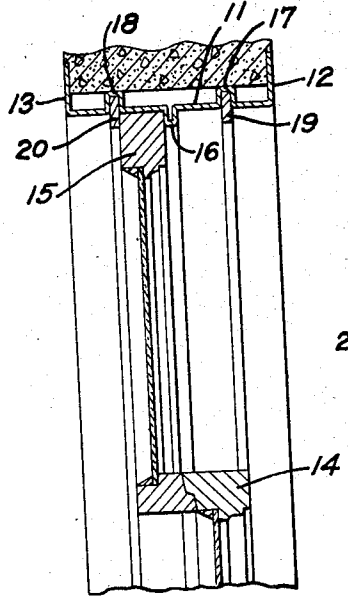


Fig. 2.



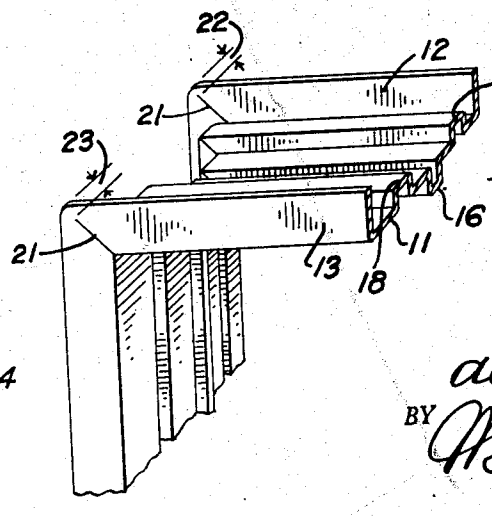


Fig. 3.

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Fig. 6.

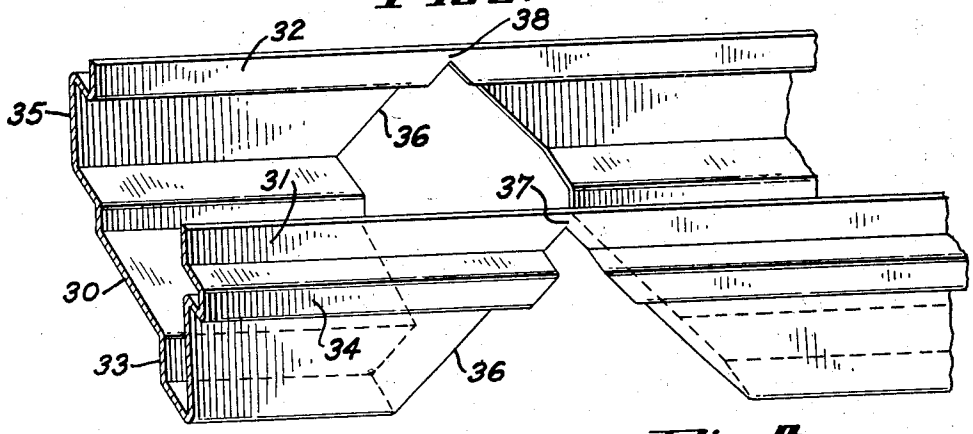


Fig. 7.

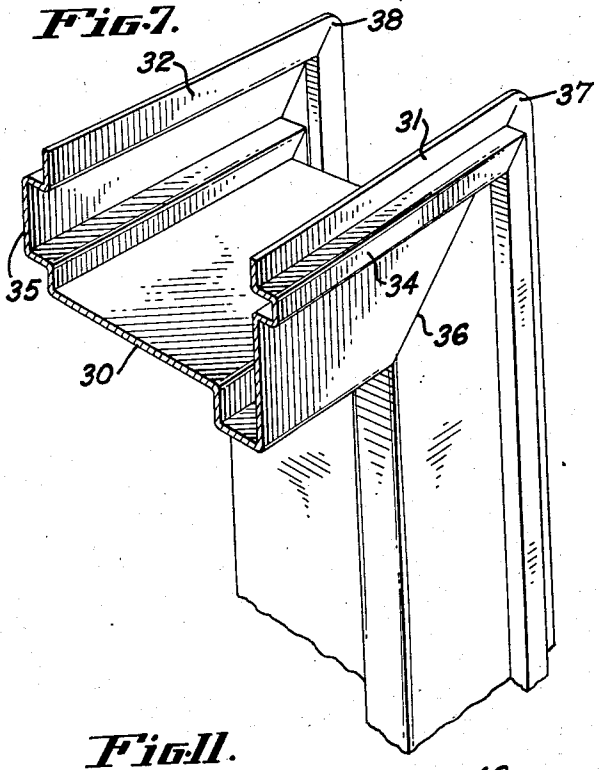


Fig. 8.

