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METAL DOOR FRAME

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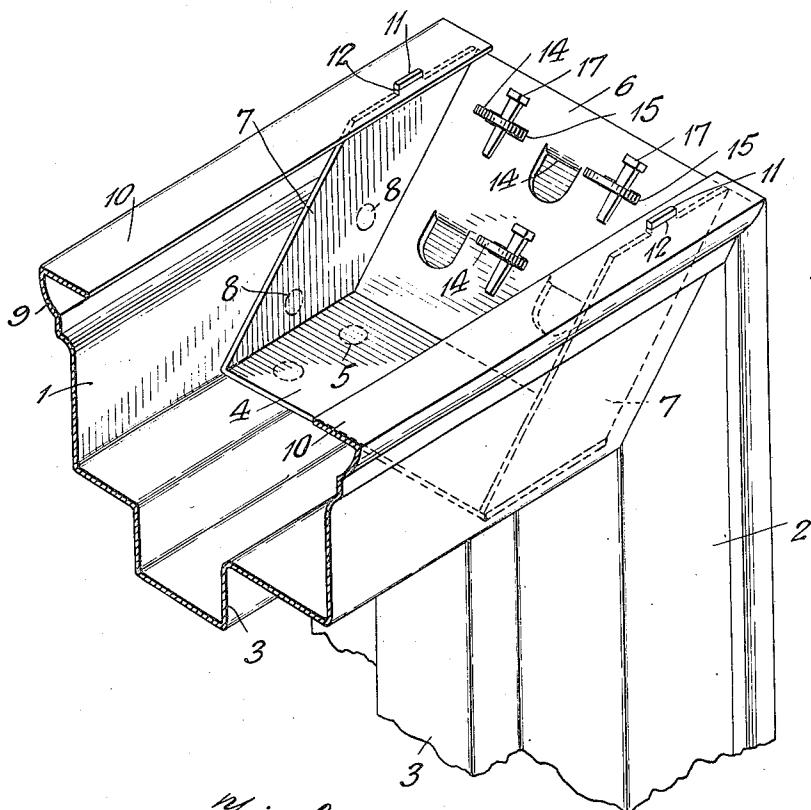


Fig. 1.

Fig. 2.

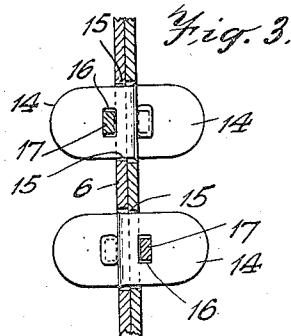
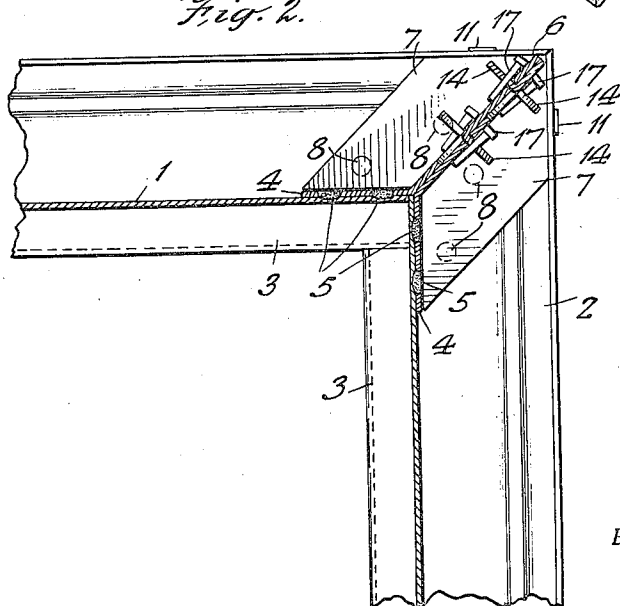


Fig. 3.

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UNITED STATES PATENT OFFICE.

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METAL DOORFRAME.

