

Oct. 15, 1957

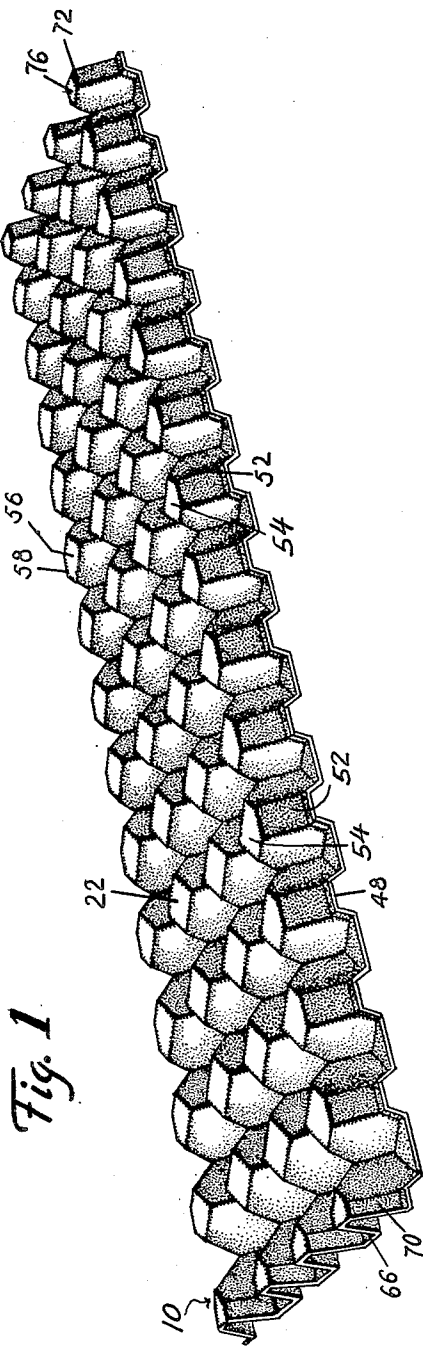
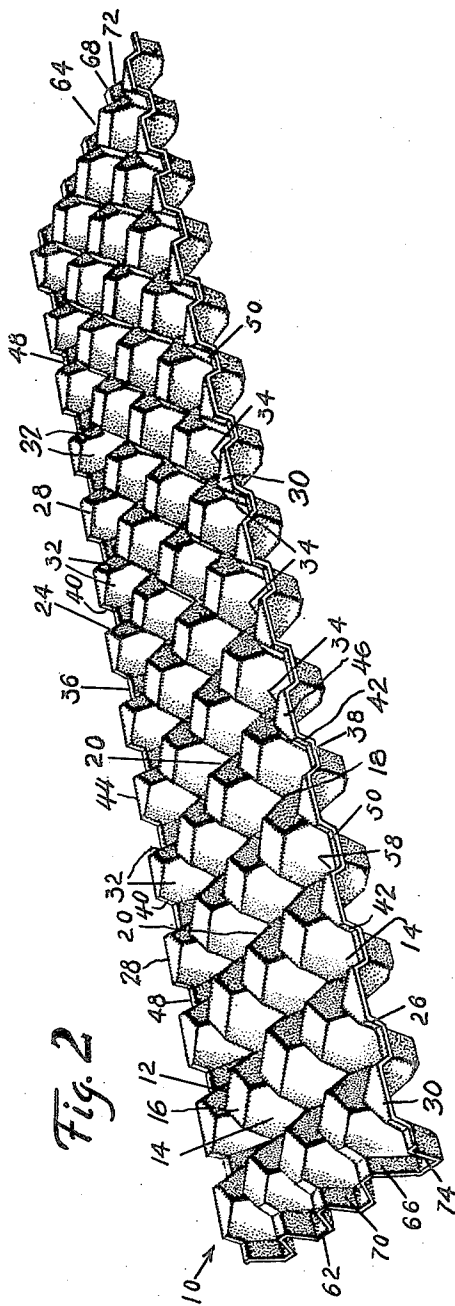
R. S. FRENCH

