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H. C. HARVEY ET AL

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METHOD OF MAKING RESIN COATED PULPBOARD

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Fig. 1.

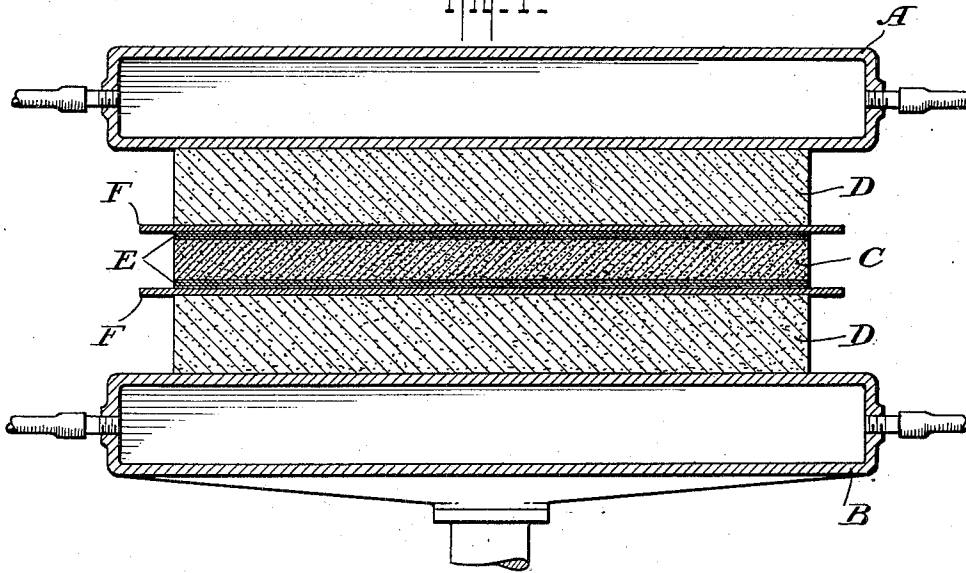
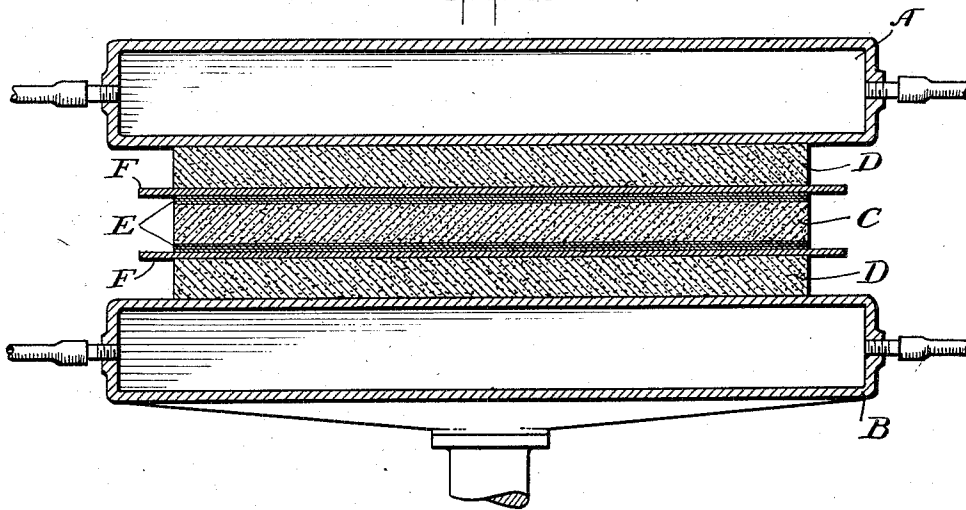


Fig. 2.



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METHOD OF MAKING RESIN COATED PULPBOARD

Application filed August 4, 1928. Serial No. 297,533.

Our invention relates to pulp board containing a fluxing binder coated with artificial resin, and to a method of making the same.

Pulp board is usually made by running paper pulp, wood pulp, asbestos or the like into a mold and, by means of pressure, removing the majority of water (see, for instance, patent to D. M. Sutherland, Jr., No. 1,272,566 dated July 16, 1918) and subsequently drying out the remainder of the water by the application of heat, preferably in a suitably constructed dryer. There is usually added to the pulp, prior to shaping it in the mold, a suitable binder, either a fluxing binder or a non-fluxing binder.

Our invention relates to pulp board having added thereto a fluxing binder, for instance, the substance known in commerce as red acaroid gum which, we understand, is obtained from several species of the Xanthorrhoea tree, the use of which is described and claimed in our United States Patent No. 1,651,388 dated December 6, 1927. In place of this material there may be used gilsonite, rosin, gum resins, mineral pitch or asphalt, although we prefer the red acaroid gum because it produces a board absorbing only a very small proportion of moisture and therefore suffering very little expansion and contraction because of atmospheric changes. When such a fluxing binder is used, the board, after having been dried, is in what might be termed a spongy condition and we therefore apply to this unfinished board the term "sponge board". This board is subjected to heat and pressure to form a compacted board.

When pulp board containing a fluxing binder has been produced in the manner herein above described, namely, by first having the majority of the water removed by means of pressure from the material as it comes from the mold, and the remainder then removed by the application of heat to form sponge board, and such sponge board has been

compacted by heat and pressure, it is a commercial article (except possibly for subsequent shaping operations such as coating or bending) which has been on the market for some time. It is a firm compact board which will not yield to any substantial degree when subjected to transverse compression forces.

