D. J. MURNANE.

METAL FRAME.

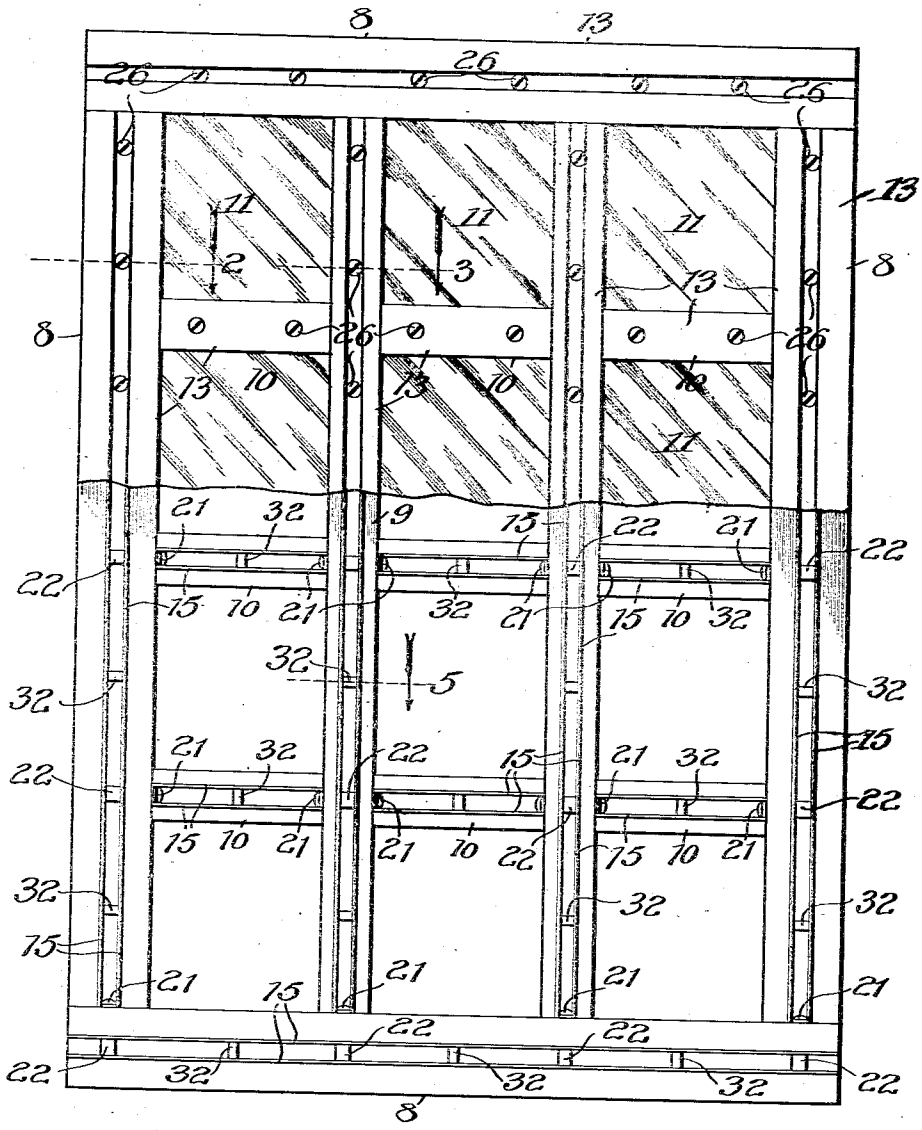
APPLICATION FILED MAY 4, 1914.

1,246,453.

Patented Nov. 13, 1917.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
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2 SHEETS—SHEET 2.

Fig. 2.

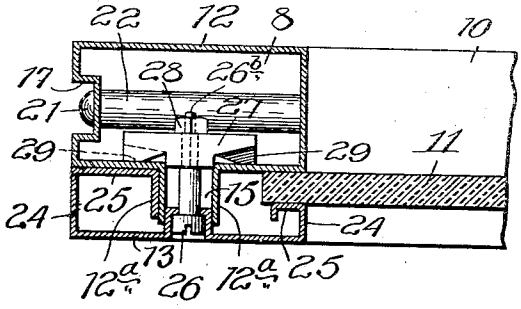


Fig. 3.

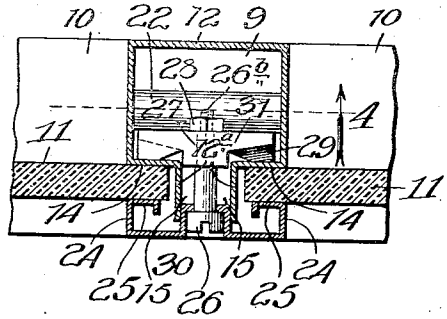


Fig. 5.