2,809,908

CONSTRUCTION PANEL

Filed Dec. 28, 1953

8 Sheets-Sheet 1



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CONSTRUCTION PANEL

2,809,908

Filed Dec. 28, 1953

8 Sheets-Sheet 2

Fig. 6

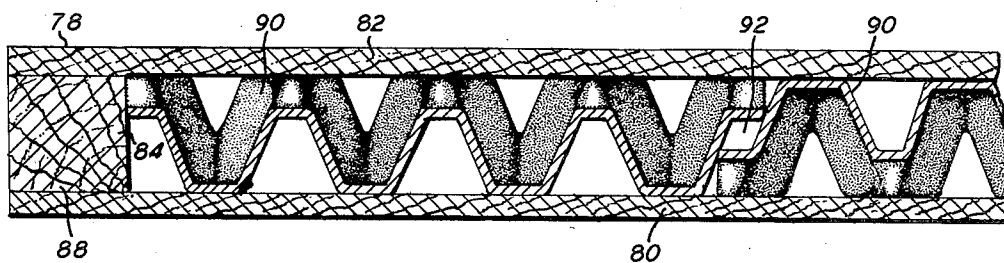
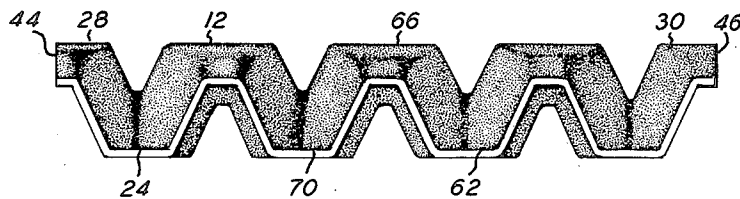


Fig. 3



Fig. 4



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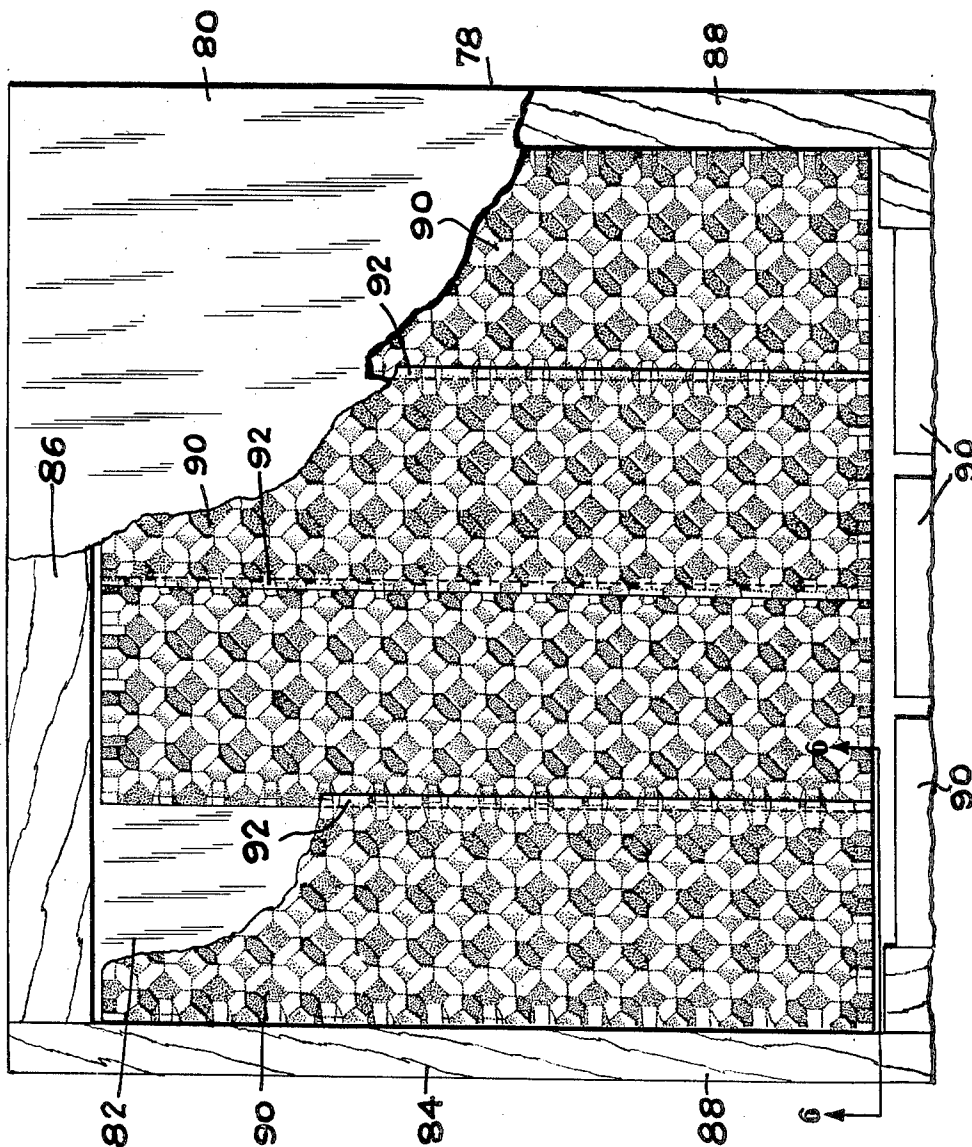
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8 Sheets-Sheet 3



