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D. M. SUTHERLAND, JR
PULP PRODUCT AND ITS MANUFACTURE

1,884,366

Filed March 29, 1929

Fig. I.

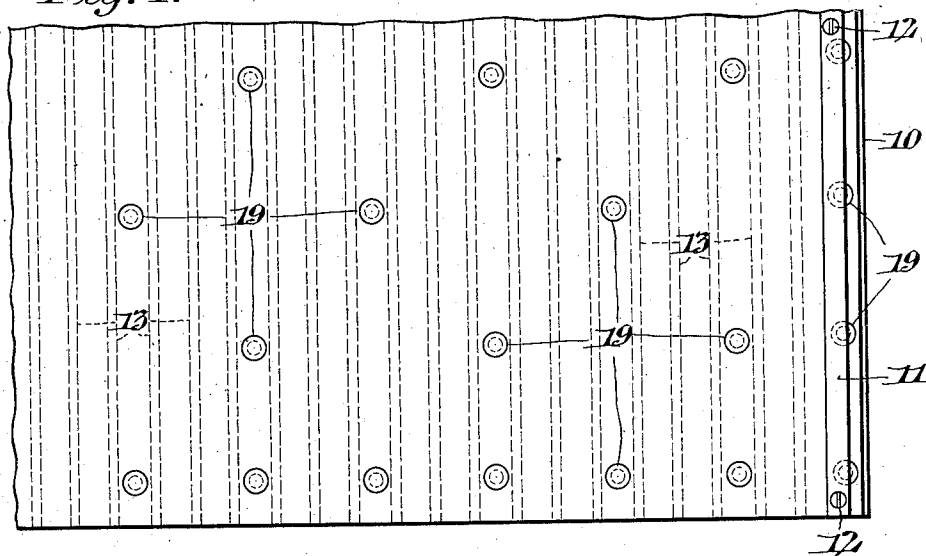


Fig. II.

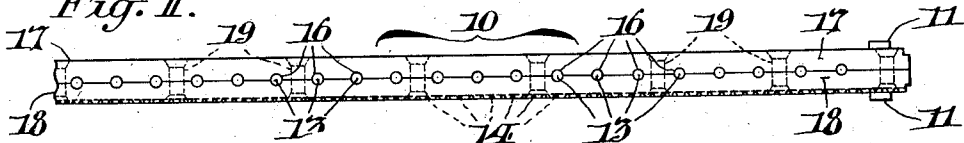


Fig. III.

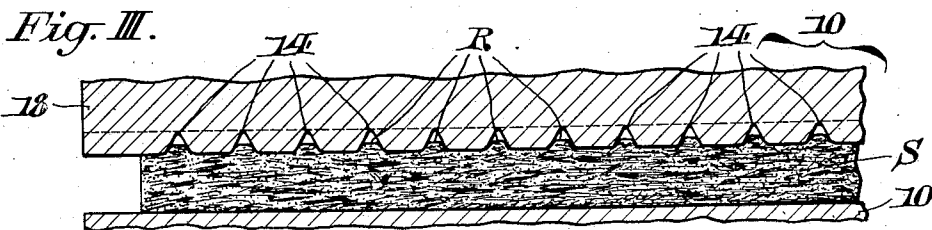


Fig. IV.

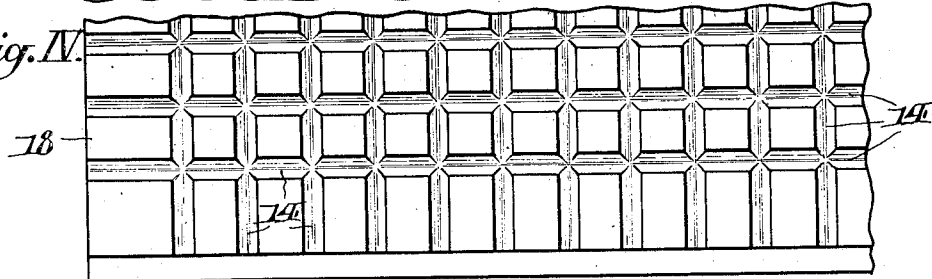
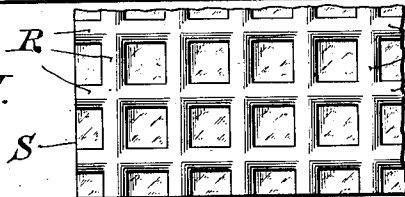


Fig. V.



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PULP PRODUCT AND ITS MANUFACTURE

Application filed March 29, 1929. Serial No. 350,872.

My invention relates to pulp products such as boards, sheets, slabs, and the like, and to the technique and apparatus for their manufacture. It is particularly applicable to "insulative" board, etc., of relatively coarse woody fibre, as well as to fine fibre board and the like. As regards the board itself, my invention is concerned with the provision of a surface "roughened" with projections adapted to hold plaster or the like, when the board is used as wall-board. As regards the manufacture of the board, my invention is concerned with the production of the roughened surface, and with providing for the escape of the vapor that is formed when the pulp is hot-pressed. As regards the apparatus employed, the invention is also concerned with the arrangements and construction thereof for heating.

