J. S. HUGHES.

PROCESS OF FORMING WOOD PULP INTO SHEETS.

(Application filed July 8, 1901.)

(No Model.)

Joseph S. Hughes
Inventor.

By A. & B. Harvey
his Attorney.
To all whom it may concern:

Be it known that I, JOSEPH STUART HUGHES, of Chesley's Corners, in the county of Len-
5 burg, in the Province of Nova Scotia, Canada, have invented certain new and useful Im-
provements 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
15 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
20 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.

25 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 regu-
lar paper-making machine—allowing it to coil
30 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, in-
volving much labor and considerable waste of pulp and other valuable matter escaping
35 in the water. The material so produced is comparatively wet and not in a compact
shape.

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

Briefly stated, my improved process con-
45 sists in forcing the fluid pulp under pressure
simultaneously into a series of spaces formed
between hollow partitions with porous sur-
faces placed transversely in a press-chamber of
rectangular cross-section, said cross-section coinciding with the edges of the sheet to
50 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
55 spaces, formed by a corresponding number of
strainers. When these spaces have been
filled with fluid pulp, the supply is stopped,
60 preferably by slides flush with the inner
surface of the chamber, and pressure is ap-
plicated to the sliding end partition. The parti-
tions or strainers are in communication with
65 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 en-
trance into the strainer is induced and ac-
70 celerated 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—t. e., a machine having two press-
75 chambers in line with a pressure-cylinder be-
C

72

80

85

90

95

100

 tween them—so that the forward stroke of
the piston presses one chamber, while the re-
turn stroke presses the other, and one cham-
ber 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 draw-
ing, 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
105 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 trans-
verse partitions D, made hollow and with por-
ous surfaces and forming and acting as strain-
ers. Strainers also line the ends of the cham-
ber, one of which is fixed and the other slid-
ing, to act as or being attached to a plunger
or piston. The strainers are connected with
95 drainage-pipes to carry off air and water en-
tering their interior from the pulp, and the
drainage-pipes are connected with an ex-
haustr—such as a suction-pump E, vacuum-
tank, or the like—by a line of pipes E' and
branches e', the movable drainage-pipes hav-
ing flexible connections e''. The central pres-
sure-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 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 "drainage-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 operated 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 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 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 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—

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 by forcing the fluid pulp under pressure simultaneously 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 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 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 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 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, 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 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.