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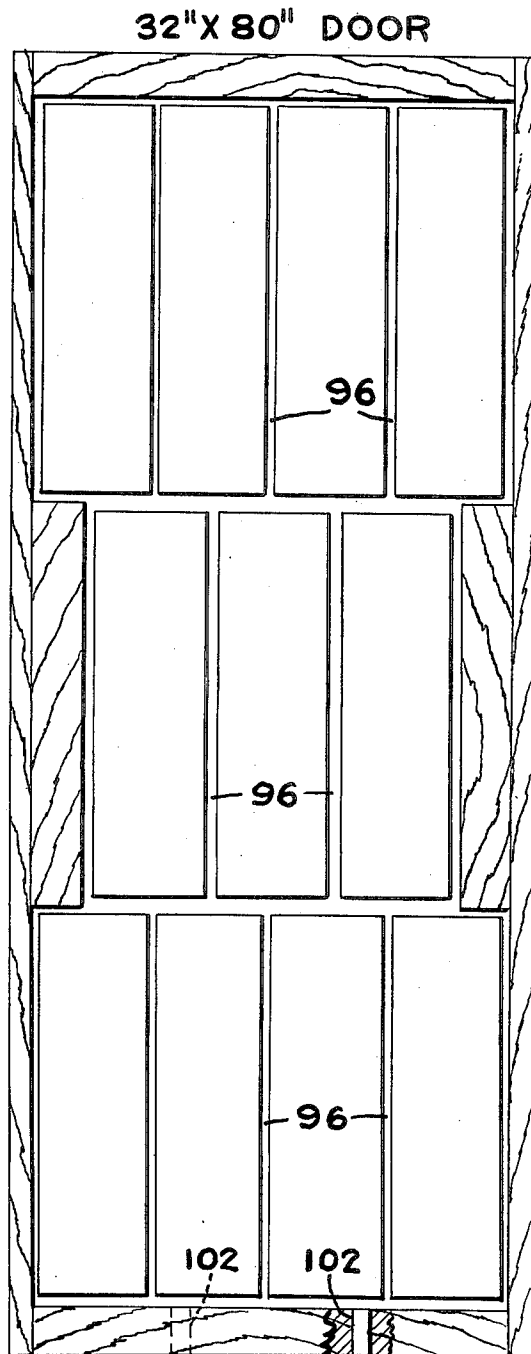
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8 Sheets-Sheet 4

Fig. 7



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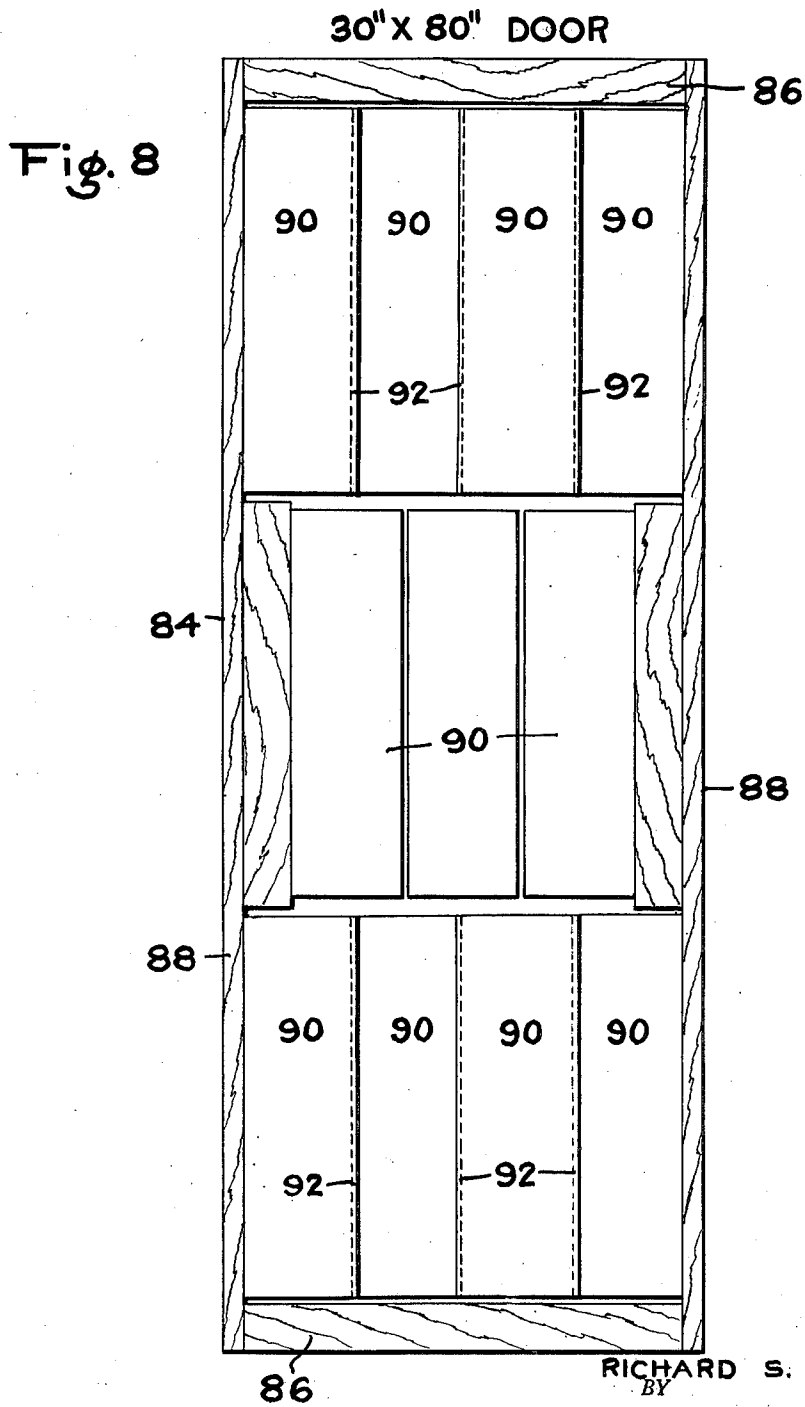
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8 Sheets-Sheet 5