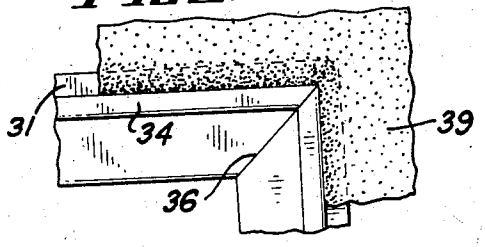


Fig. 9.

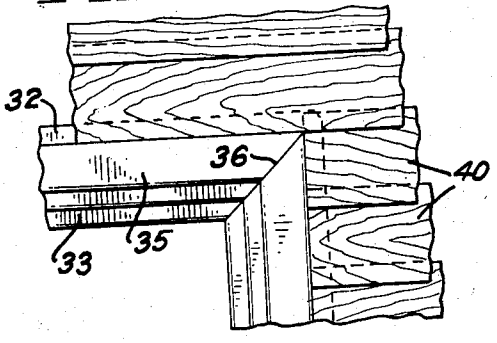


Fig. 10.

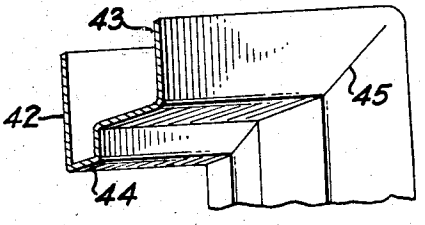
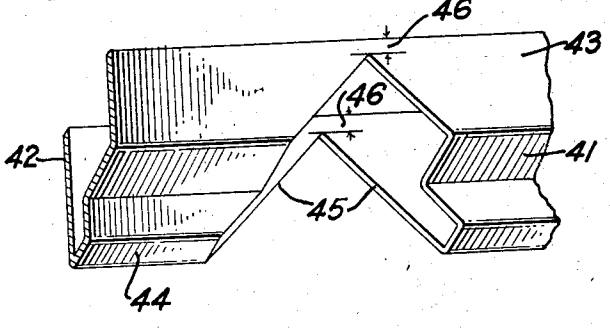


Fig. 11.



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2,219,594

METALLIC WINDOW AND DOOR FRAME

Albert Lang, Berkeley, Calif.

Original application January 3, 1938, Serial No. 183,079. Divided and this application January 17, 1939, Serial No. 251,330

9 Claims. (Cl. 189—75)

The present invention relates to metallic window and door frames and more particularly to an improvement by means of which window and door frames may be constructed in an inexpensive, practical and an efficient manner from a continuous strip and is a division of my copending application Serial No. 183,079, filed January 3, 1938, and entitled "Method of forming metallic frames."

During the recent past, there has been an increasing demand for metallic frames for double hung windows and also for doors which can be manufactured and sold for use on small dwellings and the like. To satisfy this demand a number of manufacturers have developed and are at present time offering to the trade, metallic frames in which the various parts, such as the head, jambs and sill are individually stamped or cast and finally secured together at the corners by providing overlapping and/or interlocking portions which are secured together by spot welding and other means. While these frames possess many advantages not found in the older forms of wooden frames and sashes, they are still open to the objection that their cost is prohibitive due to the complications encountered in their manufacture. It is, therefore, the principal object of the present invention to provide an article and method of manufacture in the form of window and door frames in which the parts forming the head, jambs and sill are of substantially identical and uniform cross-section and which, because of this characteristic, can be formed from a single strip of metal and thus greately simplify the manufacturing operations and provide a frame for windows and/or doors constructed entirely of metal that can be manufactured at a price competitive with the wooden frames heretofore supplied for this purpose.

Another object of the invention is to provide a new and novel improvement in metallic frames which will facilitate the manufacture of the frames from a continuous preformed strip of sheet metal.

A further object of the invention is to provide an improved method of fabricating metallic frames for double hung windows and doorways which will greatly simplify the manufacturing operations by eliminating the time consuming effort which is now necessary to properly align and secure the top, jambs and sill of the frame together in accordance with the prior art methods.

