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ROBERT A. MARR, OF NORFOLK, VIRGINIA.

MANUFACTURE OF FIBER BOARD.

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The present invention relates particularly to the manufacture of fiber board although it will be understood that the same is applicable also to the manufacture of other flat molded articles from pulp and similar materials.

In my co-opending application filed October 17, 1922, Serial No. 595,215 is described a process of making pulp which can be briefly described as follows: Cane material including cane and bamboo is digested under pressure in an aqueous solution containing preferably zinc sulfate, sodium sulfate and potassium sulfate, after which the cane material is removed from the digester, preferably washed and can then be converted into pulp by being run through a pulper and a Jordan or a pulper and a beater engine. The pulp produced in accordance with said process is particularly advantageous for use in the present invention, although it is to be understood that other kinds of pulp can be employed, either wood pulp of the ordinary kind, or recovered pulp from repulping used paper. In the present invention, a liquid flowable pulp constitutes the starting material, this containing, as is usual, a sufficient amount of aqueous liquid such as water, to be in a readily flowable condition.

In the first step of the process, according to the present invention, an amount of the pulp in question containing the desired weight of actual pulp is run into a box-shaped sieve. This sieve preferably has a bottom composed of fine wire screening for example, seventy (70) mesh, the box having vertical sides. On the top of the wire screening, before introducing the pulp may be placed a coarse fabric, if desired, although this is not necessary in all cases. The desired quantity of pulp being placed in the box, the same is then subjected to suction from below and during this operation the box may be given a shaking motion from side to side or lengthwise, if desired, in order to produce a better felting of the fibers.

The suction is continued until substantially all of the free water of the pulp is removed. A cloth is then placed on the top of the layer of pulp, and the sides of the box are then lifted off. Unless cloth has been used in the bottom of the box-sieve before running in the pulp, the bottom of the box-sieve containing the pulp, is then inverted upon suitable table or bench and a cloth is placed on top of the pulp. The entire package containing the pulp with the cloth above and below the same is then wrapped in a fine wire mesh screen, for example, 70 mesh screen, and the package containing the wet board is then placed in a perforated tray of which the bottom is rigid and perforated with numerous small holes. This may take the form of a perforated galvanized iron box, of a size adapted to fit the package containing the sheet of wet pulp. A board or rigid member is then placed upon the package containing the wet pulp and the same is then subjected to heavy pressure in order to squeeze out as much as possible of the water contained in the pulp board. This leaves a pulp board which is still damp but which is rigid enough and strong enough to be handled to some extent. This is then placed between foraminous rigid plates, which are then clamped together and the same then run into a drying oven where the damp pulp board is dried while being held between the foraminous rigid plates. If desired any suitable waterproofing agent, such as those commonly used in the art, may be applied to the pulp board before this drying operation, or the dried pulp board may be dipped into a solution of water-proofing agent, and again dried between the foraminous rigid plates.

A suitable covering such as paper may then be glued upon one or both sides of the pulp board in the usual manner. The pulp boards produced in accordance with this invention are more uniform and are materially stronger than pulp boards made according to any prior processes with which I am familiar.

It will be understood that a suitable binder either of a water soluble or water insoluble nature can be incorporated with the pulp at any suitable stage of the operation. If a binder of a water insoluble nature is used, this may be incorporated with the pulp in the pulper or Jordan or beater engine. If a water soluble binder such as glue is to be used, this can be added to the liquid pulp in the box sieve used in the first stage of the molding operation. Since such a method would ordinarily involve considerable waste of binder, it is more advisable to spray the pulp board during or just after the suction operation and before the pressing operation.

The binder may in some cases also serve as a waterproofing agent.

During the first filtration, in the box sieve, the wire gauze forming the bottom of the box sieve should be suitably supported, in order to prevent the same from bulging down materially in the center which would lead to the production of boards thicker at the center than at the edges.

I have above referred to the use of cane fiber as being the preferred material for making the fiber boards. It will be understood however, that this material can be used alone or mixed with other kinds of pulp, including ordinary wood pulp, and recovered pulp, from repulping used paper. A particular mixture which has been shown to be very advantageous and cheap is a mixture of repulped brown paper waste and the cane pulp above described.

It will be understood that the wrapping of the fabric and of wire gauze can be removed at any time after the pressing operation. Ordinarily, I remove the said wrappings directly after the pressing operation, and before placing the damp boards in the drying frames.

What I claim is:

1. A process of making fiber board which comprises running into box sieve, an amount of a liquid pulp containing a large amount of aqueous liquid and a small amount of pulped digested cane material, such amount of liquid pulp containing a predetermined weight of said cane material, removing in the liquid state the major part of the aqueous liquid in such pulp, by suction, encasing the residual semi-dried pulp material in a fabric, and also encasing the same in a fine wire mesh exterior casing, and supporting the package on a rigid perforated plate, and applying a uniform mechanical pressure on the top of said package to squeeze out more of the aqueous liquid, until a rigid wet pulp board is produced, placing such rigid wet board between non-flexible perforated members and clamping the same together, and drying the board while held between said members under sufficient pressure to prevent substantial warping, whereby a rigid flat board structure is produced.

2. In the manufacture of pulp articles, the steps of placing in a box sieve having vertical side walls, an amount of liquid fiber pulp containing a predetermined amount of actual dry pulp, removing the liquid material therefrom while leaving the whole of the solid pulp and drying the product while clamped to prevent warping.

3. In the making of pulp board, the steps of forming a wet pulp board and pressing the same while encased in fabric and in fine wire mesh screening, to eliminate a major part of the aqueous liquid therein, then drying the pressed boards while closely held between rigid perforated plates to prevent warping.

4. A process of making fiber board which comprises running into box sieve, an amount of liquid pulp containing a large proportion of aqueous liquid and a small proportion of pulped fibrous material, such amount of liquid pulp containing a predetermined weight of said fibrous material, draining and pulling out the major part of the aqueous liquid in such pulp, by suction, encasing the residual semi-dried pulp material in a permeable envelope, supporting the package on a rigid perforated plate, applying a uniform mechanical pressure upon said package to squeeze out more of the aqueous liquid, until a rigid damp pulp board is produced, placing such rigid damp board between non-flexible perforated members, capable of preventing warping of the board, and drying the board while held between said members to prevent substantial warping, whereby a rigid board structure is produced.

In testimony whereof I affix my signature.

ROBERT A. MARR.