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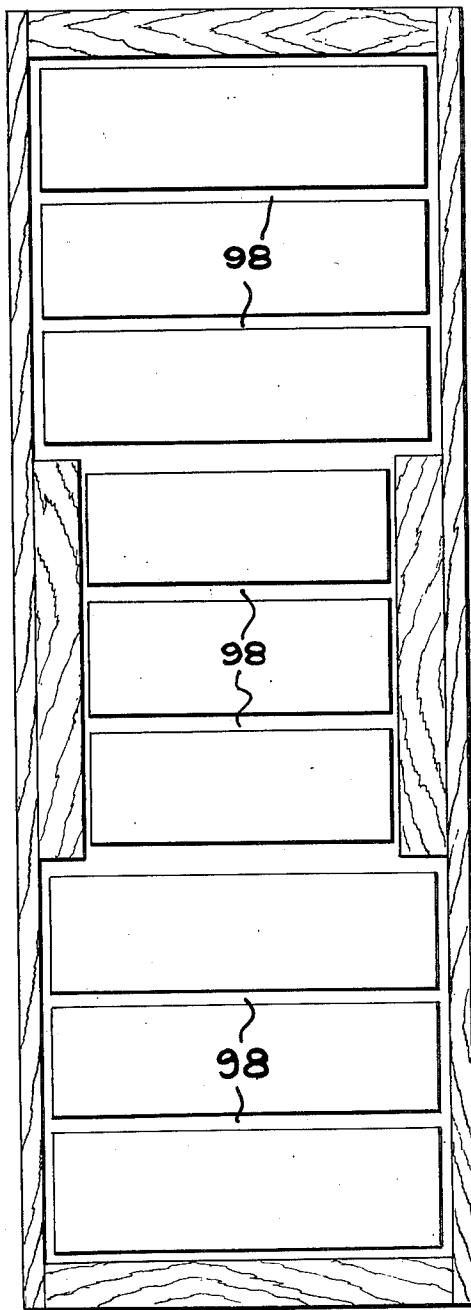
2,809,908