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This invention relates to sheet metal frames for doors, windows, and the like, and particularly to the manner of connecting the frame members at their corners. Heretofore difficulty has been experienced in shipping the frames in "knocked down" condition for the reason that no satisfactory method of connecting the frame members at their corners has been devised. Consequently, the practice has been to ship the frames assembled, with the result that the space occupied by the assembled frames adds so materially to the cost of shipment, as to prevent the manufacturer from successfully competing with others at any very great distances from the factory.

An object of the invention is to provide an improved frame construction which may be shipped in "knocked down" condition and assembled at the job in a simple manner; with which the only assembly tools required would be a hammer; which, when assembled, will be exceptionally rigid, have a tight joint or connection between the members, and be strong and durable; which will not loosen during use; and which will be relatively inexpensive.

Various other objects and advantages will appear as the accompanying description of an embodiment of the invention proceeds, and the novel features will be particularly pointed out in connection with the appended claims.

In the accompanying drawings:—

Fig. 1 is a perspective of one corner of a frame construction, with the members connected together in accordance with this invention;

Fig. 2 is a sectional elevation of the same;

and Fig. 3 is a sectional plan through a portion of the connecting plates to illustrate certain details.

In the illustrated embodiment of the invention, the two frame members 1 and 2, which abut at their ends to form a corner, are channel shaped and formed of sheet metal, and have door or window stops formed in the bottom walls of the channels. These stops 3 overrun one another at the corners as shown in Fig. 2, so that there will be a direct overlapping joint between them as common in door and window frame constructions. The remainder of the abutting ends of the frame members are mitred to fit

one another, and difficulty arises in connecting such mitred ends.

In each end of a frame member an angular plate 4 is secured to the frame member in a suitable manner such as by spot welding at a plurality of points indicated at 5. The edge section 6 of the plate, which is adjacent the mitred end, is bent into a plane approximately parallel with and in close proximity to the plane of the mitred end, so that the angular plate sections 6 of the two abutting ends of the frame members will be in proximity to one another and approximately parallel to one another.

The sections 6 of the plates are provided at their ends with wings 7, which are bent to extend along the inner faces of the side walls of the channels and fitting against the same, the wings being connected to the side walls by suitable means such as spot welding. The wings, therefore, prevent flexure of each plate section 6 about its line of connection to the base section which is secured to the bottom wall of the channel of the member.

The free side edge portions of the side walls of each member are bent, as at 9, to give the impression of molding, and the extreme edges thereof are bent inwardly to form flanges 10 for constructional reasons. These flanges 10 extend across the wings 7, and the latter are preferably provided with tongues 11, which project through apertures 12 in the flanges to provide an additional interlock between the wings and the walls of the members and to aid in positioning the members with respect to one another.

The plate section 6 of at least one of each abutting pair at a corner between the members, is provided with one or more tongues which pass through an aperture in the other plate of the pair for interlocking together the abutting plates and, therefore, the abutting ends of the members. Preferably, each plate is provided with a plurality of tongues 14, which are struck out from the interior thereof, and also with apertures 15 through which the tongues of the opposite plate of the pair may extend for interlocking together the two plates of that pair.

Each tongue, in the portion projecting through the other plate of the pair, is provided with an aperture 16 through which a wedge or drift pin 17 may be passed. Thus, when the wedge 17 is driven through

the aperture 16, it will act against the plate through which that tongue passes and draw that tongue further through the aperture 15 and thus draw the plates of each pair tightly together and rigidly hold them in that relation. The tongues struck from each plate are preferably spaced apart transversely of the member and staggered with respect to one another and with respect to the tongues struck from the opposite plate of the pair, so that each tongue will not be hidden or concealed behind another tongue projecting through the same plate. Each tongue will thus be readily accessible from the outer edge of the plate sections 6, so that the wedges may be driven in from the outer or corner edge without interference from other tongues projecting through the same plate. By having the tongues spaced apart or staggered as indicated, the plates may be drawn together tightly across the entire body of each plate section 6.

It will be observed that with this construction, the frame members may be shipped unconnected to one another, so that they may be packed very compactly, and when they are to be used they may be readily assembled by merely placing them in the proper abutting relation with the tongues of each plate section passing through those of the abutting plate section, inserting the wedges 17 and driving them through the tongues by a hammer. Thus the abutting ends of the members are tightly, firmly and rigidly drawn together. This assembly operation takes but a few moments of time, and the resulting frame construction is exceptionally rigid, strong and durable.

