July 8, 1952 A. RIZZA 2,602,204

CONSTRUCTION OF COMPENSATED BOARDS OR PANELS FOR THE MANUFACTURE OF DOORS AND THE LIKE

Filed July 26, 1946 2 SHEETS—SHEET 1

Fig. 1.

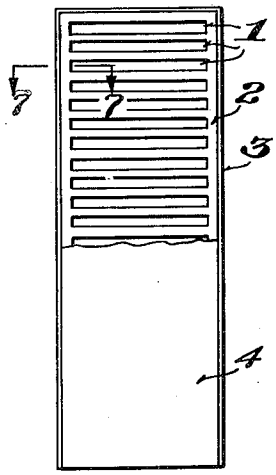


Fig. 2.

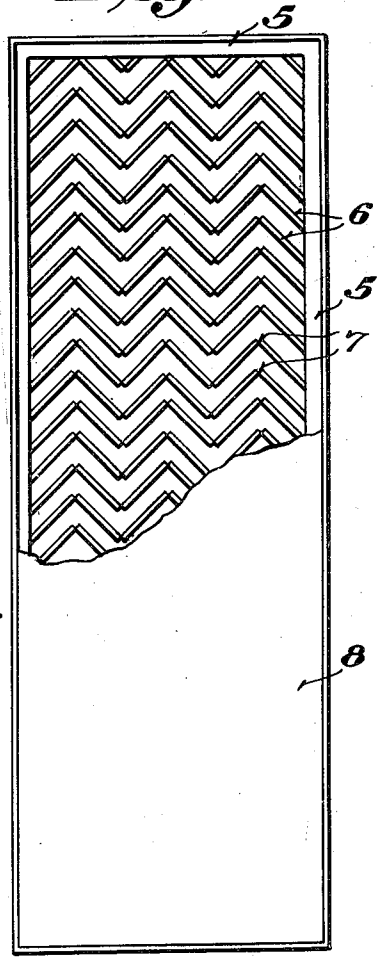


Fig. 3.

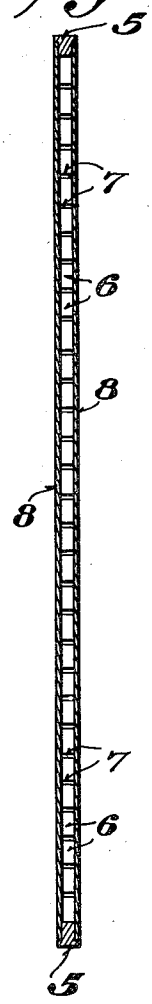


Fig. 4.

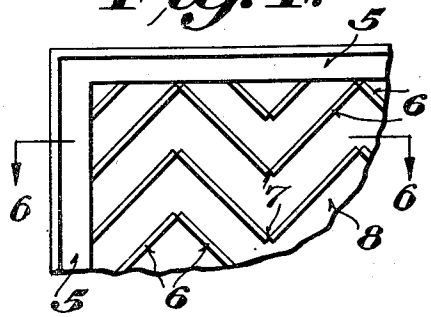


Fig. 5.

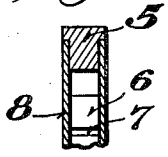


Fig. 6.

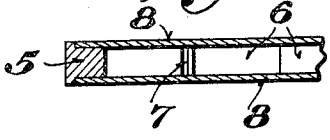
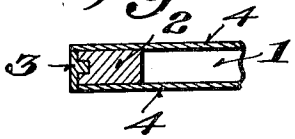


Fig. 7.



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Fig.8.

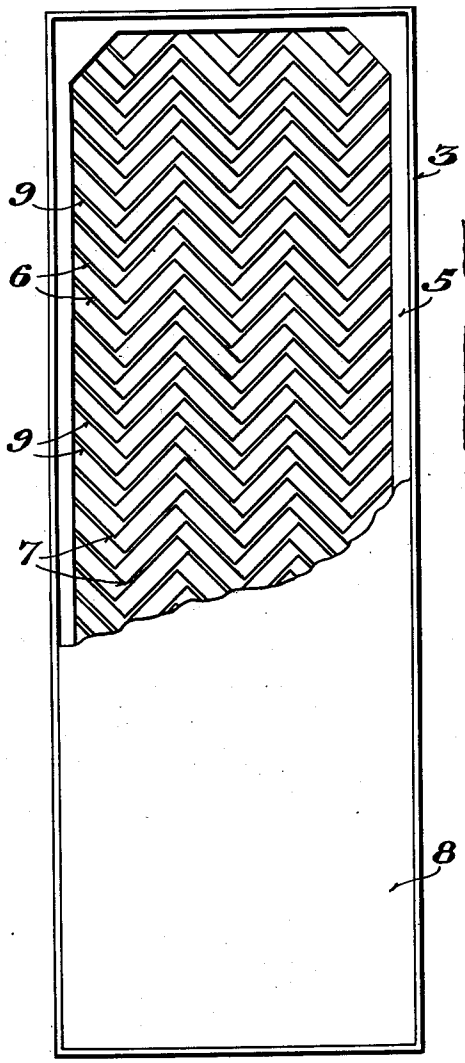


Fig.9.