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8 Sheets-Sheet 6

28" X 80" DOOR

Fig. 9



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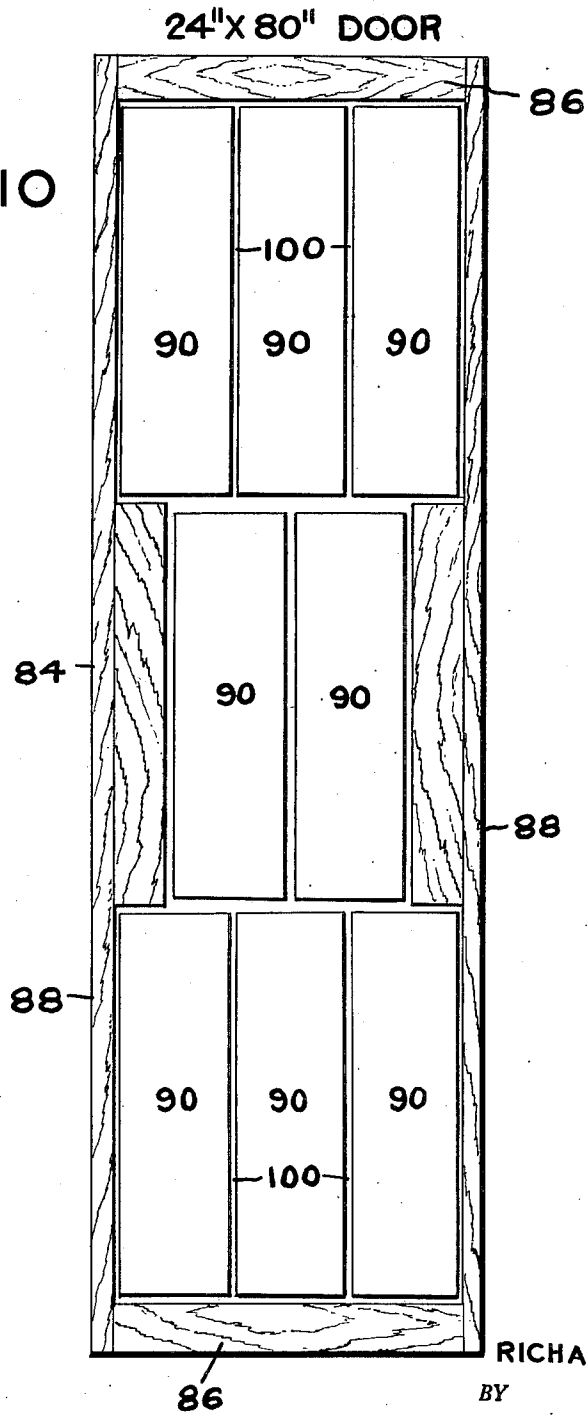
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CONSTRUCTION PANEL

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8 Sheets-Sheet 7

Fig. 10



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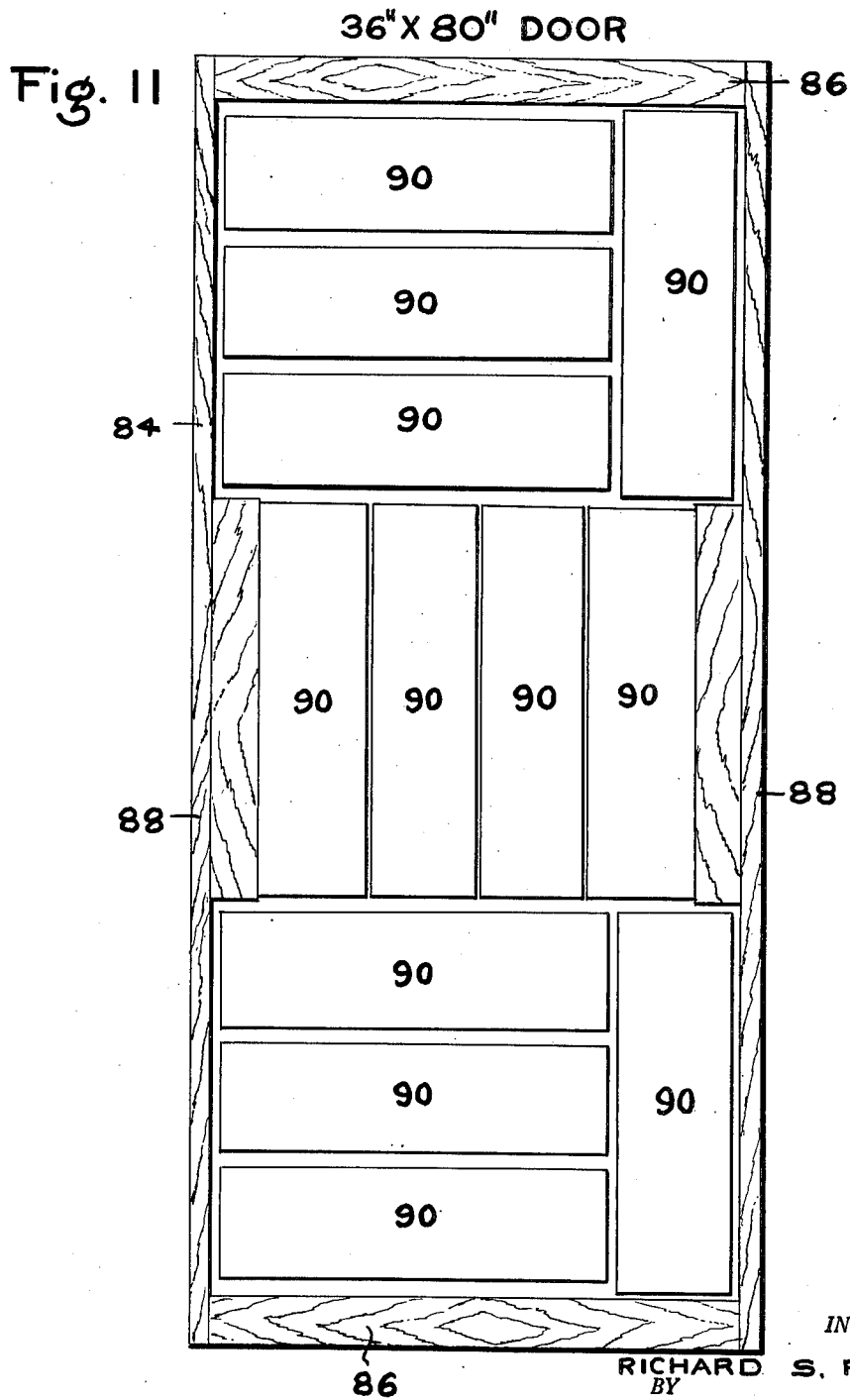
Oct. 15, 1957

