

Jan. 27, 1931.

D. M. SUTHERLAND, JR

1,790,178

FIBER BOARD AND ITS MANUFACTURE

Filed Aug. 6, 1928

2 Sheets-Sheet 1

FIG. I.

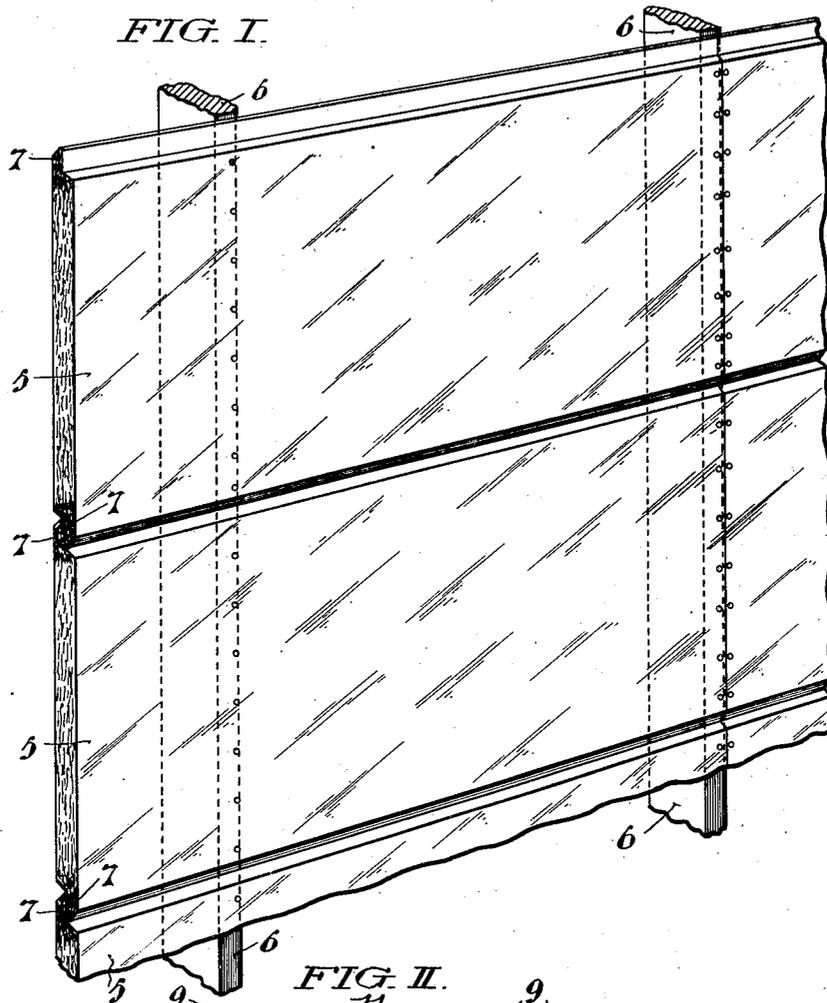


FIG. II.

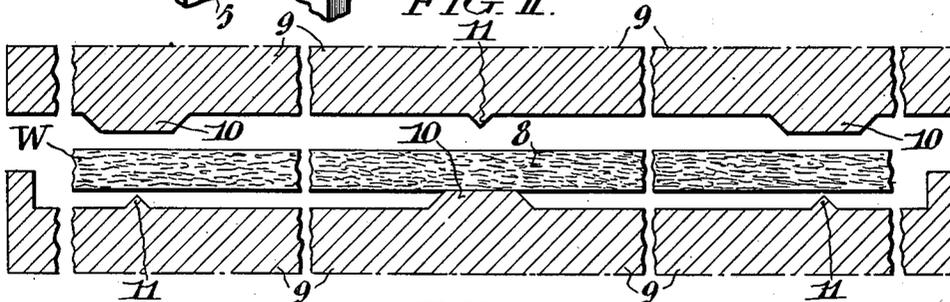
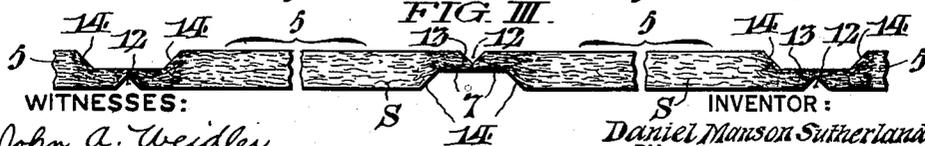


FIG. III.



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FIG. IV.

