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METHOD OF MAKING BOARDS

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This invention relates to the manufacture of boards from fibrous material such as wood, and more particularly from waste wood.

Insulating panels or board for use as a plaster base are now made by reducing wood to a pulp and then reassembling the fibers to form sheets which are pressed and dried. The pulp is formed in any suitable way, either chemically or mechanically, and then mixed with water and deposited on a screen by the usual wet machine, or the mixture of pulp and water may be flowed on to a screen by a flow box such as is described and claimed in my copending application Serial No. 159,834, filed January 8, 1927 (now Patent No. 1,712,852, granted May 14, 1929). In either case the thickness of the layer of pulp is limited by certain practical constructions as it is impossible to form a layer of pulp beyond a certain thickness on a screen and the layer so formed must then be pressed to reduce the moisture content of the sheet and to cause the fibers to properly adhere to each other. When sheets beyond the permissible thickness that can now be obtained are desired it is thus necessary to use a laminated structure and unite several of the sheets to each other by a layer of asphalt or other adhesive.

In the present invention I produce sheets of greater thickness than can now be obtained by known processes in which the entire sheet is of a homogeneous structure and in which the use of adhesives for uniting separate laminations or preformed sheets is eliminated. I thus obtain a much stronger structure than could otherwise be obtained. My process consists of taking the preformed damp sheets from any of the now employed processes and uniting these sheets to each other by a pressing operation in which the board is also reduced to its final moisture content. Thus, half inch boards now made by the wet machine process are formed by depositing a layer of very thin mixture of pulp and water on a screen by means of a suction cylinder and the layer of pulp on the screen is then passed between squeeze rolls to remove a portion of the moisture. The water content of the damp sheets so formed is reduced to approximately 50 percent and in the ordinary manufacture of half inch insulating panels, these sheets are then dried to their final moisture content. Or the sheet may be formed by feeding a layer of pulp on to a screen by means of a flow box and then pressing it to remove a portion of its moisture content. In my process, the preformed, damp sheets, after they leave the squeeze rolls or the press and while they contain about 50 to 60 percent of moisture, are superimposed on each other and submitted to a pressing and drying operation. Additional moisture, about 5 percent, may be sprinkled on the surfaces of the sheets and these surfaces may also be roughened. After the superimposed sheets are submitted to a drying operation, a substantially homogeneous product is obtained in which the separate layers or boards cannot be separated from each other.

In a specific embodiment of the invention the damp sheets containing from 50 to 60 percent of moisture are superimposed, preferably with three sheets arranged on top of each other and the contacting surfaces of these sheets are preferably roughened to cause them to more readily unite to each other. The roughened surfaces of the sheets may also be moistened with a small quantity of water, preferably about 5 percent by volume of the sheet. These superimposed sheets are then placed in a press and submitted to a pressure sufficient to cause them to unite with each other. This pressure will vary according to the density of the finished product. In practicing the process, I have employed a pressure of 150 pounds per square inch when three superimposed sheets, each of a thickness of $\frac{2}{16}$", are pressed to provide a final product of a thickness of $\frac{3}{8}$". The invention, however, is particularly adapted for obtaining thicker and stronger sheets than can be obtained by present processes in which the density of the product is not increased as in the example quoted above and in such instances a much lower pressure is employed. During the pressing operation the platens of the press are heated to a temperature of about 350° F. The sheets are left in the press until the moisture content is reduced to about 5 percent and the product obtained is a board, of varying thickness and density, depending upon the pressure employed in which the original sheets or layers are united to each other to form a homogeneous product.

The pressing operation may be employed in a press having hollow platens to permit the introduction of steam into the platens to obtain the desired heating during the pressing operation. The faces of the press platens contacting with the surfaces of the sheet are preferably formed of Fourdrinier wire to permit escape of moisture in the form of steam.

As stated above, the pulp or stock may be formed in any of the known methods either by mechanical treatment of the wood used, such as grinding, or by chemical treatment to produce a chemical pulp. If the pulp is produced by grinding, waste wood such as slabs, edgings, trim-

mings, sawdust, chippings and bark may be used as the starting material. The pulp is reduced to the proper consistency by the addition of moisture and arranged on the screen in any known manner as by the use of a wet machine or by the use of the flow box of my copending application referred to above. The original moisture content may also be reduced to the desired point in any suitable way, as set forth above and the novelty of the present invention is believed to reside in causing a plurality of separately formed sheets of pulp to unite to each other in a homogeneous structure possessing much greater strength than can be obtained in a laminated structure in which the separate sheets, after completion, are united to each other by an adhesive. As stated, the invention is particularly applicable to the production of thicker sheets than have heretofore been possible by known processes.

I claim:

1. The method of making fiber boards which comprises forming a pulp, shaping the pulp into sheets containing from 50 to 60 percent moisture, superimposing a plurality of such sheets on each other, and simultaneously pressing and heating the superimposed sheets to remove a portion of the moisture and unite them to each other and to dry the homogeneous sheet so formed to its final moisture content.

2. The method of making fiber boards which comprises reducing cellulose containing material to a pulp, adding water thereto, shaping said pulp into sheets containing from 50 to 60 percent moisture, superimposing a plurality of such sheets on each other, and simultaneously pressing and heating the superimposed sheets to unite them to each other and to dry the homogeneous sheet so produced to its final moisture content.

3. The method of making fiber boards which comprises forming a pulp, shaping it into sheets containing from 50 to 60 percent moisture, moistening and roughening the surfaces of such sheets, superimposing a plurality of said sheets on each other, and simultaneously heating and pressing the superimposed sheets to unite them to each other and to dry the homogeneous sheet so produced to its final moisture content.

4. The method of making fiber boards which comprises forming a pulp, shaping it into sheets containing from 50 to 60 percent of moisture, superimposing a plurality of said sheets on each other, and simultaneously pressing and heating said superimposed sheets at a pressure of substantially 150 pounds and a temperature of substantially 350° F. to unite them to each other and to dry the homogeneous sheet so produced to its final moisture content.

5. The method of making fiber boards which comprises forming a pulp, shaping the pulp into sheets containing from 50 to 60 percent moisture, moistening and roughening the surfaces of such sheets, superimposing a plurality of said sheets on each other, and simultaneously heating and pressing the superimposed sheets at a temperature of substantially 350° F. and a pressure of substantially 150 pounds to unite them to each other and to dry the homogeneous sheet so produced to its final moisture content.

6. The method of making fiber boards which comprises forming a pulp, shaping the pulp into damp sheets, superimposing a plurality of said damp sheets on each other, and simultaneously pressing and heating these superimposed sheets to remove a portion of the moisture and unite them to each other and to dry the homogeneous sheet so formed to its final moisture content.

7. The method of making fiber boards which comprises forming a wet pulp, removing water from and shaping said pulp into rigid sheets, superimposing a plurality of damp sheets on each other, and simultaneously pressing and heating the superimposed sheets to remove a further portion of the water of the wet pulp and unite the sheets to each other and dry the homogeneous sheet so formed.

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