

No. 802,755.

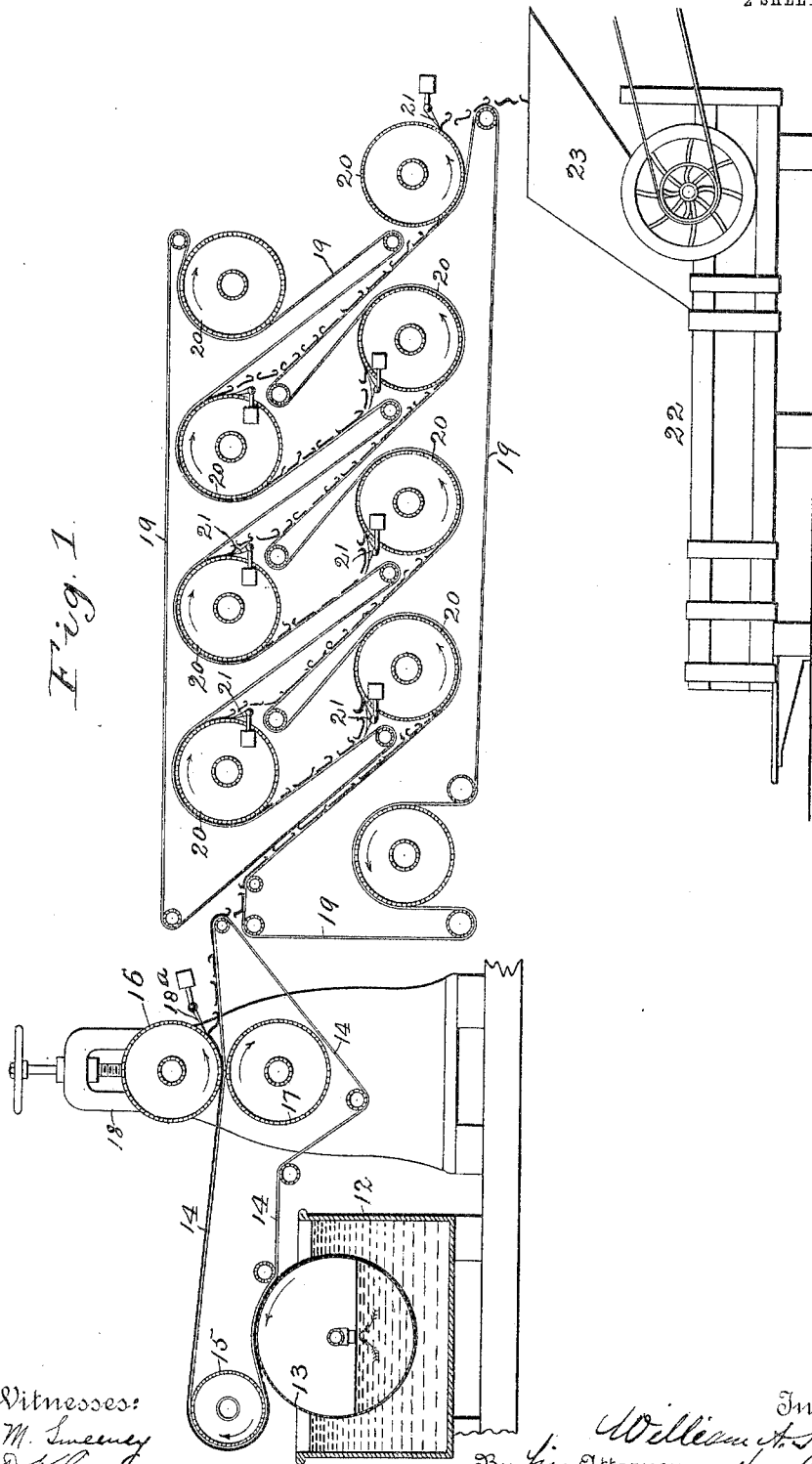
PATENTED OCT. 24, 1905.

W. A. HALL.
PROCESS OF TREATING WOOD PULP.

APPLICATION FILED DEC. 29, 1904.

2 SHEETS—SHEET 1.

Fig. 1.