R. S. FRENCH
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2,809,908

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8 Sheets-Sheet 8



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2,809,908

CONSTRUCTION PANEL

Richard S. French, Waterville, Maine, assignor to Keyes Fibre Company, Portland, Maine, a corporation of Maine

Application December 28, 1953, Serial No. 400,601

7 Claims. (Cl. 154—45.9)

This invention relates to construction panels and particularly to core-filled panels used for doors, walls, partitions, and the like, and is a continuation-in-part of co-pending application Serial No. 201,933, filed December 21, 1950, now Pat. No. 2,689,988, issued September 28, 1954, in the name of Richard S. French. It has recently been found that doors may be made with great strength and lightness and yet not require the machining and technique necessary in making the ordinary type of wooden door. A door incorporating such a panel is used to illustrate this invention, the door comprising an ordinary framework of solid wood rails and stiles between which is positioned the panel generally comprising a pair of plywood or other molded boards between which is positioned a pocketed filler made of molded fibers or the like. It has been found that such a door can be produced in great quantities by mass production methods which, together with the relatively inexpensive materials involved, result in a door which is far less expensive than the ordinary type made of solid wood. Furthermore, this type of door having an internal structure which provides a plurality of air pockets; results in both acoustic and thermal insulation not possible with the ordinary type of solid wooden door.

The filler may be made of any fibrous material capable of being molded from an aqueous suspension, preferably wood pulp. A molding die such as illustrated in U. S. Patent No. 2,192,937 issued March 12, 1940, to E. L. Shepard may be used for this purpose. The fibrous material may comprise either a slurry of conventional pulp fibers such as ground wood, chemical and semichemical fibers, or mixtures of such materials; or it may comprise glass fibers, hemp, asbestos and the like.

It is therefore one object of this invention to provide a panel for doors or the like wherein the panel is light in weight but sturdy in construction.

Another object of this invention is to provide a panel for doors or the like wherein the inherent construction of the panel provides for good acoustic and thermal insulation.

Another object of this invention is to provide panels for doors or the like wherein the panel, although being sturdy in construction, is cheaply and easily produced.

Other objects and many of the inherent advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when construed in connection with the accompanying drawings wherein:

Fig. 1 is a perspective view looking at one face of a filler element embodying the present invention;

Fig. 2 is a perspective view looking at the obverse face of the filler element shown in Fig. 1;

Fig. 3 is a longitudinal side edge view of the filler element;

Fig. 4 is an enlarged end elevation of the filler element;

Fig. 5 is a fragmentary view of a door constructed in the manner of the present invention with a portion of one

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facing board removed and a portion of one of the filler elements broken away;

Fig. 6 is a transverse section taken along the line 6—6 of Fig. 5; and

Figs. 7 to 11 inclusive are views of several types and dimensions of doors commonly used, one facing board being removed from each door to illustrate the arrangement of the filler elements there within.

Referring now in greater detail to the drawings wherein similar reference characters refer to similar parts, there is shown a pocketed sheet 10 having a series of parallel rows of hollow embossments 12, each of the embossments being in the form of a polyhedron with four inclined walls, as indicated at 14, culminating in a top wall 16 which, in plan view, is shown to be substantially square in shape. Each of the embossments 12 is connected to the embossments adjacent thereto at the lower ends thereof as at 18, this method of joining the embossments creating an elevated groove or channel 20 between the embossments.

