

No. 691,771.

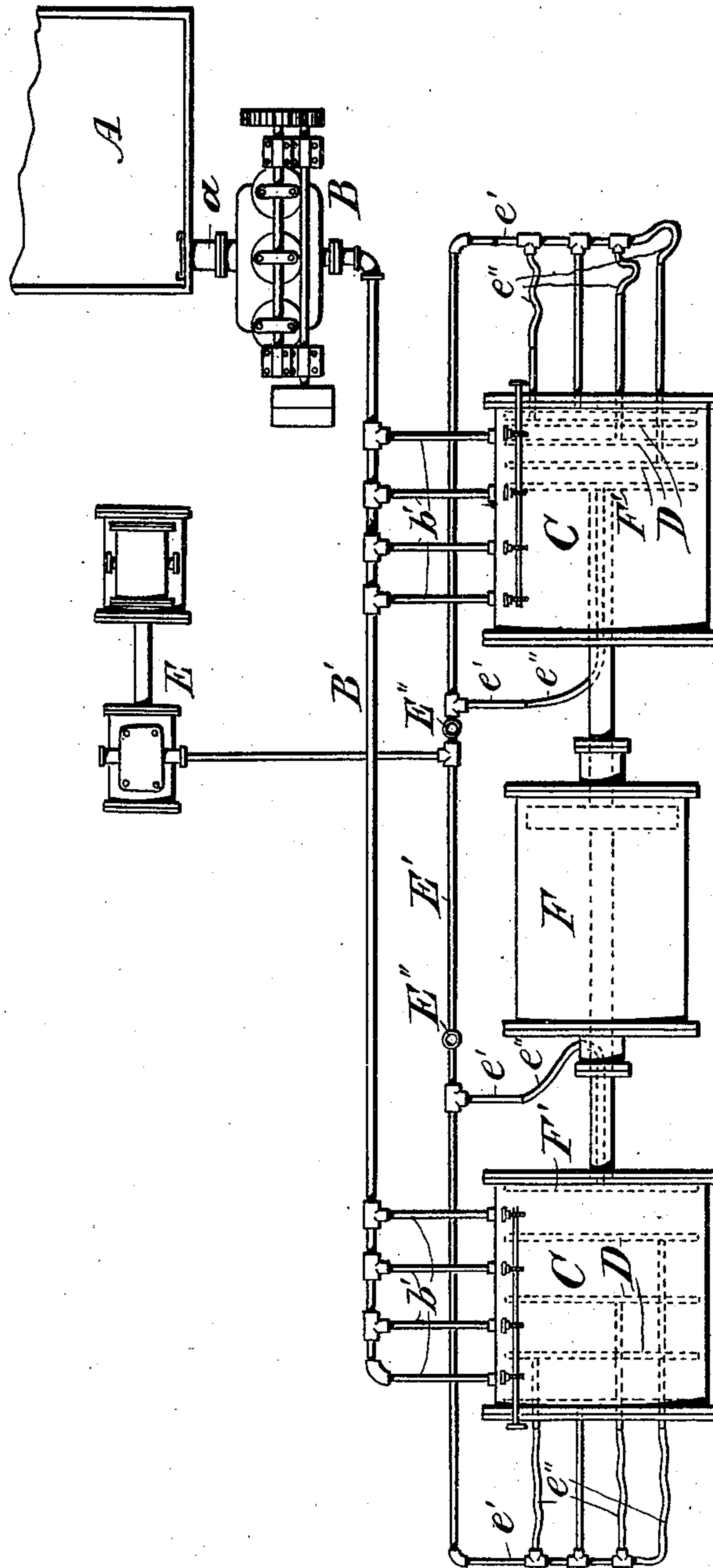
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J. S. HUGHES.

PROCESS OF FORMING WOOD PULP INTO SHEETS.

(Application filed July 3, 1901.)

(No Model.)



Witnesses:

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UNITED STATES PATENT OFFICE.

JOSEPH STUART HUGHES, OF CHESLEY'S CORNERS, CANADA.

PROCESS OF FORMING WOOD-PULP INTO SHEETS.

SPECIFICATION forming part of Letters Patent No. 691,771, dated January 28, 1902.

Application filed July 3, 1901. Serial No. 67,060. (No specimens.)

To all whom it may concern:

Be it known that I, JOSEPH STUART HUGHES, of Chesley's Corners, in the county of Lunenburg, in the Province of Nova Scotia, Canada, have invented certain new and useful Improvements in Methods or Processes of Forming Wood-Pulp into Sheets for Shipping; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming a part hereof.

My invention, which will be hereinafter fully set forth and claimed, relates to improved methods or processes for converting fluid wood-pulp into sheets or cakes of convenient shape and condition for storage and shipping.

The object of my invention is a method or process of treating fluid wood-pulp so as to convert it into sheets or cakes of convenient form for storing or shipping in a more rapid and expeditious manner than has been known hitherto and at a reduced cost of production and freight and with a minimum of waste of pulp.

The method or process in general use at present for putting wood-pulp in shape for storage or shipment is to run the pulp through a "wet machine"—the first part of the regular paper-making machine—allowing it to coil up on the top press-roll until a layer is formed of one-eighth of an inch to one-quarter of an inch thick, when it is cut off, folded, and made into bundles. This process is slow, involving much labor and considerable waste of pulp and other valuable matter escaping in the water. The material so produced is comparatively wet and not in a compact shape.