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C. M. Sweeney
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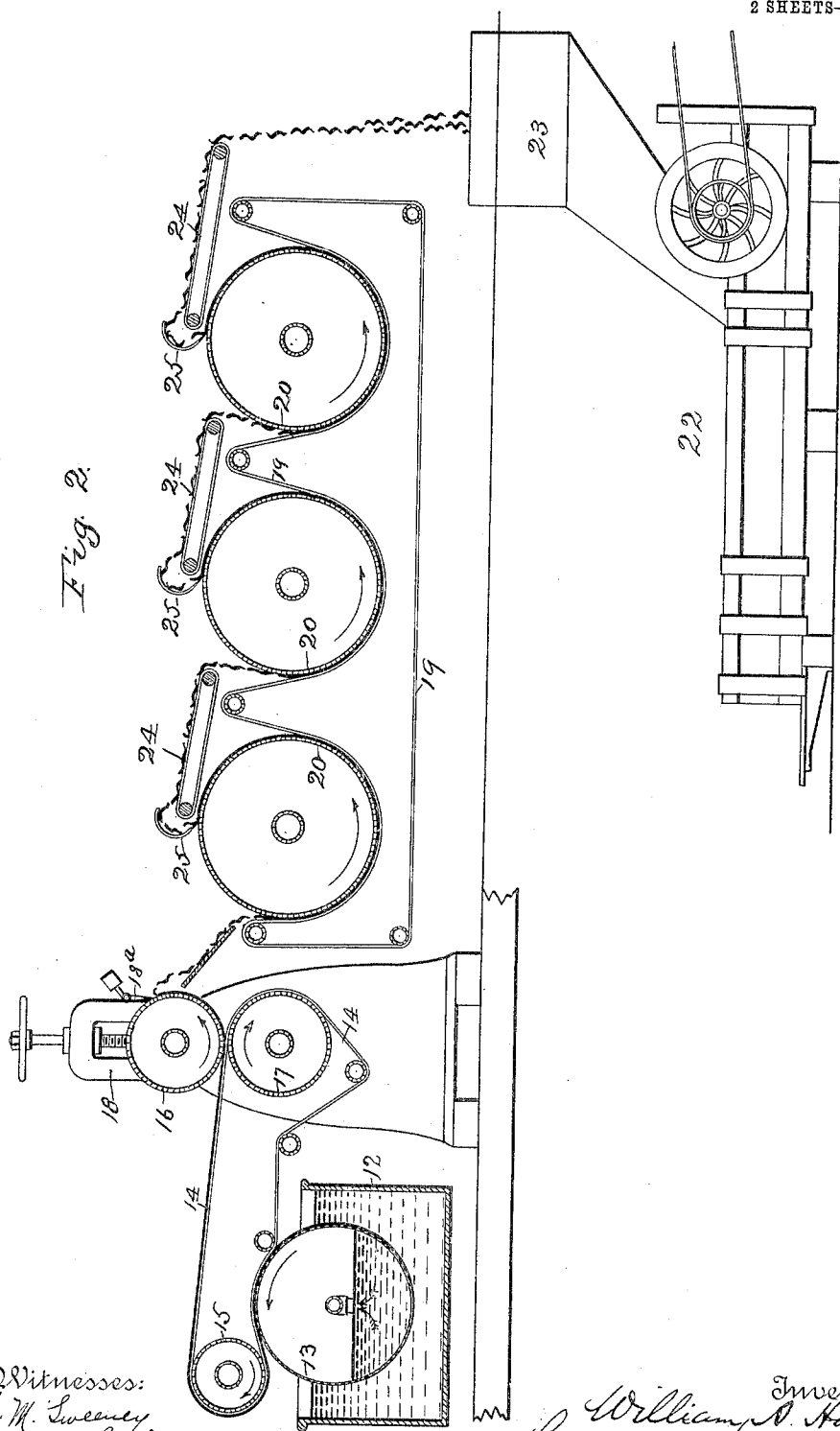
Inventor:
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PROCESS OF TREATING WOOD PULP.

APPLICATION FILED DEC. 29, 1904.