Upon a compacted board of this type, which we shall call a base board, we place one or more sheets of paper, preferably at least three, or other suitable fibrous material, impregnated with a phenolic or other artificial resin of the class which is transformed under pressure and high heat to a hard, insoluble and infusible condition, for instance, paper impregnated with a varnish or other solution of phenolic resin. In the preferred form of our invention, we place also a number of such sheets similarly impregnated, below the board so as to coat both sides thereof. This aggregate of sheets and board we place between the hollow platens of a press of the well known type (see, for instance, patent to Sutherland, No. 1,506,509 dated August 26, 1924). If only one side of the board has been provided with the impregnated sheets of paper, we place between such side and the corresponding platen a piece of sponge board, preferably one impregnated with a fluxing binder, for instance, a board of the same size and material as the compacted board which is to be coated, and preferably of the same thickness as was the latter while in spongy condition. If both sides of the compacted board are to be covered with impregnated sheets of paper we place a suitable piece of sponge board between each side of said board and its corresponding platen. Between the sponge board and the resin layer we place a material which will not permanently adhere to the fluid resin, for instance, a plate of sheet steel or sheet copper having applied thereto a suitable repellant substance, for instance, stearic acid. Steam or other heating medium is then admitted to the platen chambers and

the entire aggregate of boards and sheets is subjected to sufficient heat and pressure to bring the resin into its final insoluble and infusible condition and to compact the piece or pieces of sponge board. Before releasing the pressure we permit the aggregate to cool, for instance, by flooding the platens with cold water so that any moisture which may be present in the board will not be able to form steam as the pressure is released and thus do damage to the board or resin coating. As the result of the application of heat and pressure, the resin has not only been converted into its final condition but caused to adhere firmly to the board.

The outermost layer of paper may, prior to the application of the resin be provided with a suitable design, for instance, a reproduction of a colored fabric, and this will be visible through the outermost resin layer and add to the artistic effect of the finished article. Although in accordance with our invention only one side of the board need be coated in the manner described, we prefer to coat both sides thereof so as to prevent any warping of the board which might be caused by the entrance of moisture or by stresses set up in the resin layer, on one side of the board, which would have no counterbalancing stresses on the other side of the board.

The sponge board is sufficiently elastic to act as a cushion to compensate for any unevenness in the surface of the platen or platens, as the case may be, or of the base board. Any unevenness in any such surface, for instance, of even $1/5000$ inch, would cause an unevenness of finish and thus render the resulting product unsalable for any use in which the beauty of such product is important. It is a further very great practical advantage of our invention that the sponge board, after having performed its function as a cushion, becomes the compacted board ready in its turn to be coated with resin in the manner described with the aid of another piece of sponge board. The heat and pressure necessary to complete the hardening of the resin are usually sufficient to fuse the binder in the sponge board, and to compact such board; but in any event, enough heat and pressure are used to effect both such results. It is obvious that the sponge board must possess sufficient elasticity while the resin hardens to accomplish the object described. Of course, the sponge board will lose its elasticity as it reaches its compacted condition, but by that time its function as an elastic cushion will have been performed. A further advantage of using as a cushion a sponge board provided with a fluxing binder is that such binder is a very good conductor of heat, and thus readily conducts heat, during the pressure stage, from the platen to the resin, and, during the cooling stage, from the coated board to the platen.

In the accompanying drawings illustrating our invention, and in which Fig. 1 shows the sponge board, base board, and sheets of paper before compression, and Fig. 2 the same after compression, A, B show the two platens of a press, each provided with a steam chamber, C represents a sheet of compacted pulp board made with a fusible binder, D—D represent pieces of sponge board, E—E each represents a number of sheets of paper coated with resin, and F—F represent steel plates which prevent adhesion between the sponge board and its adjacent resin layers. If a resin coating possessing a high gloss is desired, the steel plates are given a high polish on the side which comes into contact with the resin. If a resin covering with a mat or lustreless surface is desired, the steel plates are given a corresponding finish.

In order further to insure the sponge board, when the binder has been fluxed by the heat, against sticking to the steel plate, in order to prevent the refluxed binder of the compacted board from oozing into the resin and discoloring it, and in order to secure the strongest possible adhesion between the board and the resin coating, it is advantageous to impregnate the surface or surfaces, adjacent to the steel plate or plates, before using the sponge board as a cushion, with a liquid artificial resin, for instance, by dipping the sponge board into a varnish made of such resin. The sponge board, after compaction, will then be coated with a layer of finished (insoluble and infusible) resin extending into, and interlocking with, the fibres at and near the surface of the compacted board. This layer will prevent any tendency of the binder to stick to the steel sheet, and flow into the resin surrounding the sheets of paper.

Instead of paper, we may use any other suitable material in sheet form, such as cloth or felt, capable of absorbing fluid artificial resin. For instance, the outermost sheet may be constituted of a piece of cloth woven or printed in colored design. We may also have the same design appear on all the sheets so that if the outermost layer is worn through, or otherwise damaged, the appearance of the next layer may be in harmony with the remainder of the outermost layer.

We claim:

The process which consists in superimposing, in order, on one face of a base board of compressed fibres intermingled with a fluxing binder, one or more sheets of fibrous material embedded in fluid artificial resin, a sheet of protective material which will not permanently adhere to the fluid resin, and a piece of sponge board consisting of relatively uncompressed fibres intermingled with a fluxing binder and being sufficiently elastic to act as a cushion to compensate for any unevenness in the surface of the base board or of the platen or platens with which such sheets

of fibrous material are to come in contact;
thereafter subjecting the entire aggregate of
boards and sheets to heat and pressure suffi-
cient to render the resin infusible and in-
soluble and to compact the sponge board
6 thus rendering such sponge board suit-
able for use as a base board, and then
coating said board with resin in the
manner aforesaid, thereby again producing
10 a compacted sponge board suitable for treat-
ment as a base board in the manner aforesaid.

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