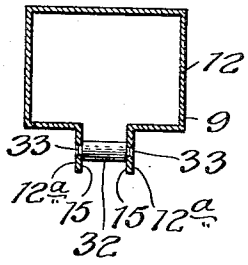


Fig. 4.

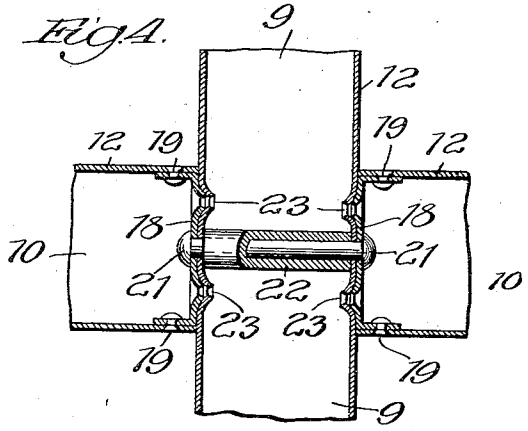


Fig. 6.

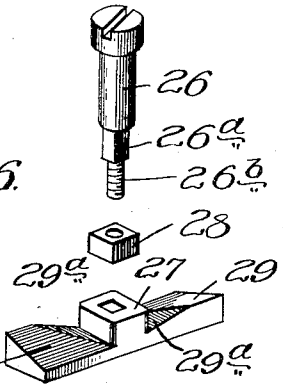
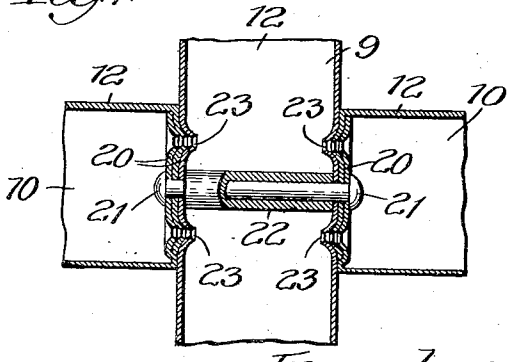


Fig. 7.



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UNITED STATES PATENT OFFICE.

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METAL FRAME.

1,246,453. Specification of Letters Patent. Patented Nov. 13, 1917.

Application filed May 4, 1914. Serial No. 836,206.

To all whom it may concern:

Be it known that I, DANIEL J. MURNANE, a citizen of the United States, residing at Glendale, in the county of St. Louis and State of Missouri, have invented a new and useful Improvement in Metal Frames, of which the following is a specification.

In hollow metal frame construction, and particularly in constructions designed to support heavy plate glass, the joining of the members forming the frame in a manner to cause such joining to be accurately, economically and readily accomplished and a rigid construction provided, is very important.

My objects are to provide a construction of hollow metal frame which shall be of simple construction, strong and rigid, economical of manufacture, neat in appearance and the parts of which may be readily, economically and accurately assembled.

Another object is to provide a construction of frame wherein plate-sections, as for example panes of glass of different thicknesses may be tightly secured therein, yet be capable of ready and easy removal therefrom, when desired, as in the case of breakage.

Another object is to provide a construction of frame wherein danger of denting or distorting the frame members in the act of assembling them to form the frame shall be reduced to the minimum; and other objects as will be manifest from the following description.

Referring to the accompanying drawings—

Figure 1 is a view in elevation of a window-sash, with means for securing the panes of glass in place constructed in accordance with my invention, portions of the removable cover-plates for the stationary members of the sash, and portions of the glass being omitted. Fig. 2 is an enlarged broken section taken at the line 2 on Fig. 1 and viewed in the direction of the arrow. Fig. 3 is an enlarged broken section taken at the line 3 on Fig. 1 and viewed in the direction of the arrow. Fig. 4 is a section taken at the line 4 on Fig. 3 and viewed in the direction of the arrow. Fig. 5 is a section taken at the line 5 on Fig. 1 and viewed in the direction of the arrow. Fig. 6 is a perspective view of the parts of one of the several similar fastening devices employed; and Fig. 7, a view like Fig. 4 of a modification of the structure shown in Fig. 4.

I have chosen to illustrate my invention as applied to a window-sash provided for receiving a plurality of panes of glass, shown as twelve in number, though not with any intention of limiting it thereto, or to a multiple light sash.

The marginal frame-members of the sash are represented at 8, the vertical and horizontal interior members, or mullions, of the sash, at 9 and 10 respectively, and the panes of glass, or lights, at 11.