2 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

WILLIAM AUGUSTUS HALL, OF BELLOWS FALLS, VERMONT.

PROCESS OF TREATING WOOD-PULP.

No. 802,755.

Specification of Letters Patent.

Patented Oct. 24, 1905.

Application filed December 29, 1904. Serial No. 238,760.

To all whom it may concern:

Be it known that I, WILLIAM AUGUSTUS HALL, a citizen of the United States, residing at Bel-
lows Falls, in the county of Windham and
5 State of Vermont, have invented or discovered certain new and useful Improvements in Processes of Treating Wood-Pulp, of which the following is a specification, reference being had therein to the accompanying draw-
10 ings.

In the manufacture of paper from wood-pulp it is at present customary to ship the pulp fiber or paper-stock from the pulp-mills (which are usually located conveniently acces-
15 sible to the timber from which the pulp is made) to the paper-mills (which are frequently located at long distances from the paper-mills and nearer to the consumers of the paper) in a wet condition and in heavy sheets. This is a serious disadvantage in the manufacture of
20 paper from wood-pulp in that the pulp when shipped wet from the pulp-mills contains a large percentage of water, and being thus unnecessarily heavy requires the payment of excessive freight rates, which in transporting
25 this wood-pulp at long distances is a very burdensome tax to the manufacturers. Furthermore, this wet wood-pulp when shipped in the winter time freezes and it is very difficult
30 to remove it from the cars in this frozen condition and difficult and expensive to thaw out; also, this wet wood-pulp when shipped in summer time or if allowed to stand in storage for any great length of time at any season of
35 the year dries together very hard on the outside of the packages or bales, the thick sheets of pulp coming from the rolls of the wet machines shrinking into compact board-like masses, which cannot be readily disintegrated
40 by the beating-engine, and the wet pulp is apt to mold on the insides of the packages or bales, making black spots or resulting in objectionable discolorization; also, in shipping the pulp in wet condition it becomes readily soiled,
45 as dirt and cinders have a natural tendency to adhere to it.

The present invention has for its object to obviate the difficulties referred to by a novel process of treating the wet pulp in such a man-
50 ner that it will be practically dry before it leaves the pulp-mills and can be readily compressed into compact bales, and thus the cost of transportation of the pulp will be greatly lessened and the other objections, as above
55 noted, incidental to shipping the pulp in wet condition will be avoided. This object is ef-

fectuated by drying the wet pulp in broken sheets or shavings by subjecting the pulp suc-
cessively to the action of a series of steam-
heated rolls until it is practically, but not ab-
60 solutely, dry, as it has been discovered that the hot rolls will not injure the fiber of the pulp if a very small percentage of water still remains therein. In other words, the pulp is not injured by drying at high temperatures, 65
if the drying operation be continued only up to the point where the pulp still contains a very small percentage of moisture, though ap-
parently or practically dry.

In the accompanying drawings, Figure 1 70
is a sectional elevation of an apparatus by which the invention may be carried into ef-
fect, and Fig. 2 is a somewhat different form of apparatus from that shown in Fig. 1 by
75 which the invention may also be carried into effect.

Referring to the drawings, 12 denotes a tank for holding the finely-ground wood-pulp as it comes from the grinders and which con-
tains a large percentage of water. In the 80
tank 12 rotates what is known as the "mold," which is a perforated or foraminous roller 13, connected with an interior suction apparatus,
which draws the water from the pulp to the
85 interior of the roll and causes the pulp to accumulate on the surface of the roll, from
which it is taken by an endless felt apron 14, which is pressed in contact with the roll 13 in
such a manner as to take a constantly-accumu-
90 lating thin sheet of wet pulp from the mold-roll 13 and carry it over a couch-roll 15, whence it passes between a pair of pressing-rolls 16
and 17, which remove the surplus water from the pulp and which are mounted in a suitable
95 frame 18, and which pressing-rolls are yieldingly forced together in any suitable manner by means of adjustable bearings, which may
be regulated, as by means of hand-wheels and screws, as shown in the drawings, to suit dif-
100 ferent conditions of work.