Other objects and advantages of the invention will be in part pointed out hereinafter and in part evident to those skilled in the art as the description thereof proceeds.

For a better understanding of the invention reference should be had to the accompanying drawings wherein there is shown, by way of illustration and not of limitation, preferred embodiments thereof.

Figure 1 is a perspective view showing a double hung window frame constructed of metal in accordance with the invention and with sashes assembled therein,

Figure 2 is a vertical fragmentary sectional view taken through the frame and sill assembly illustrated in Figure 1,

Figure 3 is a fragmentary perspective view showing a corner of the window frame illustrated in Figure 1 of the drawings,

Figure 4 is a fragmentary view of corner of a door frame of simple construction,

Figure 5 is a horizontal sectional view of a door frame having a section similar to that illustrated in Figure 4 with a door mounted thereupon and with portions broken out to foreshorten the illustration,

Figure 6 is a fragmentary view showing a portion of a strip of modified configuration from which a window frame constructed in accordance with this invention may be made,

Figure 7 is a fragmentary perspective view showing the portion illustrated in Figure 6 as bent to complete a corner of the frame,

Figure 8 is a fragmentary inside view showing a frame constructed from the strip illustrated in Figures 6 and 7 as mounted in a wall opening and with the plaster extending thereover to finish the opening,

Figure 9 is a fragmentary outside view showing the manner in which the frame cooperates with an outside clapboard siding to produce a finished appearance,

Figure 10 shows a frame forming strip constructed in accordance with the present invention and from which a metallic window sash may be constructed, and

Figure 11 is a fragmentary view showing a strip of the latter type as mitred prior to the bending operation to complete a corner similar to that illustrated in Figure 10 of the drawings.

The novelty of the present invention in addition to residing in the production of a metallic frame from a single piece of sheet metal in a

novel and inexpensive manner also resides in the particular characteristics of the strip which when mitred in accordance with the invention provide two spaced and uncut portions upon which the strip may be bent to bring the adjacent portions thereof at the corners into exact meeting relation by virtue of the fact that the two spaced uncut portions function as bendable indexing ties in a manner similar to that obtaining with a door hinged upon two spaced hinges.

In my prior above identified disclosure, wherein the frame is disclosed as formed with a single outwardly extending side flange, means must be provided to bring the adjacent parts of the frame into meeting relation during the bending operation, whereas with the present invention the strip can be easily bent after being mitred without requiring any special means to insure a meeting of the inner light opening defining portion of the frame or the side walls thereof into exact meeting relation.

The particular frame structure illustrated in Figures 1 and 2 of the drawings is of simple construction and is particularly adapted for use with double hung window sashes. The frame, designated generally by the numeral 10, has an inner light opening defining wall 11 and inside and outside flange forming portions 12 and 13 respectively which before the strip is mitred and bent, as will hereinafter appear, provide what may be designated as a main channel section. In order to adapt this frame for use with double hung sashes as illustrated with a lower sash 14 and an upper sash 15, the light opening defining wall 11 in this embodiment of the invention is shown more clearly in Figure 2 as having a centrally disposed smaller channel 16 that provides an inwardly extending rib or parting strip against which the sashes 14 and 15 are adapted to be held and slide. As a means for retaining the lower and upper sashes 14 and 15 in cooperating relation within the frame 10, the light opening defining wall 11 of the frame is also shown as having two oppositely disposed channels 17 and 18 into which removable retaining strips 19 and 20 are respectively inserted. When these retaining strips 19 and 20 are inserted in their respective channels 17 and 18 it will be seen that the sashes 14 and 15 will each be provided with spaced guides between which they may freely slide in accordance with the practice in the conventional double sash window frames.

At this point it will be evident that while the sash retaining strips 19 and 20 are shown as provided in the head or top of the window frame 10, the strips may, if desired, be omitted at this point and at the bottom of the frame, if desired, the channels 17 and 18 may be provided with a filler strip which extends flush with the inside surface of the light opening defining wall 11 of the window frame 10. Further it may be said that while the channels 17 and 18 are not necessary at the top or sill of the frame, since they do not detract from the appearance of the frame their provision in the frame at these points is fully justified as it makes possible the construction of the frame from a continuous single strip of sheet metal of uniform cross-section.