The members 8, 9 and 10 are each formed of stationary members 12 and removable cover members 13. The stationary members 12 which are of hollow form are formed of sheet-metal, bent preferably into the form illustrated, one side-wall 14 of each member 12 containing an opening 15, in the form of a slot, extending lengthwise of the member, the metal flanking these openings being deflected outwardly to form parallel flanges 12^a spaced apart, the wall 14 which contains the opening 15, forming seats for the panes 11. The members 12 of the members 8 differ from the members 12 of the members 9 and 10 in that the outer side-walls of the former are provided with grooves 17, formed by striking the metal inwardly, for a purpose hereinafter explained.

The ends of the members 12 of the frame-members 10 are provided at their ends with transverse members, these transverse members in the construction illustrated in Fig. 4 being represented at 18 and formed of channeled members fitting the ends of the member 12 and secured thereto at their flanges, as by rivets 19; and in the construction shown in Fig. 5, forming a modification, formed by providing extensions 20 on opposite side-walls of the member 12 and deflecting them into overlapping relation to extend transversely of the members carrying them.

The members 9 and 10 are secured together in abutting relation, as represented, by fastening devices preferably in the form of rivets 21, which pass through the transverse members on the ends of the members 10, the side-walls of the members 9 and through spacers 22 disposed between said side-walls and forming reinforcing members for the members 9 preventing them from becoming dented or collapsing, these fastening devices being readily secured in position in the interior of the members 10, as stated, by means of the access afforded there-

to through the openings 15 in the members 10.

It is preferred that one fastening device described be provided for each joint, and to permit of the ready accurate positioning of the members 9 and 10 relative to each other, interengaging means are provided on the ends of the members 10 and the abutting portions of the side-walls of the members 9. These means are preferably formed by indenting the said ends and abutting side walls as indicated at 23, whereby upon the act of assembling these frame-members these indentations register and properly position the members and also prevent accidental axial rotation of the members 10.

The members 8 are connected in the abutting relation shown, by fastening means similar to those just described for the members 9 and 10, these fastening means 21 extending through opposite side-walls of the horizontal ones of the members 8 and through transverse members provided on the ends of the vertical ones of the members 8, as explained of the transverse members on the ends of the members 10, the outer heads of the fastening means fitting in the grooves 17.

The members 9 and 10 are secured to the members 8 in the same way as explained of the connection between the members 8, the ends of the members 9 being provided, for this purpose, with transverse members as in the case of the members 10.

The cover-members 13, or plates, for the members 9 and 10 are provided at opposite edges with rearwardly extending flanges 24 having inturned edges 25 between which and the seats 14 the panes 11 are clamped by the means hereinafter described. The cover-members 13 for the members 8 are like the cover-plates for the members 9 and 10, excepting that the flanges 24 at the outer sides of these cover-plates are deeper and are adapted to fit against the walls 14 at the marginal edges of the members 8.

The means for releasably securing the plates 13 in position on the members 8, 9 and 10, are preferably of the form shown, comprising a screw-bolt 26 provided intermediate its ends with a squared-section 26^a adapted to fit into a square recess in a wedge-member 27, the nut 28 screwing upon the threaded end 26^b of the bolt. The wedge 27 is formed with oppositely inclined wedge-surfaces 29 disposed at opposite sides of the bolt 25. In use, the bolt 25 is inserted into an opening 30 in the cover-plate 13, the wedge-member 27 then applied to the bolt and the nut applied and tightened. The cover-plate is then applied to position by introducing the wedge-member 27 through the slot 15 and upon turning the bolt, the wedge-surfaces 29 ride upon the inner surfaces of the sectional wall 14, containing the opening 15, thus drawing the cover-plate 13 toward the stationary frame-member to which it is applied, and clamping the panes of glass between the stationary member 12 and plate 13, it being understood that these fastening devices are provided of a number sufficient to clamp the panes at the desired number of points.

The flanges 12^a, if desired, may be reinforced, as by spreaders 32, interposed therebetween at intervals, with rivets 33 or the like passing through them and the flanges 12^a. It is preferred that the wedge-faces 29 adjacent to the center of the wedge-member 27, be partially cut away, as represented at 29^a so that the wedges when applied to position, will engage the walls 14 at points removed from the edges of the openings 15 and thus cause the panes 11 to be clamped between directly opposed surfaces.

It will be readily understood from the foregoing that a frame constructed in accordance with my invention is not only capable of being readily assembled with its various members accurately fitting each other and forming tight joints, but the frame so formed is strong, rigid and durable, the panes may be readily applied and removed from the frame, and the fastening devices for the members 12 are not exposed to view. Furthermore, by my improved fastening means panes of different thicknesses may readily be secured in place in the same frame.