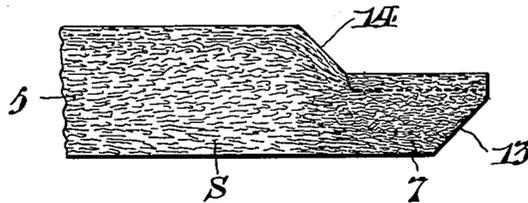


FIG. V.

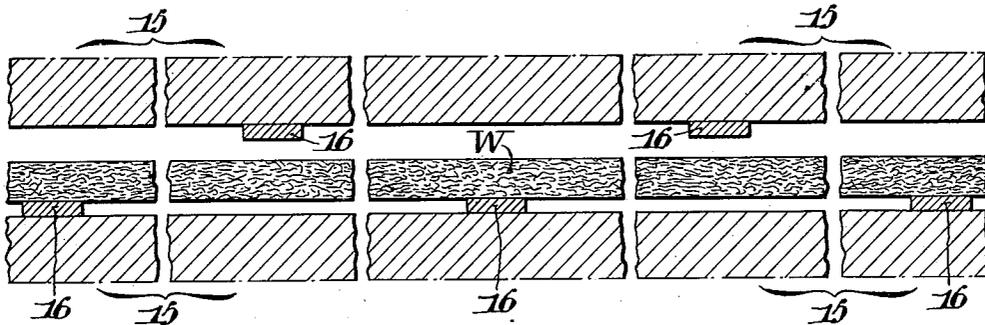
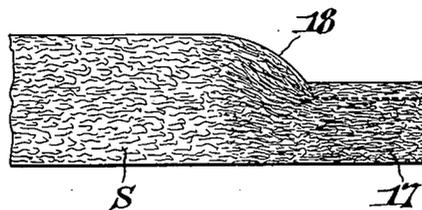


FIG. VI.



WITNESSES

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FIBRE BOARD AND ITS MANUFACTURE

Application filed August 6, 1928. Serial No. 297,588.

My invention relates to fibre boards and the like, such as are used for sheathing buildings, for nailing to studding to serve as a base for plaster; for thermo-insulating railroad refrigerator cars, domestic refrigerators, etc., and for various other purposes. The invention is concerned with locally strengthening such boards or planks, and particularly with their edge structure and conformation. The invention affords a strong, tough zone of the board, adapted to take nails much better than the main body of the board,—as well as simplicity and economy in manufacture. I have here illustrated and explained the invention as embodied in boards with ship-lap edges.

In the drawings, Fig. I is a perspective view of several courses of boards embodying my invention nailed to studding in the usual manner.

Fig. II is a sectional view of a pair of drying plates or dies for the manufacture of boards (such as shown in Fig. I) from a fibre sheet, which is also shown in section between the dies.

Fig. III shows the sheet after pressing in the dies of Fig. II, but before division into separate boards.

Fig. IV is a fragmentary cross-section through one of the boards at and adjacent its edge, illustrating its fibre structure.

Fig. V is a view similar to Fig. II, illustrating a difference in the dies.

Fig. VI is a view similar to Fig. IV, showing a board edge produced by the dies of Fig. V.

Fig. I shows a number of fibre boards nailed flat against vertical studding in a series of horizontal courses, one above another,—the ends of the boards in several of the courses being shown butted over the right-hand stud. The horizontal edges of the boards are reduced to half thickness at 7, and overlapped, so as to form what is commonly known as a "ship-lap joint."

Hitherto, the "ship lap" conformation of the board edges 7 has been produced by machining away half the thickness of the fibrous material along the margins of the boards, just as in the case of ordinary "ship-lap"

wood planking. This not only weakens the margin of the board to the full extent of the material removed, but even tends to leave the residue of material at 7 weakened by the tearing and pulling away of fibres that are interlaced with the residual material.

I have discovered a way of locally strengthening fibre board and the like, so as to make the strengthened portion as strong as the rest of the board, or stronger, even though reduced in thickness like a ship-lap edge 7, by compressing (or "super-compressing") the portion that is to be strengthened to a greater density than the rest of the board. This is useful not only in producing a "ship-lap" or other reduced type of edge 7, but also to strengthen and toughen a fibre board where nails are to be driven, or wherever special strength is desired. The effect is due partly to the greater amount of material in a given thickness, and partly, it would seem, to the more intimate and thorough interconnection of the fibres.

My invention may be carried out as an incident to the manufacture of the fibre board, without any additional complication or expense.