Each of the embossments in the central portion of the sheet combine with the embossments adjacent thereto to form indentations 22, complementary to the adjacent embossments and sharing the same inclined side walls 14. The bottom walls of these indentations 22 are also substantially square in plan view.

The marginal portions of the sheet 10 are formed somewhat differently from the center portion, the margins 24 and 26 being of substantially the same height as the embossments 12 and being provided with a row of spaced embossments 28 and 30, aligned with the central embossments 12. However, these embossments 28 and 30 comprise only two inclined walls as at 32 and 34 which are integral with a top flange as at 36 and 38, the embossments extending above these flanges and having additional side walls 40 and 42 integral with but at an angle to both the flanges and the respective side walls 32 and 34. The side walls 32 and 40, on the other side, are integral with a four sided top wall 44 which has approximately half of the area of the top walls 16, while side walls 34 and 42 are integral with similar four sided top walls 46.

Between the embossments 28 in the flange 36 are formed the recesses 48 and between the embossments 30 in the flange 38 are formed the recesses 50. The recesses 48 are each in communication with an indentation 52 which, by virtue of the position of the marginal wall 24, is somewhat different in shape from the central indentations, the bottom wall 54 being pentagonal in shape instead of square. The same is true of the bottom walls 56 of indentations 58 which are in communication with the recesses 50. Since each of the recesses 48 and 50 is in alignment with a channel 20, a complete groove or passage is provided from every pocket to the margins of the sheet. The importance of this type of construction will appear subsequently.

On the marginal portions at 62 and 64 respectively there are provided a plurality of spaced, hollow embossments 66 and 68, each being connected to an end embossment 12. Spacing these embossments 66 and 68 from each other are recesses 70 and 72, each having a bottom wall at 74 and at 76 respectively, similar in shape to the top walls 44 and 46. If two sheets 10 were to be placed end to end, the embossments 66 and 68 on one sheet can be made to overlap the embossments 66 or 68 of the other sheet, thereby forming an interlocking juncture.

Figs. 4, 5 and 6 illustrate the pocketed sheet material, described above, as used in a door generally designated 78. This door 78 is made up of a front and back facing board indicated respectively at 80 and 82. These facing boards may be constructed of any desired material but are preferably made of plywood, hard press-board (Masonite), fibre board, or the like. The boards

80 and 82 are spaced from each other by a framework 84 consisting of rails 86 and stiles 88. The framework is connected to the facing boards by any desirable means such as cementing, nailing, or the like. Between the facing boards and within the framework is provided the corrugated filler material described above. This filler material is preferably made up of a plurality of sheets such as indicated at 90. The use of a plurality of sheets is preferable since these filler sheets may be readily manufactured in the standard sizes and then as many as necessary used for any specific purpose. Since the sheets are of molded, fibrous construction, and since the channels 20 form lines of weakness, the sheets may also be easily broken along these channels into any desired fragmentary sizes to fill up spaces. A convenient size and shape for the individual sheets is a rectangular body about 24 inches in length, and 7 inches in width with a height corresponding to the thickness of the hollow space in the door or panel.

A good rigid panel or door construction may be obtained if these filler sheets are either overlapped at their marginal portions as indicated at 92 in Fig. 2 and at 94 in Fig. 11 or they may be spaced from each other as indicated at 96 in Fig. 7, 98 in Fig. 9 and 100 in Fig. 10. The widest spacing which will still provide good rigidity is about one inch between sheets, Figs. 7 to 11 show the various arrangements of the panels in relation to the five generally used sizes of doors.

The filler sheets are preferably fastened to the facing boards by any one of a number of well known glues; however, the standard casein type wood glue or the newer type resin adhesives give the resulting door or panel an unusually high resistance to deformation. This is important where the board facings are constructed of exceptionally light material such as plywood. For economy in manufacture, the glue used to adhere the filler material to the board facings can be applied only to those portions of the filler surface that engage the facing boards, which means that the glue is applied to the top walls of the embossments and to the bottom walls of the indentations. The adhesion may be accomplished either in a cold pressing operation or in a hot pressing operation. The cold pressing has the advantage of being simpler and easier, however, the hot pressing method results in a firmer and more complete adhesion. This hot pressing method is carried out at temperatures ranging up to 350° F. During the hot pressing operation, moisture and steam are given off by the adhesive and the fibre. This moisture and steam are vented through the recesses 48 and 50 connected to the channels 20. Fig. 7 illustrates openings 102 formed in the frame of the door. These openings allow the moisture and steam to escape from the interior of the door during the hot pressing operation and are then plugged up by suitable plugs.