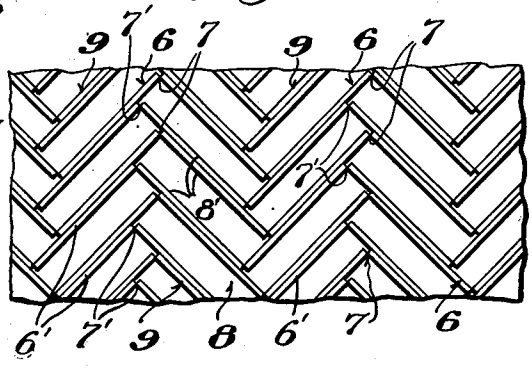
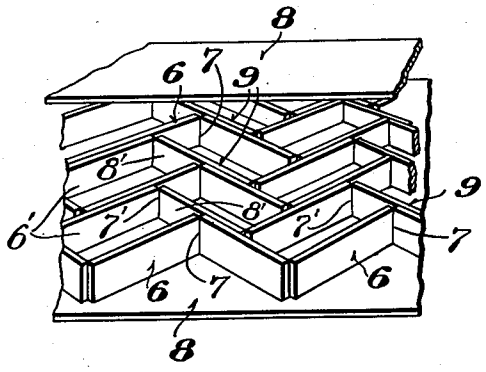


Fig.10.



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Patented July 8, 1952 2,602,204

UNITED STATES PATENT OFFICE

2,602,204

CONSTRUCTION OF COMPENSATED BOARDS OR PANELS FOR THE MANUFACTURE OF DOORS AND THE LIKE

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Application July 26, 1946, Serial No. 686,402

2 Claims. (Cl. 20—91)

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This invention relates to improvements in the construction of compensated boards or panels and substantially has for object a compensated board or panel which owing to its convenient features of construction as well as of resistance to deformation and economy of the material used in its manufacture, offers several important advantages over the boards or panels of similar type as heretofore proposed or used.

The compensated boards or panels in accordance with this invention are particularly adapted for the construction of doors in general, but they may also conveniently be used in the manufacture of furniture and for similar purposes.

The invention also views other complementary objects which will more fully be understood when considering the following specification.

It is already known that in ordinary panels for doors or the like, use is made, as a connecting element between the two sheets which operate after the manner of cover plates in a truss girder, of a certain number of parallel laths arranged in horizontal directions and suitably spaced one from another, so that the resistance of the trussed panel thus formed will be considerably impaired in a vertical direction by the tendency to bulging of said cover sheets, generally consisting of sheets of ply-wood, rather devoid of resistance.

On the other hand, the contraction of one of the cover sheets or the expansion of the other, will cause a deformation of the panel in a vertical direction, in which its resistance is less, and although in some cases said deformation will be opposed by the side rabbet ledges, in others the same rabbet ledges will cause the panel to deform.

Besides requiring an excessive amount of hand labor in their construction, the resulting panels are of considerable weight and require the use of heavy door fittings.

In order to overcome the difficulty above set forth, the compensated panel which forms the object of this invention has been devised and an essential feature of the same consists in that the two sheets of ply-wood which form the cover plates of the panel, are connected together by a succession of double T-shaped laths, arranged in two approximately normal directions, so that their flanges will be in contact, while the width of said flanges, as well as the relation between the web portion and said width will be adapted to the particular requirements of each case.

In this way, the panel which forms the object of this invention will really behave as a girder trussed in two directions.

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In effect, when considering a single section of the structure, it will be seen that each of the same acts in the manner of a girder of double T-profile, arranged according to two directions, this being the particular profile adopted in steel structures for enabling the same to withstand flexure stresses, owing to such shape combining the greatest amount of inertia moment with the least weight of material.

In order that the invention may be readily understood and carried into practice, two preferred embodiments of the same have been shown by way of example in the illustrative drawings accompanying this invention. In said drawings:

Figure 1 shows a door constructed in accordance with one of the usual methods.

Figure 2 represents a door constructed in accordance with this invention.