After the strip of sheet metal from which the frame is to be constructed has been provided with right angled mitre cuts, as contemplated by the invention, the portions thereof adjacent the mitre cuts are bent, as illustrated in Figure 3, to bring the adjacent sides of the frame into right angled meeting relation. In this figure of the drawings the mitre cut, designated by the numeral 21, is shown as extending through the inner light opening defining wall 11 of the frame and into the inside and outside flange forming portions 12 and 13 thereof to a point closely adjacent the outer edges of these latter flange forming portions where small uncut portions of these flanges, designated by the numerals 22 and 23, will function during the bending operation as spaced hinges or bendable indexing ties that will bring the adjacent portions of the frame into exact meeting relation when the mitre cuts 21 are fully closed. To complete the frame there then only remains the necessity for securing the meeting ends of the strip which complete the rectangular frame. With a frame of this character the builder need only prepare the wall of the building with properly spaced stringers and/or studding between the side forming flanges 11 and 12 to which the frame can be finally nailed and/or otherwise secured.

In Figures 4 and 5 of the drawings there is illustrated an embodiment of the invention which is particularly adapted for use as a door frame. In this embodiment of the invention the jamb, head and sill forming portion of the frame, designated by the numeral 24, is shown as having a relatively wide central channel 25 which provides what may be otherwise termed an inwardly extending cleat 26 against which a door, designated by the numeral 27, may be mounted. The cleat 26 is made to extend out sufficiently far from the wall 24 of the frame to form a stop for the door and at the same time this cleat is so proportioned in width that it will not provide an obstruction at the sill of the frame which, as contemplated by the invention, is of the same cross-section as are the jambs and top of the frame. In this embodiment of the invention the mitre cuts 21 are shown as extending through the portion 24 and the cleat 26 of the frame and into the spaced outwardly extending side forming portions 28 and 29 which form respectively the inside and outside cheeks of the door frame. While these outwardly extending side forming portions are shown in these figures of the drawings as of relatively small width, it will be understood that they may be of any suitable dimensions. They may also be ornamented by a fluting and/or otherwise to thus produce an ornamental finish for the door frame. In any event, it is to be understood that the mitre cuts 21 will extend outwardly in these side forming portions to a point where at their apex there will remain a small uncut bendable tie portion between the adjacent parts of the frame upon which the strip after being mitred may be bent to bring the adjacent parts thereof into right angled meeting relation.

In Figures 6 and 7 of the drawings there is shown a further modified form of the invention which is particularly adapted for window frames having double hung sashes. As here illustrated, the strip from which the frame is constructed is first folded and/or bent longitudinally to provide a main channel section having a light opening defining wall 30 from the sides of which there extend two spaced parallel flanges 31 and 32 which together form what might be termed a main channel section. The light opening defining wall 30 of this channel section is also shown as having an outwardly extending sash engaging rib 33 which is formed by a smaller channel in the bottom of the main channel section. Each of the spaced parallel flanges 31 and 32 are here

also shown as respectively having outwardly extending ribs 34 and 35 that are formed by providing a channel upon the inside surfaces thereof. The rib 34 upon the flange 31 which constitutes the inside cheek of the finished frame is shown as smaller than is the rib 35 upon the flange 32 which forms the outside cheek of the frame. After the strip has been rolled into this configuration it is provided with mitre cuts 36 which extend through the light opening defining wall 30 and into the side flanges 31 and 32 to a point beyond the ribs 34 and 35 in these portions of the frame and thus leave two spaced uncut and bendable tie portions 37 and 38 which, as has been hereinbefore pointed out, function to retain the adjacent portions of the strip together and bring the surfaces thereof into exact meeting relation, as illustrated in Figure 7 of the drawings, when the strip has been bent upon these uncut tie portions to complete the frame.

When the window frame is constructed from a strip formed with the ribs 34 and 35, as last above described, these ribs in addition to providing a reinforcing in the sides of the frame at these points also furnish a beading to which the finish of the wall surface can be extended to complete the assembly.

As shown in Figure 8 of the drawings, the rib 34 upon the inside flange 31 of the frame provides what may be termed a plaster stop to which the interior finishing plaster, designated by the numeral 39, can be extended. With this arrangement it will be readily seen that when the frame is constructed in this manner the necessity for any additional finishing frame or molding is eliminated.