While I have described my invention as applied to a sash for receiving panes of glass, I do not wish to be understood as intending to limit it to the use of such material, or to its use as a window or door sash, as the plate-sections to be secured in place by the frame so formed may be of any other material and the frame may be used for other purposes than windows or doors. Furthermore, I do not wish to be understood as intending to limit my invention to the particular construction illustrated as the same may be variously modified and altered without departing from the spirit of my invention, except as defined by the claims.

What I claim as new and desire to secure by Letters Patent is—

1. A frame construction including a plurality of members, one of which abuts at the end against a side of the other of said members, one of said members being hollow and containing an opening in its longitudinally-extending side, and fastening means insertible into the interior of said hollow member through said opening and into position for securing said members together in said relative positions.

2. A frame construction including a plurality of members, one of which is hollow and abuts at an end against a side of the

other of said members, said hollow member containing an opening in its longitudinally extending side and having a section extending transversely thereof, and fastening means insertible into the interior of said hollow member through said opening and engaging said transverse section and the member against a side of which said end-abutting member abuts.

3. A frame construction including a plurality of members, two of which are hollow and abut at their ends against the opposite side walls of another of said members, said endwise-abutting members containing openings in their longitudinally extending sides, and a fastening device insertible into the interior of said members through said openings and engaging said endwise-abutting members and extending through the side walls of the other of said members.

4. A frame construction including a plurality of members, two of which are hollow and abut at their ends against opposite side walls of another of said members, said endwise abutting members containing openings in their longitudinally extending sides and having transverse members adjacent the ends thereof at which they abut against the other of said members, and a fastening device insertible into the interior of said members through said openings and engaging said transverse members and extending through the side walls of the other of said members.

5. In a hollow metal frame construction including a plurality of frame-members formed of sheet metal, means for securing a plurality of said frame-members together, said means including a transverse member extending across the end of one of said frame-members, a reinforcing member disposed between the side walls of the frame-member against a side wall of which said last-referred to frame-member abuts at said above-referred to end, and a fastening device passing through said transverse member and said side-walls and compressing the latter upon said reinforcing member.

6. In a hollow metal frame construction, the combination of a pair of sheet metal frame-members, one of said members abutting at its end against a side-wall of the other thereof, a transverse member at the end of said end-abutting member, a reinforcing member disposed between the side-walls of the other of said members, and a fastening device passing through said transverse member and said side-walls and compressing the latter upon said reinforcing member.

7. In a hollow metal frame construction, the combination of a pair of sheet-metal frame-members, one of said members abutting at its end against a side-wall of the other thereof, a transverse member at the end of said end-abutting member, a reinforcing member in the form of a spreader disposed between said side-walls of the other of said members, and a fastening device passing through said transverse member and said side-walls and compressing the latter upon said reinforcing member.

8. In a hollow metal frame construction including a plurality of frame-members formed of sheet metal, means for securing a plurality of said frame-members together, said means including a transverse member extending across the end of one of said frame-members, a reinforcing member disposed between the side-walls of the frame-member against a side-wall of which said last-referred to frame-member abuts at said above referred to end, and a fastening device passing through said transverse member and said side-walls and compressing the latter upon said reinforcing member, said transverse member and the side-wall abutting the latter being provided with interengaging elements.

9. A hollow metal frame construction including a plurality of hollow frame-members, two of said members abutting at their ends against opposite side walls of the other of said members, a fastening device passing through said side walls of said third member and engaging said endwise-abutting members for securing all of said members together and tending to crush the said side walls together, and reinforcing means between said side walls against which the latter are pressed by said fastening device.

10. A hollow metal frame construction including a plurality of hollow frame-members, two of said members abutting at their ends against opposite side walls of the other of said members, a fastening device passing through said side walls of said third member and engaging said endwise-abutting members for securing all of said members together and tending to crush the said side walls together, and reinforcing means located between said side walls against which the latter are pressed by the fastening device, said fastening device extending through said reinforcing means.

11. A hollow frame construction including a plurality of hollow frame members, two of said members abutting at their ends against opposite side walls of the other of said members and containing openings in their longitudinally extending sides, a fastening device insertible into the interior of said members through said openings and engaging said endwise abutting members and extending transversely of the side walls of the other of said members, and a reinforcing member located between said side walls and against which said side walls are compressed by said fastening device.

12. In a hollow metal frame construction,

the combination of a plurality of frame members arranged side by side, in spaced relation, cross-connecting frame-members located in the spaces between said first referred to members and abutting at opposite ends against the side walls of said first-named members, said frame-members containing slots opening through a face of the frame, and fastening means for said frame members located within the interiors thereof, said slots being arranged to permit said fastening means to be applied to position through a face of said frame.

DANIEL J. MURNANE.

In presence of—
DAISY C. THORSEN,
AMY C. FISCHER.