Figure 3 is a vertical cross section of the door shown in Figure 2.

Figure 4 illustrates another partial detail of the same door, drawn to an enlarged scale.

Figure 5 is a partial section of the foregoing view, on a vertical transversal plane.

Figure 6 is a fragmentary horizontal section taken on line 6—6 of Figure 4.

Figure 7 is a similar section taken on line 7—7 of Figure 1.

Figure 8 is a front elevation of a modified arrangement of the compensated panel according to this invention;

Figure 9 is a partial view, on an enlarged scale, of Figure 8, and

Figure 10 shows a partial perspective of the modification represented in Figures 8 and 9.

In all the figures, similar numbers of reference indicate like or corresponding parts.

Referring now to the form of construction shown in Figures 1 to 7, the compensated boards or panels which form the object of this invention, are substantially characterized by that the inner frame, constituted in the common structures by solid cross bars 1, joined to the rabbet ledges 2, covered along their free edges by an edge lath 3 and on the two opposite faces, by the sheets 4, has been replaced, in the present case, by a series of thin tablets, of a width equal to the free space existing between the two outer front sheets of ply-wood and arranged in zigzag lines, forming square or acute angles and covering in conjoint the entire length or width of said panel.

In the construction of a panel in accordance with this invention, the first operation consists in gluing a frame 5, of double reinforcement in comparison with the common frames, to one of the sides of a ply-wood sheet, whereupon in the

inner part of said frame the corresponding tablets 6 are arranged which are to replace the framing of common use as above set forth.

The tablets 6 are placed in parallel positions and at small distances one from another, so that their apices 7, at each of the angles formed by two successive tablets, will be situated inside of the angles formed by the tablets of the adjacent rows, in such a way that after the engagement of said tablets with the sheets 8 which cover the same, they will strengthen or stiffen the panel against warping or bending in several directions. The assembled tablets 6 will resist transverse, longitudinal and diagonal bending or warping of the panel.

By means of the efficient arrangement of the tablets 6, the problem of the flexure of the wood in both directions of the plane is satisfactorily resolved and the deficiencies inherent to the framings of ordinary construction entirely overcome, as in these latter the greater part of the cross battens was arranged in a single direction and in consequence, the flexure of the wood used in the construction of the panels only depended on the good condition of the same.

Before placing in position the tablets 6, a layer of glue is applied to the inner side of the sheet 8, to which previously the frame 5 has been secured, and under these conditions the said tablets 6 are suitably applied to the glued face so that after drying of the glue, the tablets will remain in their fixed position.

Finally, the conjoint formed by the frame 5 and tablets 6 is covered with a second sheet of plywood 8, also previously covered on its inner side with a layer of glue, so that after drying, a compact conjoint of great solidity and strength is formed, thus finishing the manufacture of the improved panel.

Besides the advantages set forth at the commencement, the panel in accordance with this invention is of very economic construction, owing to the small size of the tablets 6, which allows of using in the manufacture, small pieces or waste wood, not suitable for other uses.

The modified construction of the panel shown in Figures 8 to 10 is essentially characterized by that the tablets 6 of each row, are partially superposed on the tablets of the adjacent rows, the joining of the tablets one to another being conveniently performed by gluing or other suitable means.

In this form of construction, the lineal continuity between the angles formed by the tablets corresponding to the different rows is avoided, and in consequence, any possibility of the panel deforming in a longitudinal direction, i. e., in the direction determined by the apices of said angles.

In accordance with this modified arrangement, the tablets 6 are placed so as to practically intercross each other, without interruption in the continuity of the same, as following the direction taken by each of the tablets, it will be seen that at the point of crossing, other tablets continue its course until meeting with the tablets of the adjacent rows, and so on in succession.

The stresses of flexure to which the structure may be submitted in any intermediate direction, will be distributed in accordance with known laws, as there does not exist any line of breakage along which the panel might be bent.

In this arrangement, every one of the tablets which form the inner framing, not only acts as a connecting member between the tablets of the adjacent rows, but they also oppose a considerable degree of longitudinal resistance to the distortion of any one of them.

In the form of the invention illustrated in Figures 8 to 10, the reinforcing tablets or strips 6 are arranged to provide longitudinal rows of main V-shaped reinforcing elements mounted within the frame 5 and secured by gluing or the like to the inner faces of the covering sheets 8. The main V-shaped reinforcing elements taper in the same direction in each row and have apices 7 which are arranged in alignment and open bases. The reduced end of each main V-shaped reinforcing element in each row, excepting the end V-shaped reinforcing element, extends through the open base of the next main V-shaped reinforcing element and has its apex 7 terminating at a point inwardly of the open base of such next V-shaped reinforcing element.

