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J. C. DE PENNING

METHOD OF MAKING WOODEN DOORS

Filed Nov. 4, 1926

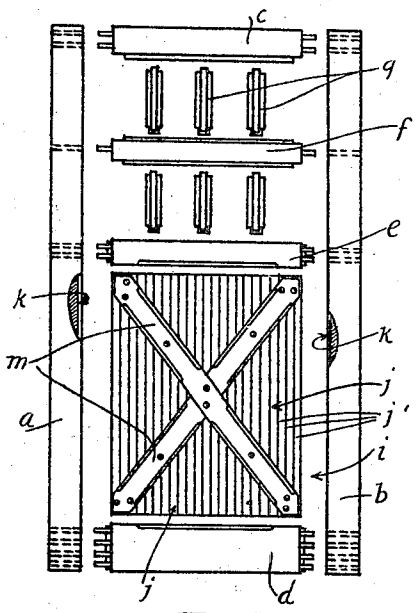


Fig. 1

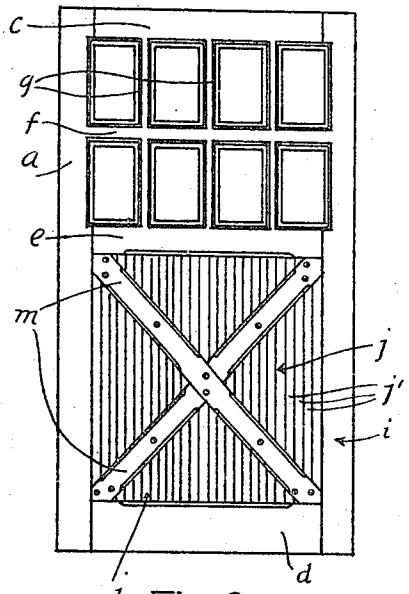


Fig. 2

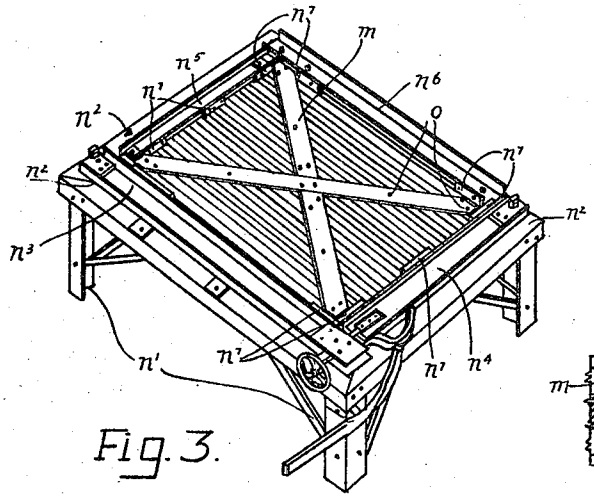


Fig. 3.

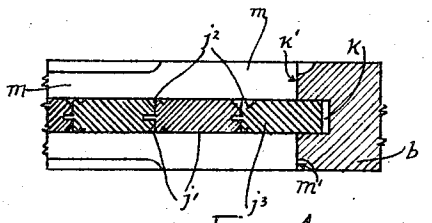


Fig. 4.

INVENTOR

John C. De Penning

BY

ATTORNEY

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JOHN C. DE PENNING, OF PORTLAND, OREGON, ASSIGNOR TO CENTRAL DOOR AND LUMBER COMPANY, OF PORTLAND, OREGON, A CORPORATION.

METHOD OF MAKING WOODEN DOORS.

Application filed November 4, 1926. Serial No. 146,149.

My invention relates to the manufacture of wooden doors, and the like, comprising a frame and a panel, such panel being built up of a plurality of relatively thin parallel strips recessed in such frame, and constituting a large portion of such door.