As the material for the wedges, I have found that the ordinary cut or wrought iron nails answer very satisfactorily, but obviously any material for the wedges or any type of wedge or its equivalent may be utilized to draw the two plates of each pair together. Of course, bolts may be passed between the plates of each pair of abutting members and answer quite satisfactorily, but I have found that by the use of the tongues and wedges, the assembly operation is greatly expedited, and an equally strong and satisfactory connection obtained.

It will be obvious that various changes in the details and materials, which have been herein specified in order to explain the nature of the invention, may be made by those skilled in the art, without departing from the spirit and principle of the invention as set forth in the appended claims.

I claim:

1. A metal frame for doors of channel shaped sections, each section being mitred to fit another at its abutting end, a connecting construction fastened to the bottom and

sides of the channel sections at each mitred end of the same with the sides of the channel connected by a plate in the plane of the mitred ends whereby the frames form a finished joint, integral perforated lugs struck from each plate and passing through matching holes in the opposing plate and a fastening drift pin driven in each perforation and bearing on the opposite plate to retain the channel members in contact, whereby a firm finished joint is obtained.

2. In a sheet metal frame for doors, windows and the like, the combination of channel shaped sheet metal frame members having portions of their angularly abutting ends mitred to fit one another, a plate anchored to each end of a frame member which abuts another member and having a portion bent into the plane of the mitred end, so that the bent portions of the plates of abutting ends of the members will abut face to face, at least one of each pair of abutting plate portions having struck out connecting tongues, passing through apertures in the abutting plate portion, for securing the members rigidly together at their abutting ends.

3. In a sheet metal frame for doors, windows, and the like, the combination of channel shaped sheet metal frame members having portions of their angularly abutting ends mitred to fit one another, a plate anchored to each end of a frame member which abuts another member and having a portion bent into approximately the plane of the mitred end, so that the bent portions of the plates of abutting ends of the members will abut face to face, at least one of each pair of abutting plate portions having struck out locking tongues passing through apertures in the abutting plate portion, and locking means for anchoring each tongue in the aperture through which it passes.

4. In a sheet metal frame for doors, windows, and the like, the combination of channel shaped sheet metal frame members having portions of their angularly abutting ends mitred to fit one another, a plate anchored to each end of a frame member which abuts another member and having a portion bent into the plane of the mitred end, so that the bent portions of the plates of abutting ends of the members will abut face to face, at least one of each pair of abutting plate portions having struck out locking tongues passing through apertures in the abutting plate portion, and wedges acting between the tongues and plate portions through which the tongues pass for locking the tongues against removal and the members against separation at their abutting ends.

5. In a sheet metal frame for doors, windows, and the like, the combination of sheet metal frame members fitted against one

another at their angularly abutting ends with a metal facing member in the plane of the ends at least one of each pair of said facing members having upon the face abutting the other facing member a tongue passing through an aperture in said other facing member, and locking means engaging with the tongue to prevent its removal from the aperture through which it passes.

6. In a sheet metal frame for doors, windows, and the like, the combination of sheet metal frame members fitted against one another at their angularly abutting ends with a metal wall lying in the plane of the ends at least one of each pair of abutting ends having upon the face abutting the other member a tongue passing through an aperture in the other, and a wedge acting between the tongue and wall through which it passes for locking the abutting members tightly together.

7. In a sheet metal frame for doors, windows, and the like, the combination of channel shaped sheet metal frame members having portions of their angularly abutting ends mitred to fit one another, a plate anchored to each end of a frame member which abuts another member and having a portion extending across substantially the greater portion of and approximately in the plane of the mitred end, whereby the plates of abutting members at each corner will be face to face, and approximately parallel to one another, and means interlocking the abutting portions of each pair of abutting plates.

