

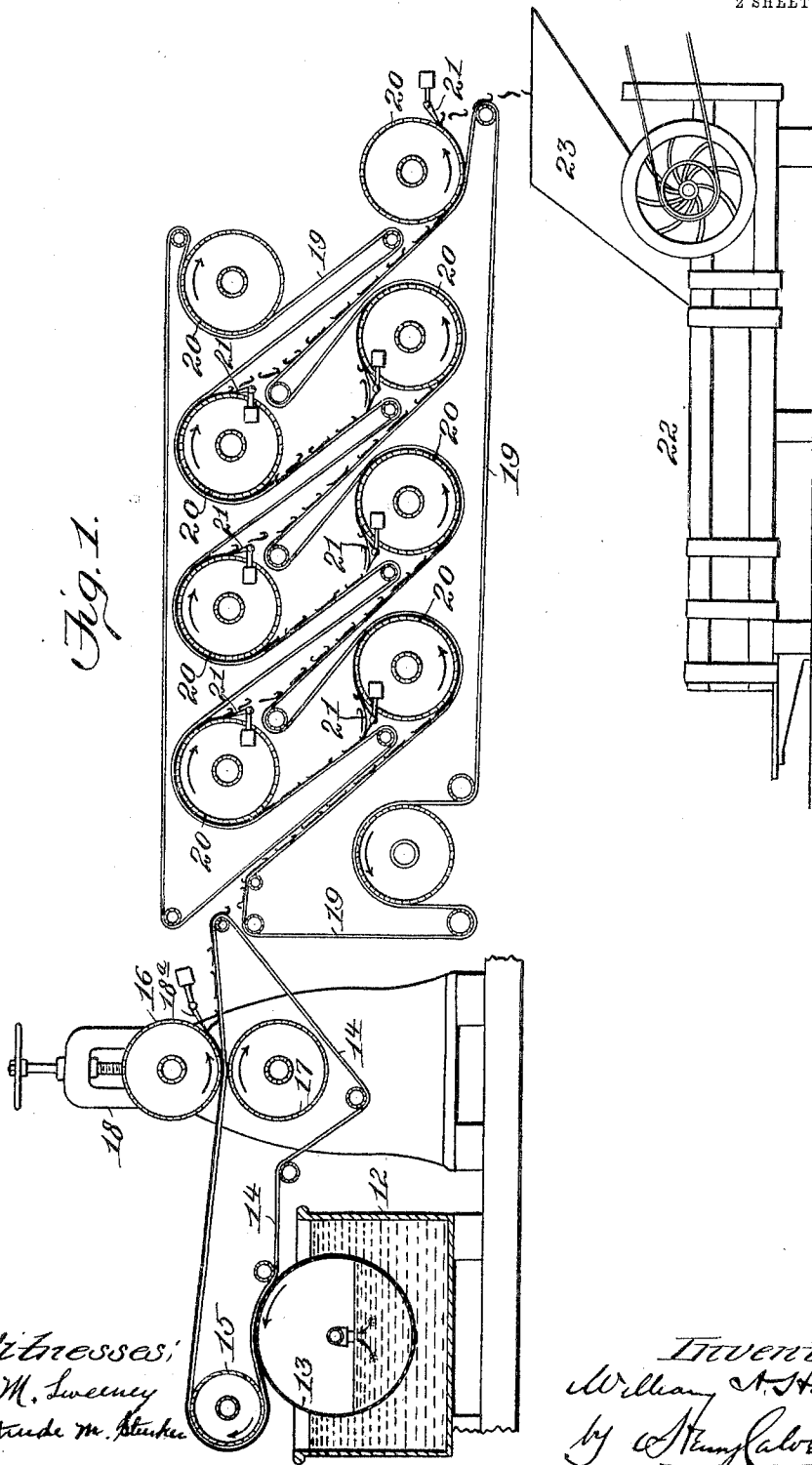
No. 802,754.

PATENTED OCT. 24, 1905.

W. A. HALL.
APPARATUS FOR TREATING WOOD PULP.

APPLICATION FILED DEC. 29, 1904.