Heretofore the common method of building such type of door was to assemble the frame, leaving off one side member or stile thereof, and then slipping said panel strips into such frame until the panel was completed, and then pressing on the remaining side member or stile. Experience has proven however, that even though said strips are machine cut to a predetermined standard, there is a relatively large variance in width, mainly due to unequal shrinkage in the drying of the lumber. Thus the overall width of the panels varies to such a degree that in some cases when the stile is forced on there is considerable space between the strips while in other cases it is necessary to compress said strips to force the said stile member into place. Such resulting compression produces internal strains in the door which eventually loosen and unseat the frame members, while in other cases cracks are left between the panel strips.

There has been no practical method devised for checking up the overall width of such panels before they are locked in the door frame because it is such assembly of the door frame that forms the panel itself. That is, the panel strips must have tongue-and-grooved edges or some similarly formed edge portions to form an inter-locking joint between the strips, and thus the only way in which the overall width of the panel, composed of such strips, can be measured is to build up such panel by forcing the engaging edges of the strips together. When such panels are assembled in the door frame and forced together by the seating of the frame members, it is too late to substitute a wider or narrower strip if the overall width of the built-up panel proves to be too great or too small for the panel opening. This for the reason that the dowel connections of the door frames fit so tightly that efforts to unseat the members, would only cause the destruction of the latter and would require their replacement.

Thus, if the panel proves to be too wide, extra force must be applied to force the frame members home, and thus set up internal stresses in the frame because of the compression of the panel. On the other hand if the panel proves to be too narrow, cracks are left between the strips, which not only are unsightly, cause rattling, and do not effect an air tight closure, but also permit water to collect therein to produce unequal swelling of the parts of the door and the early destruction thereof.

In this method of assembling doors, also, if bracing members are placed across the panels to strengthen them and brace the frame, such latter members must be fitted in after the door is assembled. Bracing members can not be forced in sufficiently tight after the door frame is formed to prevent sagging of the latter, even though they are cut especially for the particular door. That is, to be effective as a brace for the door frame, the bracing members extending transversely or diagonally of the panels must be substantially longer than the frame opening for the panel so that they can be forced into the frame members and subjected to lengthwise compression to take up the inherent elasticity of the wood. Thus, if all of the frame members bounding the panel opening are seated it is impossible to force in a panel stiffening member which would be effective to brace the frame. The ordinary diagonal member placed across the panels thus does not brace the frame, until the latter has sagged and become out of square to subject the brace to a compressive force, even though the brace and the frame members were fitted so closely that all play was eliminated. This feature is described in greater detail in my copending application for patent entitled Wooden panel door, which application was filed November 4, 1926, Serial No. 146,148.

The principal object of my invention is to provide a method of building doors, and the like, so that a built-up panel of this character can be used, which panel will fit exactly the door opening, and the transverse stiffening members used will brace the frame securely.

I attain this object by assembling the panel strips in a press or clamp, arranging them side by side, and force their engaging edge portions together to form a panel. If such panel is not of the correct width the outer strip can be removed and a strip of correct width substituted therefor. While

thus compressed, stiffening members of proper length are located upon and fastened across the panel, so that the latter is formed into a unit which can be removed from the clamp or press and inserted in a door frame.

If two crossed stiffening members are fastened to each panel and arranged diagonally thereof, they will automatically square the door frame when the panel is inserted, as well as brace such frame effectively. Such squaring of the door frame will not result if the stiffening members are fastened to the panels after their assembly in the door frame, or if the stiffening members are not fastened to the panels before being placed into the frame, because such stiffening members are necessarily quite thin so as not extend beyond that face of the door frame which holds the panel. Thus such relatively thin members are not sufficiently stiff of themselves to resist buckling under lengthwise compression, which buckling would lessen their overall length relatively to the panel and the frame. Such buckling also causes the stiffening members to become spaced from the panels so as to render the fastening together of such parts difficult. If the panels are assembled by my improved method, however, the fastening of the members to the panel supplies the necessary stiffness to the former to enable them to withstand lengthwise compression without buckling.