My improved process or method is shown diagrammatically in the accompanying drawing, representing a skeleton plan outline of a single-machine plant.

Briefly stated, my improved process consists in forcing the fluid pulp under pressure simultaneously into a series of spaces formed between hollow partitions with porous surfaces placed transversely in a press-chamber of rectangular cross-section, said cross-section coinciding with the edges of the sheet to be formed. Said partitions form strainers, dividing said chamber longitudinally into transverse spaces. These spaces are of such

a width that the wet pulp which they are able to hold contains sufficient dry pulp to form a sheet or cake of the desired thickness when the water has been expelled. Each chamber may contain any convenient number of such spaces, formed by a corresponding number of strainers. When these spaces have been filled with fluid pulp, the supply is stopped, preferably by slides flush with the inner surface of the chamber, and pressure is applied to the sliding end partition. The partitions or strainers are in communication with fixed and movable drainage-pipes through which the air and water entering the interior of the strainers may pass off. The removal of the air and water is assisted and their entrance into the strainer is induced and accelerated by exhausting the drainage-pipes by means of connection with a vacuum-tank or a suction-pump. I further accelerate the operations by employing double-ended presses—i. e., a machine having two press-chambers in line with a pressure-cylinder between them—so that the forward stroke of the piston presses one chamber, while the return stroke presses the other, and one chamber is being emptied and refilled while the other is being pressed.

To illustrate more in detail, the process may be described, with reference to the drawing, as follows: The fluid pulp is contained in a tank A, from which it is drawn by a force-pump B through a supply-pipe *a* and forced under considerable pressure into a line of pipe B'. This line is connected by branches *b'* to a series of spaces formed in a chamber C, divided longitudinally by sliding transverse partitions D, made hollow and with porous surfaces and forming and acting as strainers. Strainers also line the ends of the chamber, one of which is fixed and the other sliding, to act as or being attached to a plunger or piston. The strainers are connected with drainage-pipes to carry off air and water entering their interior from the pulp, and the drainage-pipes are connected with an exhaust—such as a suction-pump E, vacuum-tank, or the like—by a line of pipes E' and branches *e'*, the movable drainage-pipes having flexible connections *e''*. The central pressure-cylinder F of the press has a reciprocating piston, operated by steam, hydraulic, or

other pressure, to which the pistons or plungers F', bearing against the end partitions in the press-chambers, are coupled. The inlet-ports for the pulp in the press-chambers
 5 are provided with valves flush with the interior, and means are provided to operate the valves of each chamber simultaneously. Stop-cocks E'' are provided in the exhaust-pipes. The strainers, also known as "drain-
 10 age-plates" in other branches of industry, may be of any suitable construction, and any suitable number may be used in each press-chamber. The construction of the press may also vary and may be single-acting and op-
 15 erated by any desired medium. Pressure on the pulp and the exhaust of the drainage may be produced by power or direct-acting pumps connected to the pipe-lines direct or to closed tanks, and the lines will admit of different
 20 connections to the press-chamber and drainage-points, respectively.

The simultaneous filling of a number of spaces with pulp, the forcing in under pressure of the latter, and the application of an
 25 exhaust or vacuum to the interior of the partitions forming the spaces all greatly facilitate the formation of pulp sheets or cakes at a saving of cost, while the more compact form of the sheets, owing to the rectangular shape
 30 of the spaces in which they are formed, is of great advantage for shipment. The wastewater also carries off a far smaller percentage of pulp.

I claim as my invention—

35 1. A method or process of converting fluid wood-pulp into dry or semidry pulp for storage and shipment, consisting in forming the fluid pulp into dry or semidry cakes or sheets of convenient shape for storage or shipment
 40 by forcing the fluid pulp under pressure si-

multaneously into a series of confined spaces the edge dimensions of which coincide with the size of the sheet to be formed, forcing part of the water through the walls of the
 45 confining-spaces by the pressure on the fluid pulp during the filling of said spaces, extracting another part of the water by suction simultaneously with the filling, stopping the admission of fluid pulp when the spaces are
 50 filled and extracting the remaining extractable water by pressure on the side walls of the confining-spaces while continuing the draining by suction, substantially as set forth.

2. A method or process of forming fluid
 55 wood-pulp into dry or semidry cakes or sheets of convenient shape for storage or shipment, by forcing the fluid pulp under pressure simultaneously into a series of confined spaces the edge dimensions of which coincide with
 60 the size of the sheet to be formed and which series forms one of a pair used alternately, forcing part of the water through the walls of the confining-spaces by the pressure on the fluid pulp during the filling of said spaces,
 65 extracting another part of the water by suction simultaneously with the filling, stopping the admission of fluid pulp when the spaces are filled and extracting the remaining extractable water by pressure on the side walls
 70 of the confining-spaces while continuing the draining by suction, and releasing and emptying one set of spaces while the other is under final pressure, substantially as set forth.

In testimony whereof I hereby affix my signature in the presence of two witnesses.

JOSEPH STUART HUGHES.

Witnesses:

F. W. CLARK,
 A. L. WILE.