In the manufacture of fibre board, a large, thick sheet of wet fibre pulp is pressed between heated metal plates to a substantially less thickness, thus partly squeezing out the water and partly drying it out, and also compacting and compressing the fibres together. The dried and compressed sheet is sawed into strips or boards of the desired width by a gang saw, and their edges machined to ship lap form as already mentioned.

For the purposes of my invention, I preferably provide means to "supercompress" the fibre sheet locally, along suitable narrow zones, to a less thickness and a greater density than elsewhere. By severing the resultant compressed sheet through the midst of each of these parallel zones, it is divided into a number of boards with reduced but strengthened margins. By having the reduction at opposite sides of the sheet for alternate zones and making them (or afterward machining them) only about half as thick as the main body of the compressed sheet, boards

are produced with reversely reduced edges 7 that will match up as shown in Fig. I.

Fig. II shows an ordinary initial sheet W of wet fibre pulp 8 between drier plates or dies 9 suitable for my purpose. As here shown, each die plate 9 has a series of broad bevel-edged ridges 10, so located that those on one plate fall midway between those on the other plate. To facilitate division of the pressed sheet S into boards 5, each plate 9 has a V-shaped ridge 11 opposite the middle of each ridge 10 on the other plate, so as to groove the resultant compressed sheet S nearly through at 12 (Fig. III). Thus the final boards can be very easily separated by sawing along the grooves 12, or even broken apart. The bevelled edges 13 left on the boards 5 coact with the bevels 14 at the roots of the marginal zones 7 to form V shaped grooves when the boards are assembled as in Fig. I, and when plaster is applied to the boards, these grooves make the application easier, and also tend to improve the adhesion. Moreover, the extra compression of the material by the die ridges 11 in forming the grooves 12 densifies and strengthens the outer edges 13.

Fig. IV indicates, roughly and diagrammatically, the varying density of the fibre near and in the reduced portion 7. It will be observed that the variation of density and strength between the body of the board and the reduced portion 7 is not abrupt, but graded, so that there is no abrupt change in either strength or cross-section.

I have found that sometimes it is not desirable to compress the zone 7 as much as to half the thickness of the rest of the compressed sheet S, because if this is done either the rest of the sheet S will be insufficiently compressed, or an inordinately high pressure would be required. Accordingly, I generally prefer to compress the zone 7 to a less thickness,—say to $\frac{1}{8}$ in. for a $\frac{1}{2}$ in. sheet,—and to remove the excess by machining, as indicated by dotted lines in Fig. IV. The machining away of this small thickness of material will not seriously affect the strength of the highly compressed residue.

In some cases, where ordinary plain drier plates 15 such as shown in Fig. V are to be used, I may employ rectangular strips of metal 16 detachably secured to the plates 15 in lieu of the integral trapezoidal ridges 10 of Fig. II,—omitting the V ridges 11 of Fig. II altogether. These strips 16 may be half the intended thickness of the boards or less, as already explained. This will give a reduced zone 17 such as shown in Fig. VI, with a rounding or bead 18 instead of the flat bevel 14 of Fig. IV. Here, again, the transition between the density and strength of the rest of the board and that of the reduced zone 7 is graded and not abrupt, as in Fig. IV,

although the gradation is naturally somewhat different.

Having thus described my invention, I claim:

1. A pressed fibre board or plank having along its edge a margin compressed to a greater density than the body of the board.

2. A pressed fibre board or plank having along its edge a margin supercompressed to a greater density and less thickness than the body of the board.

3. A pressed fibre board or plank having along its edge a margin compressed to a greater density than the body of the board, and united to the body of the board by a zone of varying density.

4. A pressed fibre board or plank having along its edge a margin supercompressed to a greater density and less thickness than the body of the board, and united to the body of the board by a zone of varying thickness and density.

5. A pressed fibre board having a shiplap edge formed by supercompression of the margin of the initial fibre sheet to approximately half the thickness of the body of the board, and correspondingly greater density, and united to the body of the board by a tapered zone of varying density.

6. The method of producing pressed fibre board with shiplap edges which comprises supercompressing a fibre sheet to approximately half the general thickness along zones spaced in correspondence with the board widths, and severing the sheet into boards through these zones.

7. The method according to claim 4 wherein the supercompressed zones are left somewhat more than half as thick as the boards, and the excess is afterward machined away.

8. The method according to claim 4 wherein grooves are pressed in the midst of the thinned zones, so as to weaken the sheet for easy severance into boards.

In testimony whereof, I have hereunto signed my name at Trenton, New Jersey, this 2nd day of August, 1928.

DANIEL MANSON SUTHERLAND, Jr.