As shown in Figure 9, the outwardly extending rib 35 upon the side wall 32 of the frame is adapted to cooperate with the exterior finish of a building. In this instance the exterior wall of the building is shown as finished with clapboards 40, such as are commonly used on wooden dwellings. When such an exterior finish is provided, the clapboards 40 are extended to the outside surface of the rib 35 which, as has been previously stated, may be of any suitable width and height, this depending upon the character and design of the building. In connection with the exterior finish, it will also be apparent that the rib 35, like the rib 34, is also adapted to provide a plaster stop should the building be provided with an exterior finish of stucco.

In the above description, the invention has been associated with window and door frames. However, as illustrated in Figures 10 and 11 of the drawings, the invention is equally applicable to window sash frames, such as might be used with an outer frame constructed in accordance with this invention. The sash frame here illustrated is substantially identical in cross-section except for the omission of the reinforcing plaster stops upon the side flanges. As shown, the sash frame has an inside wall 41 which defines the light opening of the sash and extending upwardly from the sides of this wall 41 there are two spaced side walls 42 and 43 which may extend outwardly to any desired extent depending upon the size of the sash frame. The light opening defining wall 41 is also shown as having an inwardly extending rib 44 against which a pane of glass may be positioned and secured with putty or other means in the usual manner.

As more clearly shown in Figure 11 the strip from which this sash frame is to be constructed is first folded and/or bent to provide the channel section above described after which the strip is provided with mitre cuts 45 that extend through the light opening defining wall 41 of the frame and into the side flanges 42 and 43 so as to leave a comparatively small bendable tie portion 46 at the apex thereof upon which the strip is later bent to bring the adjacent portions of the sash frame into right angled meeting relation. The novelty here, like in the previously described frames, resides in the arrangement of two uncut portions in the strip at points spaced laterally from each other and outwardly beyond the light opening defining wall of the frame so that when the strip is bent upon these uncut portions the inner and side wall surfaces of the frame will be brought into exact meeting relation when the strip is bent to close the mitre cuts.

It will be of importance to note that this structure provides two transversely aligned connecting ties at each mitre cut and that, since each mitre cut extends entirely through the channel base or light opening defining wall and outwardly into the two opposed side flanges, each tie will be disposed in the plane of the side flange of which it is a part. Also it will be observed that the ties will not be bent transversely of the metal of which it is formed, but that each tie will be bent in the plane of its metal; that is, each tie will be bent in the plane of the side flange of which it is a part.

While I have, for the sake of clearness and in order to disclose the invention so that the same can be readily understood, described and illustrated specific devices and arrangements, I desire to have it understood that this invention is not limited to the specific means disclosed, but may be embodied in other ways that will suggest themselves to persons skilled in the art. It is believed that this invention is new and it is desired to claim it so that all such changes as come within the scope of the appended claims are to be considered as part of this invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent is—

1. A metallic frame for a wall opening, comprising a single strip of metal folded longitudinally to provide cooperating cleats for a closure member and having a channel-like cross-section with spaced outwardly extending side forming flanges, said strip being provided with mitre cuts that extend through the folded cleat forming portion and into both of said spaced outwardly extending flanges and being bent upon the uncut part of the side forming flanges at the apex of said mitre cuts to complete a rectangular frame having a top, jambs and a sill of similar cross-section, each of said uncut parts being bent in the plane of the side flange of which it is a part.

2. A metallic frame for a wall opening, comprising a single strip of metal folded longitudinally to provide cooperating cleats for a closure member and having a channel-like cross-section with spaced parallel side forming flanges, said strip being provided with mitre cuts that extend through the folded cleat forming portion and into both of said spaced parallel side forming flanges and being bent upon the uncut part of each of said parallel flanges at the apexes of said mitre cuts to form a rectangular frame having a top, jambs and a sill of similar cross-section, each of said uncut parts being bent in the plane of the side flange of which it is a part.

3. A metallic frame for defining a window opening, comprising a single continuous strip of sheet metal folded longitudinally into a substan-

tially channel-like cross-section having a light opening defining inner wall and two spaced outwardly extending side forming flanges, the light opening defining wall of said strip being folded to provide an inwardly extending cooperating cleat for a sash, said frame being completed by forming mitre cuts in said folded strip at points corresponding to the corners thereof that extend into both of said outwardly extending flanges and leave an uncut bendable connecting tie at the apexes thereof upon which the strip is finally bent to form a frame having a top, jambs and a sill of uniform configuration, each tie being bent in the plane of the side flange of which it is a part.