In the manufacture of pulp board, aqueous pulp of suitably divided wood or other fibre is brought into sheet form in an apparatus known as a "wet machine", and is afterward pressed and dried between heated surfaces, to consolidate it and free it of moisture, in an apparatus known as a "drier". Sometimes, the sheet of wet, loose pulp as first formed is given a preliminary cold pressing, so as to squeeze out as much water as possible before it goes to the drier, and thus reduce the amount to be vaporized.

One form of drier heretofore used is illustrated in my Patent No. 1,506,789. I have also used a type of drier comprising a stack of heated plates between each pair of which a sheet may be pressed; and I have hereinafter explained the invention as embodied in plates adaptable to this type of apparatus.

In the drawing, Fig. I is a top view of a portion of a plate element or member used in hot-pressing the pulp.

Fig. II is a corresponding edge view, from the front of Fig. I.

Fig. III is a fragmentary sectional view of a pair of plate elements with a pulp sheet pressed between them, on a larger scale than Figs. I and II.

Fig. IV is a bottom view of the upper plate shown in Figs. II and III.

Fig. V is a fragmentary side view of a pulp sheet.

Figs. I and II show a drier plate 10 adapted to cooperate with similar plates in a stack, as described above. Adjacent one edge, it has spacing strips 11, 11 on its upper and lower sides, secured by screws 12 at suitable intervals. The spacers 11, 11 serve (in conjunction, usually, with similar spacers on adjacent drier plates) to determine the thickness of the pulp boards that the plate 10 participates in forming. As indicated in Figs. I and II, the plate 10 is provided with a multiplicity of heating elements 13 (to be described hereinafter) that heat it to a suitable temperature for drying the pulp sheets. As shown rather diagrammatically in Fig. II, the plate 10 has a multiplicity of channels 14 formed therein for the escape of the vapor generated by the heat.

As shown in Figs. III and IV, the vent channels 14 of the plate 10 have the character of grooves in its lower active surface. These grooves 14 are of V-section, with a slight rounding or bead at the bottom, and with their sloping sides preferably at an acute angle,—say 60° or less. In practice, they may be about $\frac{3}{8}$ in. wide or a little less, somewhat more than $\frac{1}{8}$ in. deep, and spaced about $\frac{1}{2}$ in. on centers. As shown in Fig. IV, there are two intersecting sets of grooves, 14, extending parallel with the edges of the plate 10 and substantially at right angles to one another. The cooperating upper surface of the subjacent plate 10 need not necessarily be grooved, but may, on the contrary, be plain, as here shown. The ends of the channels extend unimpeded under the spacing strips 11 which form the edges of the mold cavity between the plates 10, 10.

When a fibre sheet S is placed between adjacent heated plates 10, 10 and the latter are pressed together to the limit permitted by their spacing means 11, the sheet S is compressed and its material partially fills the grooves 14, as indicated in Fig. III. However, as the embossed ridges of material S only partially fill the grooves 14,—say to about half the depth of the grooves,—the channels formed by the angles of these

grooves 14 always remain open, so as to collect the vaporized moisture from the sheet S and permit it to escape. If the mold formed by the plates 10, 10 were not thus vented, the vapor would remain occluded under pressure in the sheet and disrupt it when the mold was subsequently opened.

The net-work of embossed ridges R left on the sheet, S as shown in Fig. V, serves as a roughening to facilitate the application of plaster, as well as to hold the plaster: i. e., the ridges R help to scrape the plaster off the plasterer's tool as the tool is moved over the board.

The drier plate 10 may be electrically heated, by means of heating units such as coils 13 in parallel chambers or bores 16 in the thickness of the plate (Figs. I and II). As here shown, the plate 10 is divided at its middle plane into similar halves 17, 18 provided with reciprocally corresponding half-round grooves that cooperate (when the halves are put together) to form the bores 16 for the heating units 13. The halves 17, 18 may be secured together by a number of fasteners such as bolts or rivets 19 located between the units 13, and suitably spaced apart.

Having thus described my invention, I claim:

1. A drier for pulp sheets comprising opposed members between which the pulp sheets are hot-pressed, one of said members having a multiplicity of V-grooves in its active surface, affording vent channels therein in their angles for the escape of vapor beyond the depth to which the grooves are filled by the pulp.

2. A drier for pulp sheets comprising opposed members between which the pulp sheets are hot-pressed, one of said members having in its active surface two sets of intersecting V-grooves extending substantially at right angles, and affording vent channels therein for the escape of vapor beyond the depth to which the grooves are filled by the pulp.

3. A drier member for pulp sheets comprising a pair of superposed plates provided with grooves in their juxtaposed faces and secured together with their grooves in registry, and electrical heating coils in the bores formed by the grooves.

4. A drier member for pulp sheets comprising a pair of superposed plates with registering grooves in their juxtaposed faces, electrical heating coils in the bores formed by the grooves, and rivets through the plates between their said bores securing the plates together.

5. A drier member for cooperating with a similar member in hot-pressing a pulp sheet, comprising a plate having electrical heating elements in separate bores provided in its thickness, and having in its outer face a multiplicity of intersecting grooves affording vents for the escape of vapor and adapted to

form a network of intersecting embossed ridges on the pulp sheet.

In testimony whereof, I have hereunto signed my name at Trenton, New Jersey, this 21st day of March, 1929.

DANIEL MANSON SUTHERLAND, Jr.

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