8. In a sheet metal frame for doors, windows, and the like, the combination of channel shaped sheet metal frame members having portions of their angularly abutting ends mitred to fit one another, a plate anchored to each end of a frame member which abuts another member and having a portion extending across substantially the greater portion of and in the plane of the mitred end, whereby the plates of abutting members at each corner will be face to face, and approximately parallel to one another, and a tongue struck out from at least one of each pair of abutting plates and passing through the abutting plate for interlocking the plates together and thereby holding together the abutting members.

9. In a sheet metal frame for doors, windows, and the like, the combination of channel shaped sheet metal frame members having portions of their angularly abutting ends mitred to fit one another, a plate anchored to each end of a frame member which abuts another member and having a portion extending across substantially the greater portion of and in the plane of the mitred end, whereby the plates of abutting members at each corner will be face to face, and approximately parallel to one another,

a tongue struck out from at least one of each pair of abutting plates and passing through the other abutting plate of that pair for interlocking together said plates, and a wedge acting between each tongue and the plate through which it passes for drawing the plates, and thereby the abutting ends of the members, tightly together.

10. In a sheet metal frame for doors, windows, and the like, the combination of channel shaped sheet metal frame members having portions of their angularly abutting ends mitred to fit one another, a plate anchored to each end of a frame member which abuts another member and having a portion extending across substantially the greater portion of and in the plane of the mitred end, whereby the plates of abutting members at each corner will be face to face, and approximately parallel to one another, a plurality of tongues struck out from at least one of each pair of abutting plates and passing through the other abutting plate of that pair for interlocking together said plates of each pair, the tongues struck from each plate being spaced apart from one another laterally of the members so that no tongue projecting through any plate will obstruct free access to the others projecting through the same plate, and wedges acting between the projecting ends of the tongues and the plates through which they project for drawing the abutting plates tightly together.

11. In a sheet metal frame for doors, windows, and the like, the combination of channel shaped sheet metal frame members having portions of their angularly abutting ends mitred to fit one another, a plate anchored to each end of a frame member which abuts another member and having a portion extending across substantially the greater portion of and in the plane of the mitred end, whereby the plates of abutting members at each corner will be face to face, and approximately parallel to one another, a plurality of tongues struck out from at least one of each pair of abutting plates and passing through the other abutting plate of that pair for interlocking together said plates of each pair, the tongues struck from each plate being spaced apart from one another laterally of the members so that no tongue projecting through any plate will obstruct free access to the others projecting through the same plate, and wedges acting between the projecting ends of the tongues and the plates through which they project for drawing the abutting plates tightly together, said wedges being insertable into locking engagement with the tongues in a direction from the ends of the abutting members.

12. In a sheet metal frame for doors, windows, and the like, the combination of channel shaped sheet metal frame members hav-