A row of supplemental V-shaped reinforcing elements is provided for each row of main V-shaped reinforcing elements, and likewise mounted within the frame 5 and secured by gluing or the like to the cover sheets 8. These supplemental V-shaped reinforcing elements are likewise formed by the individual reinforcing tablets or strips 6. The supplemental V-shaped reinforcing elements in each row taper in the same direction as the main V-shaped elements, and have apices 7' and open bases. The apices 7' of the supplemental V-shaped reinforcing elements of each row are in alignment, but offset or staggered laterally with respect to the apices 7 of the main V-shaped reinforcing elements. Each supplemental V-shaped reinforcing element extends through the open base of the adjacent main V-shaped reinforcing element in the same row and has its apex 7' spaced from the apex 7 of said adjacent main V-shaped reinforcing element. Each supplemental V-shaped reinforcing element has one side 6' thereof engaging the inner face of a tablet or strip 6 of the main V-shaped reinforcing element into which it extends. The other side 8' of each supplemental V-shaped reinforcing element engages and reinforces the outer face of the next V-shaped reinforcing element. It is to be seen that the sides or strips 6' and 8' of the supplemental V-shaped reinforcing elements coact with the strips or tablets 6 of the main V-shaped reinforcing elements to form stiffening ribs of double thickness. Also, the offset or staggered arrangement of the apices 7 and 7' substantially eliminates the possibility of the panel or board failing or rupturing along the line formed by the apices 7 or 7'. The arrangement is such that the completed panel will resist bending or warping in all directions, longitudinally, transversely, and diagonally.

From the foregoing description, the nature of the invention will have fully been understood and no further explanation will be required by those skilled in the art.

It will be evident that several modifications of construction and detail may be introduced without departing from the scope of this invention, as particularly set forth in the following claims.

Having now clearly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim and desire to secure by Letters Patent, is:

1. A composite panel comprising a frame, cover sheets secured to the opposite faces of the frame, rows of main V-shaped reinforcing elements mounted within the frame between the cover sheets and secured to the cover sheets, the main

V-shaped reinforcing elements in each row tapering in the same direction and having apices and open bases, the reduced end of each main V-shaped reinforcing element in each row excepting the end V-shaped reinforcing element extending through the open base of the next upper main V-shaped reinforcing element and having its apex terminating at a point spaced from such open base, the apices of the main V-shaped reinforcing elements in each row being disposed in alignment, and a row of supplemental V-shaped reinforcing elements for each row of main V-shaped reinforcing elements and mounted within the frame and secured to the cover sheets, the supplemental V-shaped reinforcing elements in each row tapering in the same direction and having apices and open bases, the apices of the supplemental V-shaped reinforcing elements of each row being in alignment, each supplemental V-shaped reinforcing element extending through the open base of the next upper main V-shaped reinforcing element in the same row and having its apex spaced from the apex of such next upper main V-shaped reinforcing element, each supplemental V-shaped reinforcing element having one side thereof engaging the inner face of a side of the main V-shaped reinforcing element into which it extends and reinforcing such side and its other side engaging and reinforcing the outer face of the next lower main V-shaped reinforcing element, the apices of the row of supplemental V-shaped reinforcing elements being staggered with respect to the apices of the corresponding row of main V-shaped reinforcing elements.

2. A composite panel comprising a frame, cover sheets secured to the opposite faces of the frame, rows of main V-shaped reinforcing elements

mounted within the frame between the cover sheets and secured to the cover sheets, the main V-shaped reinforcing elements in each row tapering in the same direction and having apices and open bases, the reduced end of each main V-shaped reinforcing element in each row excepting the end V-shaped reinforcing element extending through the open base of the next main V-shaped reinforcing element and having its apex terminating at a point spaced from such open base, the apices of the main V-shaped reinforcing elements in each row being disposed in alignment, and a row of spaced reinforcing strips for each row of main V-shaped reinforcing elements and mounted within the frame and secured to the cover sheets, the reinforcing strips in each row being inclined in the same direction and having ends disposed in alignment, each reinforcing strip extending through the open base of the adjacent main V-shaped reinforcing element in the same row and having one end spaced from the apex of such adjacent main V-shaped reinforcing element, each reinforcing strip contacting and reinforcing the inner face of a side of the main V-shaped reinforcing element into which it extends, the ends of the reinforcing strips in each row being staggered with respect to the apices of the corresponding row of main V-shaped reinforcing elements.

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The following references are of record in the file of this patent:

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