4. A metallic frame for defining a window opening, comprising a single continuous strip of sheet metal folded longitudinally into a substantially channel-like cross-section having a light opening defining inner wall and two spaced outwardly extending side forming flanges, the light opening defining wall of said strip being folded to provide centrally disposed inwardly extending fixed cooperating cleat for a sash and a removable cleat retaining channel in spaced relation with said fixed cleat, said frame being completed by forming mitre cuts in said folded strip at points corresponding to the corners thereof that extend into both of said outwardly extending flanges and leave an uncut bendable connecting tie at the apexes thereof upon which the strip is bent to form a frame having a top, jambs and a sill of uniform configuration, each tie being bent in the plane of the side flange of which it is a part.

5. A metallic frame for defining a window opening, comprising a continuous metallic strip formed as a channel having a light opening defining wall and side forming flanges, said side forming flanges being folded longitudinally to provide outwardly extending plaster stops intermediate the edge thereof, said strip having mitre cuts which extend through the inner light opening defining wall and the outwardly extending plaster stops and into both of said side flanges beyond said plaster stops to leave uncut connecting parts at the apexes of said cuts and being bent at said connecting parts to close said mitre cuts and form a frame having a continuous plaster stop extending around the top, jambs and sill thereof, each of said connecting parts being bent in the plane of the side flange of which it is a part.

6. A one-piece metallic frame for defining a window opening, comprising a continuous strip of sheet metal folded to form a main channel section having a light opening defining bottom wall and two outwardly extending side forming walls, said main channel section being mitred at spaced points with mitre cuts which extend through the bottom and into both of the side walls thereof and leave a small uncut connecting tie at the outer edge of each side wall upon which the strip is bent to form the frame, each of said side walls being also provided with a longitudinally extending channel which forms an outwardly extending reinforcing rib throughout its length and being adapted when the strip is finally bent at said mitre cuts to complete the frame to provide a continuous rib at each side of the frame with which the final surface of a wall will cooperate to present a finished appearance, each tie being bent in the plane of the side wall of which it is a part.

7. The improvement in the manufacture of metallic window frames which comprises forming the sill, jambs and head of the frame from a continuous single strip of metal of a uniform channel-like cross-section having spaced parallel side walls, providing mitre cuts in said continuous strip of metal at points dividing the sill, jambs and head of the frame, said mitre cuts extending through the sill, jambs and head forming portions of said strip and into both of the parallel side walls of the strip of metal to a point outwardly disposed from the sill, jambs and head forming portion thereof to form in each side wall at the apex of said mitre cuts bendable connecting ties, and bending said ties to form the frame, each tie being bent in the plane of the side wall of which it is a part.

8. A metallic frame for an opening in a building wall comprising a single strip of metal of channel-like cross-section having a transverse wall to surround the inner perimeter of said opening and opposed parallel side walls extending outwardly from the opposite longitudinal edges of said transverse wall to be disposed on opposite sides of said building wall, said strip being provided with mitre cuts that extend entirely through said transverse wall and into both of said side walls to leave in each side wall adjacent its outer edge uncut portions at the apexes of said cuts forming bendable indexing ties disposed in transverse pairs at each mitre cut and said strip being bent at each pair of indexing ties to complete the frame, each of said indexing ties being bent in the plane of the side wall of which it is a part.

9. The improvement in the manufacture of metallic frames for openings in building walls which comprises mitre cutting a single strip of channel stock at longitudinally spaced intervals defining the corners of the completed frame, each of said mitre cuts extending entirely through the connecting wall of said channel strip and into both side walls thereof to leave in each side wall adjacent its outer edge uncut portions at the apexes of said cuts forming bendable indexing ties disposed in transverse pairs at each mitre cut, and bending the strip at each pair of indexing ties to close the mitre cuts and thus form a frame in which said connecting wall will be adapted to surround the perimeter of said building wall opening and in which said side walls will extend outwardly on opposite sides of the building wall, each of said indexing ties being bent in the plane of the side walls of which it is a part.

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