An incidental but important feature of my invention is that it cuts the cost of assembly of such doors by a considerable amount and releases a large amount of needed space on the assembly floor which space was formerly occupied by the stacks of panel strips and stiffening members.

The method disclosed is illustrated diagrammatically in the accompanying drawings in which:—

Fig. 1 is a disjoined arrangement of the various pieces which make up a door constructed by my method;

Fig. 2 is an elevation of a completed door;

Fig. 3 is a perspective view of a door panel held in a clamp or press in which the strips are assembled and pressed together so that their engaging edges will be interlocked; the stiffening members located relatively on such panel and fastened thereto while the latter is compressed to the desired degree to permit the panel, held together by such stiffening members, to be removed and handled as a unit in the assembly of the door; and

Fig. 4 is a sectional detail of the panel recessed in the door frame.

A door constructed by my improved method may consist of stiles or edge members *a*—*b*, top and bottom rails *c*—*d*, lock and glass rails *e*—*f*, and so called "mutts" *g* for holding the panes of glass in place. The inner edges of the glass rail *e*, the stiles *a* and *b*, and the bottom rail *d*, bound and define a rectangular panel opening *i* in which the panel *j* composed of strips *j'* is seated. Such inner edges are provided with a groove *k* in which the panel seats and with flat portions *k'* with which the ends *m'* of the stiffening members *m* of the panel abut at the corners of such rectangular panel opening *i*.

As can be noted in Figs. 1 and 3, the stiffening members *m* do not extend to the corners of the panel *j*, and as is shown in Fig. 3, the portions of the panel which extend beyond the ends *m'* of the stiffening members *m*, are not as wide as the depth of the groove *k* and thus the panel itself is not supported in the door frame directly, but is supported wholly by the members *m* which fit tightly in the corners of the panel opening *i*.

The panel strips *j'* are commonly made up of ceiling, such strips being cut the length of the panel to be built up. A series of such strips are arranged side by side, in a clamp or press *n*, preferably of the type disclosed in my co-pending application for patent filed November 4, 1926, Serial No. 146,147.

A clamp or press of this character comprises a frame *n'* the upper surface n^2 constitutes a bed. Bounding such bed are a plurality of clamping members some of which, as n^3 and n^4, are pivotally fastened to the frame *n'* and others, as n^5 and n^6, are fixed thereto. Adjusting and compressing means are provided to cause the clamping members to grip the edges of the panel and to force the interlocking tongue-and-grooved edges j^2 of the strips into engagement with each other. It is not essential that this particular type of clamp or press be used but I have found it to be the most convenient and efficient type.

If the panel proves to be either too wide or too narrow, the pivoted clamping members can be swung out of engaging position and one of the border strips j^3 can be removed and one of correct width quickly substituted therefor.

When the panel has been made to be of the correct width the diagonal stiffening members *m* are laid thereon and the panel is again subjected to edgewise compression. Stops n^7 are arranged upon the inner faces of the clamping members n^3, n^4, n^5, and n^6, and such stops engage and arrange the stiffening members relatively upon the panel and such parts, still under compression, are fastened together with screws *o*. The assembled panel thus fastened together can be removed and inserted in a door frame as a unit.

When a panel, built according to my method, is inserted in a door frame, the ends *m'* of the stiffening members serve to square

the door frame automatically. That is, the dowels of the rails are often turned slightly imperfectly and cause the door to become slightly out of square if means are not provided to prevent such distortion. The large panel, built in accordance with my invention, is perfectly square and thus serves to correct the lack of trueness of the frame. This is because the stiffening members are slightly longer than the diagonal width of the panel opening and thus the cross-grain of the rails and stiles is compressed slightly and the stiffening members are subjected to compression. Such compression tends to unseat the dowel connections but, inasmuch as the stiffening members are arranged diagonally thereto, such compression tends to bind the dowels in their seats to counteract such unseating, and experience has proven that such unseating does not occur.