- ing portions of their angularly abutting ends mitred to fit one another, a plate anchored to each channel side of a frame member which abuts another member and having a portion extending across substantially the greater portion of and in the plane of the mitred end, whereby the plates or abutting members at each corner will be face to face, and approximately parallel to one another, a plurality of tongues struck out from at least one of each pair of abutting plates and passing through the other abutting plate of that pair for interlocking together said plates of each pair, the tongues struck from each plate being spaced apart from one another laterally of the members so that no tongue projecting through any plate will obstruct free access to the others projecting through the same plate, the tongues projecting in opposite directions being staggered relatively to one another, and wedges acting between the projecting ends of the tongues and the plates through which they project for drawing the abutting plates tightly together.
13. In a sheet metal frame for doors, windows, and the like, the combination of channel shaped sheet metal frame members having portions of their angularly abutting ends mitred to fit one another, a plate anchored at its ends to the opposite side walls of the mitred end of each member so as to extend across the mitred end, whereby the cross parts of plates of abutting members will be parallel and in proximity to one another, and means for interlocking together the plates of abutting ends of said members.
14. In a sheet metal frame for doors, windows, and the like, the combination of channel shaped sheet metal frame members having portions of their angularly abutting ends mitred to fit one another, a plate anchored at its ends to the opposite side walls of the mitred end of each member so as to extend across the mitred end, whereby the cross parts of plates of abutting members will be parallel and in proximity to one another, a tongue struck from at least one of each pair of plates at abutting ends of said members and passing through an aperture in the other plate of the pair for interlocking together the plates, and thereby the abutting ends of the members.
15. In a sheet metal frame for doors, windows, and the like, the combination of channel shaped sheet metal frame members, having portions of their angularly abutting ends mitred to fit one another, a plate anchored at its ends to the opposite side walls of the mitred end portion of each member so as to extend across the mitred end, whereby the cross parts of the plates of abutting members will be approximately parallel and in proximity to one another, a tongue struck from at least one of each pair of plates at abutting ends of said members, and passing through an aperture in the other plate of the pair for interlocking together the plates and thereby the abutting ends of the members, and a wedge acting between the tongue and the plate through which it passes for drawing the pair of plates toward one another and thereby drawing the mitred ends of the members tightly together.
16. In a sheet metal frame for doors, windows, and the like, the combination of channel shaped sheet metal frame members having portions of their angularly abutting ends mitred to fit one another, a plate anchored at its ends to the opposite walls of the mitred end of each member so as to extend across the mitred end, whereby the cross parts of plates of abutting members will be approximately parallel and in proximity to one another, a plurality of tongues struck from at least one of each pair of plates at the abutting ends of said members and passing through apertures in the other plate of the pair for interlocking together the plates and thereby the abutting ends of the members, said tongues being spaced apart laterally or transversely of the channel so that each tongue will be readily accessible from the outer corner of the abutting members, and means acting between each tongue and the plate through which it passes for drawing said plates toward one another and holding them in that relation.
17. In a sheet metal frame for doors, windows, and the like, the combination of channel shaped sheet metal frame members, having portions of their angularly abutting ends mitred to fit one another, a plate anchored at its ends to the opposite side walls of the mitred end of each member so as to extend across the mitred end, whereby the cross parts of plates of abutting members will be approximately parallel and in proximity to one another, a plurality of tongues struck from both plates at the abutting ends of said members and passing through apertures in the opposite plate of the pair for interlocking together the plates, the tongues being spaced apart transversely of the channel and those projecting through each plate being staggered with respect to one another and oppositely staggered from the tongues projecting through the opposite plate of the pair, so that the projecting end of each tongue will be readily accessible and not disposed directly behind another tongue, and means acting between each tongue and the plate through which it passes for drawing the tongues through the plates through which they pass so as to tighten the abutting ends of the members and hold them in that condition.
18. In a sheet metal frame for doors, windows, and the like, the combination of channel shaped sheet metal frame members hav-

ing portions of their angular abutting ends mitred to fit one another, a plate anchored to the end of each frame member which abuts angularly with another member, said plate being secured at one edge section to the bottom wall of the channel adjacent the mitred end and having its opposite edge section extending in proximity to and substantially parallel to the mitred end of the member to which it is attached, the angular portion that extends parallel to the mitred end having lateral wings which extend along the sides of the frame member and which are secured thereto, and means passing between the portions of the plates which are parallel to the mitred ends at each corner for uniting the two members through such plates.

19. In a sheet metal frame for doors, windows, and the like, the combination of channel shaped sheet metal frame members having portions of their angularly abutting ends mitred to fit one another, a plate anchored to the end of each frame member which abuts angularly with another member, said plate being secured at one edge section to the bottom wall of the channel adjacent the mitred end, and having its opposite edge section extending in proximity to

and substantially parallel to the mitred end of the member to which it is attached, the angular section that extends parallel to the mitred end having lateral wings which extend along the sides of the frame member and which are secured thereto, each channel shaped frame member having flanges at the edges of the channel which extend toward one another, and said wings having portions mechanically interlocking with said flanges, and means passing between the plates at each corner for uniting them and thereby said members.

20. A sheet metal frame for doors comprising elements of channel shaped cross section, abutting one another in mitred joints, having inturned flanges at the channel edges, said flanges being provided near each abutting end with perforations, fastening plates for each section lying in the plane of the abutting mitred corners, said plates having inturned flanges fastened to the channel sides, said flanges having projecting tongues to fit and engage the perforations in the channel flanges.

In witness whereof, I hereunto subscribe my signature.

ALVIN C. GODDARD.