In passing the wet wood-pulp between the pressing-rolls 16 and 17 on the apron 14 the pulp adheres to the top roll 16 and is taken off the apron. In thus treating the pulp it has
heretofore been customary to allow a com- 105
paratively thick sheet of pulp composed of a series of thin layers or windings to accumu-
late on the top roll 16 by successive rotations of said roll, and such thick sheets were then
110 cut so as to be removed from the roll and were folded and bundled together for trans-
portation, and these thick sheets, if partly or

wholly dried, as by the exposure of the bundles or bales to the air, were liable to felt or shrink together in hard board-like masses, difficult to disintegrate, as before stated. In practicing the present invention the pulp is constantly removed in thin broken sheets or shavings from the top roll 16 of the wet machine by a stationary knife or doctor 18^a and falls down again onto the endless apron 14, so as to be carried to a second endless apron 19, preferably of canvas. The apron 19 passes over a series of hot rolls 20, preferably heated by steam in a well-known manner, and each of which, into contact with which the broken sheets or shavings of dried pulp are carried by the endless apron 19, is provided with a stationary knife or doctor 21, which will remove the pulp from these rollers as it passes around the same and cause it to fall upon another part of the apron in such a manner as to be carried to the next succeeding hot roll. The hot moist pulp is broken up or opened out more or less after passing around each hot roll, so that the moisture can the more readily escape therefrom in the form of steam, and the drying process is thus expedited. A suitable number of heated rolls 20 will be provided, so that when the pulp has passed around the last roll of the series it will be practically or apparently, but not absolutely, dry.

In connection with the drying rolls or cylinders 20 and the endless apron 19, coöperating therewith, a continuous baling-press 22 of well-known structure and operation is preferably provided and into the hopper 23 of which the dried shavings or pulp may be delivered, so that in one continuous operation the pulp coming from the tank 12 will be dried and then compacted into bales for convenient transportation.

In the form of the apparatus shown in Fig. 2 a series of separate conveyers 24 are preferably provided, in connection with the drying-rolls 20, about which passes the endless canvas apron or carrier 19. In this form of the apparatus hooded doctors 25 are provided for removing the pulp from the drying-rollers 20 and causing it to fall upon the successive endless carriers 24.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. The herein-described process of treating wood-pulp for paper-stock, consisting in drying the same by subjecting it to the successive action of a series of hot drying-rolls in the

form of thin broken sheets or shavings, and in this drying operation successively breaking up the sheet or mass of pulp as it comes from each heated drying-roll, and then immediately compressing these dried broken sheets or shavings into bales for convenient transportation.

2. The herein-described process of treating wet wood-pulp, consisting in subjecting a non-continuous or broken-up sheet thereof to the successive action of a series of hot drying-rolls until the pulp is nearly or practically dry, the sheet or mass of pulp being successively broken up or disintegrated after passing each heated roll to permit the ready escape of steam therefrom.

3. The herein-described process of treating wood-pulp, for paper-stock, consisting in breaking up a sheet of wet pulp after the same passes the devices which remove the surplus water therefrom, and then subjecting the non-continuous or broken sheets of pulp to the successive action of a plurality of drying-rolls, until the pulp is nearly or practically dry, and, in this drying operation, successively breaking up or disintegrating the mass of pulp as it is removed from each drying-roll, to facilitate the ready escape of steam from the hot moist pulp.

4. The herein-described process of treating wood-pulp, for paper-stock, consisting in breaking up a sheet of wet pulp after the same passes the devices which remove the surplus water therefrom, then subjecting the non-continuous or broken sheet of pulp to the successive action of a plurality of drying-rolls, until the pulp is nearly or practically dry, and, in this drying operation, successively breaking up or disintegrating the mass of pulp as it is removed from each drying-roll, to facilitate the escape of steam, and finally compressing the dried pulp into bales by a baling-press into the hopper of which the dried pulp is passed directly from the drying apparatus: whereby, at one continuous operation, the pulp is dried in a broken-up condition and compressed into bales for convenient transportation.

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

WILLIAM AUGUSTUS HALL.

Witnesses:

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GERTRUDE M. STUCKER.