I claim:

1. In the manufacture of wooden doors and the like having a frame arranged to define a panel opening of fixed dimensions and having a panel recessed therein, such panel composed of a plurality of elongated strips arranged side by side and fastened together and stiffened by a transversely arranged member, the method of assembling said panel consisting in arranging said strips side by side in a press and thereby forcing their edges together, and then locating such transverse members relatively upon such composite panel while under compression and fastening the same in place to hold said strips in place relatively to each other.

2. In the manufacture of wooden doors and the like having a frame arranged to define a panel opening of fixed dimensions and having a panel recessed therein, such panel composed of a plurality of elongated strips having mutually formed engaging edges and arranged side by side and fastened together and stiffened by a transversely arranged member, the method of assembling said panel consisting in arranging said strips side by side in a press and thereby forcing their engaging edges together, and then locating such transverse members relatively upon such composite panel while under compression and fastening the same in place to hold said strips in place relatively to each other.

3. In the manufacture of wooden doors and the like having a frame arranged to define a rectangular panel opening of fixed dimensions and having a similarly formed panel recessed therein, such panel composed of a plurality of elongated strips arranged side by side and fastened together and stiffened by transversely arranged diagonal members, the method of assembling said panel, consisting in arranging said strips side by side in a press and thereby forcing their edges together, and then locating such transverse members relatively upon such composite panel, while under compression, so that the ends of the stiffening members are spaced inwardly of the corners of such rectangular panel, and finally fastening the same in place to hold said strips relatively to each other.

4. In the manufacture of wooden doors and the like having a frame arranged to define a panel opening of fixed dimensions and having a panel recessed therein, such panel composed of a plurality of elongated strips having mutually formed engaging edges and arranged side by side and fastened together and stiffened by a transversely arranged member, the method of assembling said panel consisting in arranging said strips side by side in a press and thereby forcing their engaging edges together, inserting an edge strip of such width to such panel as to make the overall width of the latter a predetermined amount, and then locating such transverse members relatively upon such composite panel while under compression and fastening the same in place to hold said strips relatively to each other.

5. In the manufacture of wooden doors and the like having a frame arranged to define a rectangular panel opening of fixed dimensions and having a similarly formed panel recessed therein, such panel composed of a plurality of elongated strips arranged side by side and fastened together and stiffened by transversely arranged diagonal members, the method of assembling said panel in said frame consisting in arranging said strips side by side in a press and thereby forcing their edges together, locating such transverse members relatively upon such composite panel while under compression and fastening the same in place to hold said strips in place relatively to each other, then inserting the panel thus formed into the recessed opening and forcing the frame members bounding such opening into engagement with said elongated strips and into abutment with such stiffening members.

6. In the manufacture of wooden doors and the like having a frame arranged to define a rectangular panel opening of fixed dimensions and having a similarly formed panel recessed therein, such panel composed of a plurality of elongated strips having mutually formed engaging edges and arranged side by side and fastened together and stiffened by transversely arranged diagonal members, the method of assembling said panel in said frame, consisting in arranging said strips side by side in a press and thereby forcing their engaging edges together, inserting an edge strip of such width to such panel as to make the overall width of the latter a predetermined amount, locating such transverse members relatively upon such composite panel while under com-

pression and fastening the same in place, then inserting the panel thus formed into the recessed opening and forcing the frame members bounding such opening into engagement with said elongated strips and into abutment with such stiffening members.

7. In the manufacture of wooden doors and the like having a frame arranged to define a rectangular panel opening of fixed dimensions and having a similarly formed panel recessed therein, such panel composed of a plurality of elongated strips arranged side by side and fastened together and stiffened by transversely arranged diagonal members, the method of assembling said panel, consisting in arranging said strips side by side in a press and thereby forcing them together, also applying pressure to the ends of such strips so as to cause the latter to lie substantially in alinement with each other, and then locating such transverse members relatively upon such composite panel while under compression and fastening the same in place.

JOHN C. DE PENNING.