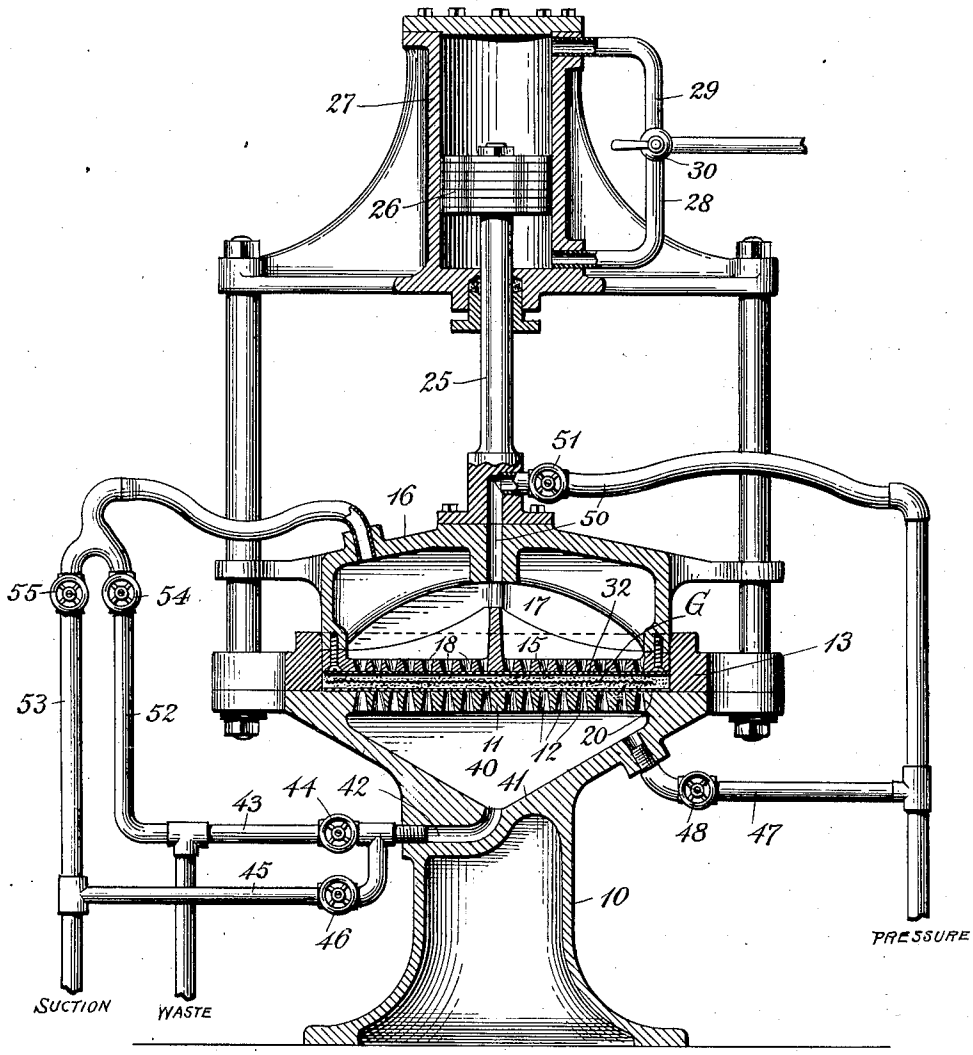
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MANUFACTURE OF FIBER BOARD.

APPLICATION FILED MAY 21, 1907.

906,043. Patented Dec. 8, 1908.



WITNESSES:

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MANUFACTURE OF FIBER-BOARD.

No. 906,043. Specification of Letters Patent. Patented Dec. 8, 1908.

Application filed May 21, 1907. Serial No. 374,939.

To all whom it may concern:

Be it known that I, THOMAS MALCOLM, a citizen of the United States, and resident of Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in the Manufacture of Fiber-Board, of which the following is a full, clear, and exact specification.

This invention relates to the art of manufacturing sheets of fibrous substances, and more especially to the manufacture of what is generally known as "leather board," and it has for one of its objects the improved method of producing such material from pulp, the several fibers of which are in substantially constant agitation during the compression of the mass to the required thickness.

My invention has, furthermore, for its object the provision of a special and particularly constructed machine for carrying my improved method into practical execution.

A further object of the invention resides in the improved method of manufacture of a sheet of fibrous material embodying a resilient reinforcing medium, which in the present instance consists of a sheet of wire netting, through the meshes of which the fibers of the pulp are caused to pass and intermingle during the process of compressing or forming the fiber-sheet, thus producing an article which possesses materially-increased tensile strength, can be very cheaply made, and has all the qualities of density of the best tanned and seasoned leather, while, on the other hand, the pulp or fiber-sheet can readily be molded into any desired shape or form.

In the accompanying drawing, I have illustrated, (in sectional view) a special machine for manufacturing fiber-sheets in accordance with my invention, it being of course, understood that changes in minor details may be readily made without affecting the generic elements thereof.