It may here be pointed out that where fireproofness is an important consideration, a conventional plaster board facing sheet having a molded plaster layer covered by a cemented paper wrapping is especially effective. The filler sheets may also be rendered fireproof, as by incorporating inert fibres or fillers in the wood pulp, or by impregnating it with fire-retardant chemicals such as sulfamic acid and ammonium phosphate.

It should further be pointed out that although the embossments and recesses have been illustrated as being in the form of a four sided pyramid, this shape is not critical. Other shapes such as frusto-conical shapes may be substituted with equal effect.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is, therefore, to be understood that within the scope of the appended claims the invention may be practiced otherwise than is specifically described. Thus, for example, although it is usual, as shown in Figs. 7 to 11 inclusive, to have stiles narrower than the rails

except for lock blocks suitably positioned, the stiles can be made as wide as or even wider than the rail, if desired. In addition, a lock block need only be provided adjacent one stile if the right or lefthandedness of the door is known at the time of manufacture. Doors of identical faces can be used either righthanded or lefthanded with only one lock block. Although vents 102 are shown in Fig. 7 as provided in only one rail, they can also be provided in both rails or in the stiles if desired.

What is claimed as the invention is:

1. A filler for generally hollow panels comprising a generally rectangular, molded pulp sheet, a plurality of hollow embossments provided with inclined side walls and having closure walls at one end, the opposite ends thereof being open, said embossments being arranged in parallel and perpendicular rows and including complementary, continuous recesses between adjacent rows of embossments, each of said recesses having one open and one closed end, flanges formed at the marginal portions of said sheet, said flanges being provided with alternate lands and grooves, said lands lying in the same plane as the closed ends of said embossments, each land being aligned with a row of embossments, said grooves lying in a plane which is intermediate the planes of the closed ends of said embossments and the open ends thereof.

2. The filler as defined in claim 1 wherein each of said grooves is in communication with a recess.

3. The filler as defined in claim 1 wherein each of grooves is in communication with a recess and wherein each of said recesses is connected to the recesses adjacent thereto by an indentation formed between adjacent embossments.

4. The filler as defined in claim 1 wherein the closed ends of said embossments lie in the same plane as the open ends of said recesses and wherein the open ends of said embossments lie in the same plane as the closed ends of said recesses.

5. The filler as defined in claim 1 wherein said sheet has a length of approximately 24 inches and a width of approximately 7 inches.

6. A filler for generally hollow panels comprising a generally rectangular, molded pulp sheet having a plurality of hollow embossments thereon, each of said embossments having one open and one closed end, said embossments being arranged in parallel and perpendicular rows with each embossment thereof connected to the embossments adjacent thereto at a position intermediate the closed and open end of each of said embossments and with each embossment of one row aligned with a respective embossment in each of the other of said rows, the substantially greater portion of said embossments being so constructed and arranged that each combines with the embossments adjacent thereto to enclose a recess having one open end and one closed end, the side walls of said embossments forming the side walls of said recesses, the closed end walls of said recesses being in substantially the same plane as the open ends of said embossments while the open ends of said recesses are in substantially the same plane as the closed end walls of said embossments, each of said recesses having a shape similar but complementary to said embossments and being continuously arranged in rows parallel to said rows of embossment, opposite marginal portions of said sheet aligned with said rows being each provided with a plurality of spaced lands, each separated from similar lands adjacent thereto by a groove, each of said spaced lands being aligned with a plurality of said embossments and each of said grooves being aligned and in communication with a recess, those marginal portions of said sheet generally perpendicular to the first mentioned marginal portions, being provided with a plurality of hollow lugs, each being spaced from the adjacent lugs thereof by indentations, each of said lugs being connected to and in alignment with one of said rows of embossments, while each of said indentations

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is in alignment with a row of recesses formed by said rows of embossments, said grooves of said first mentioned marginal portions being generally complementary to the lands thereof, while said lugs of said last mentioned marginal portions are generally complementary to the indentations thereof. 5

7. The filler as defined in claim 6 wherein each of said embossments is in the form of a polyhedron having four substantially equally inclined side walls extending from a wide base at the open end thereof to a relatively narrow tip at the closed end wall thereof, said end wall being substantially square in shape. 10

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References Cited in the file of this patent

UNITED STATES PATENTS

1,000,694	Schaefer et al.	Aug. 15, 1911
2,385,352	Davis	Sept. 25, 1945
2,481,046	Scurlock	Sept. 6, 1949
2,652,878	Gerard	Sept. 22, 1953
2,689,988	French	Sept. 28, 1954

FOREIGN PATENTS

546,397	Great Britain	July 10, 1942
969,140	France	Dec. 14, 1950