Referring to the drawing, the numeral 10 denotes the base or stand of the machine provided at its top with a plate 11, having apertures 12 and carrying on its upper face a molding box 13 which may be of any suitable shape and be secured to the plate 11 in any desired manner.

Disposed for movement and closely fitting in said box 13, is a plunger, preferably made in two parts and comprising the bottom plate 15 and top-casing 16 so as to leave a chamber 17 which is in communication with apertures 18 in the plate 15.

Disposed on top of the base-plate 11 is a screen 20 consisting preferably of a foraminated sheet plate, the apertures of which are comparatively fine so as to permit the water in the pulp to escape therefrom and yet retain the pulp fibers within the molding box 13.

The plunger casing 16 is attached to the lower end of a piston rod 25 having at its upper end a piston 26 movable in a cylinder 27, and operable therein by fluid pressure which may be either in the nature of air, steam, or liquid. In the present instance I deem it advantageous to employ compressed air which may be admitted at either end of the cylinder (to raise or lower the piston as required), by conduits 28, 29, respectively, connected with a pressure supply through the intervention of a three-way valve 30 of ordinary construction.

Secured to the underside of plunger-plate 15 is a foraminated plate 32 having a series of fine apertures registering with the somewhat larger openings 18 of the plate 15 above mentioned.

In using the machine for compressing the leather pulp which consists principally of scrap leather reduced to the required fineness, and water, the plunger is first raised out of the molding box 13, and a thin layer of pulp is then laid on top of the foraminated plate 20. On top of this pulp layer I place the reinforcing member, consisting of a sheet of fine wire netting or gauze, G, and then another layer of pulp is laid on top of said gauze-sheet. The plunger is then lowered into the molding box, and a current of air under high pressure is sent through the mass. This action will naturally result in driving the fibers of the upper pulp layer through the interstices in the gauze-sheet 32, and cause them to intermingle and knit together with those of the lower pulp layer, while at the same time the water in the pulp will be forced through the foraminated plate 20, the apertures 12 in the plate 11, and then into the chamber 40 of the base 10. This chamber 40 has a bottom plate 41 provided with a discharge-conduit 42 through which the waste water may be withdrawn from the chamber 40, the conduit 42 being connected

with a waste-pipe 43 which may be closed by a valve 44, and also with a pipe 45 leading to a suction pump (not shown) and adapted to be closed by a valve 46. The chamber 40 is also connected with the pressure supply above mentioned, by a pipe 47, having a valve 48.

Air under pressure may be introduced into the plunger casing 16 by a pipe 50 provided with a valve 51, and said casing is also connected with the waste-pipe, and with the suction pump, by pipes 52, 53, respectively, having valves 54, 55.

By virtue of the several valves above mentioned, I am enabled to meet almost any condition required to produce a board the fibers of which are thoroughly interwoven and knit together, and which has been completely relieved from moisture without the aid of heat, so that the liability of the finished board to warp, will be minimized.

Of course it is evident that under some conditions the application of heat, either to the molding box, or the plunger, or to the air current, may be advantageous, and for that reason I do not confine myself to the operation of the machine without the aid of heat.

As above stated the pulp-mass is maintained in agitation during the compressing process by air under pressure, in which case the air-valve 51 and waste-valve 44 are open. By now closing the waste-valve 44, and opening the suction-valve 46, I am enabled to increase the efficiency of the air blast through the pulp to any desired degree within the capacity of the machine.

By closing the air valve 51, suction valves 55, 45, and waste-valve 44, and then opening suction-valve 55 and lower air valve 46, the direction of the air current passing through the pulp-mass will be reversed, and the moisture will be ejected from the upper portion of the pulp without passing through the body thereof.

In a manner similar to that above stated, the efficiency of the upward air-current may be increased by closing the waste-valve 54, and opening the suction-valve 55.

It may be stated that the medium employed for actuating the plunger when compressing the pulp in the mold-box, may be in the nature of any high pressure fluid, and, inasmuch as the movement of the plunger should necessarily be comparatively slow, in order to permit the air-current to agitate the fibers of the pulp mass and at the same time exclude the moisture therefrom, it may be advantageous to operate said plunger under a hydraulic system so as to obtain the required plunger speed, and also the high pressure necessary to perform the work.

I claim:

1. The improved method of manufacturing fiber-board which consists in forming a pulp, and compressing the same under high pressure, and passing air through said pulp-mass in reverse directions, during the compressing operation.

2. In a machine for manufacturing fiber-board, the combination with a chambered base, a perforated plate covering said base, a plunger comprising an air chamber and a perforated force plate carried by said plunger, of a fluid pressure supply, suction means connected with both of said chambers, and means for controlling said pressure supply and suction means in reverse directions during the time the material is under pressure.

THOMAS MALCOLM.

Witnesses:
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