2 SHEETS—SHEET 1.



Witnesses:
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Gertrude M. Stucke

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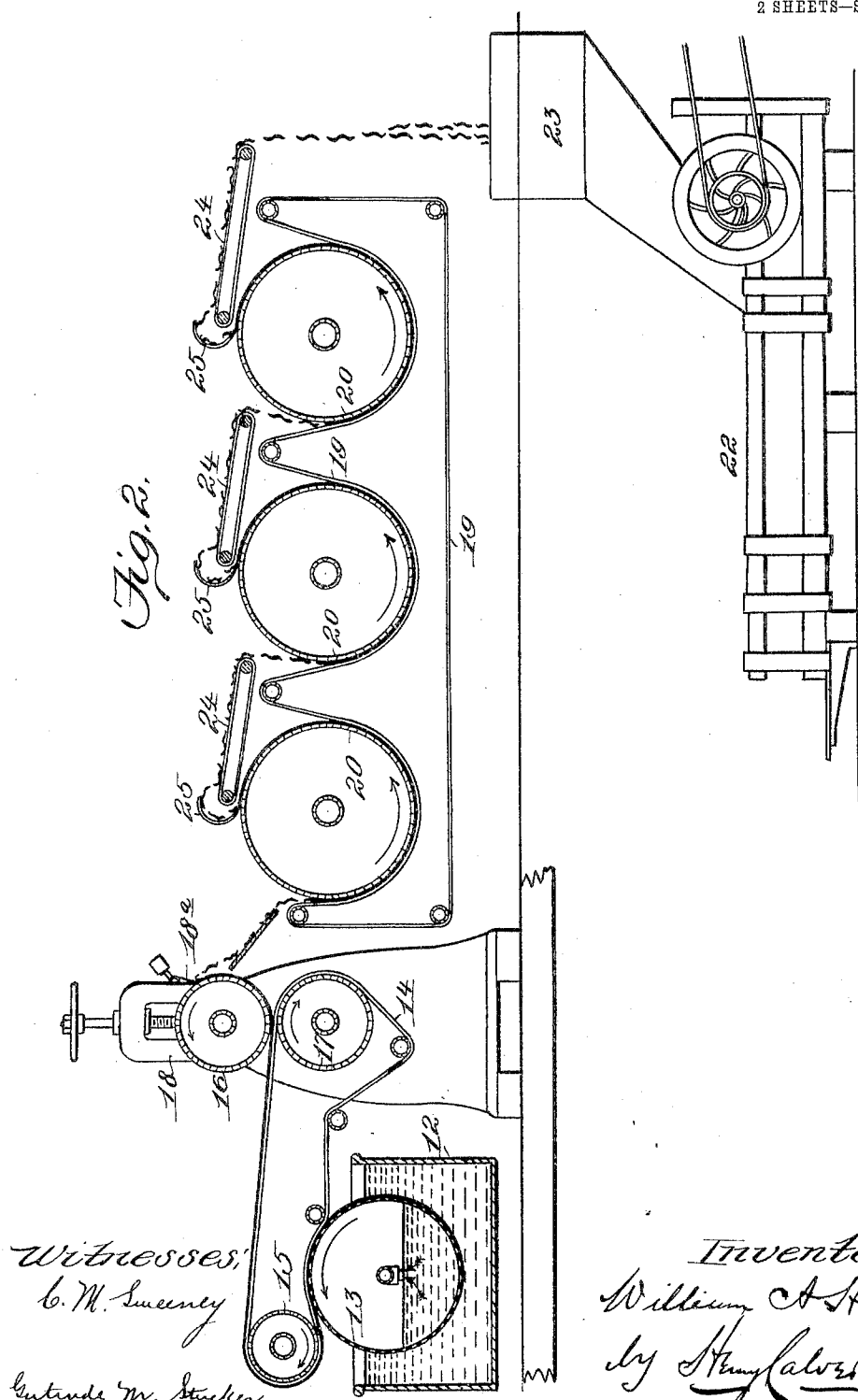
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Witnesses,

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UNITED STATES PATENT OFFICE.

WILLIAM A. HALL, OF BELLOWS FALLS, VERMONT.

APPARATUS FOR TREATING WOOD-PULP.

No. 802,754.

Specification of Letters Patent.

Patented Oct. 24, 1905.

Application filed December 29, 1904. Serial No. 238,759.

To all whom it may concern:

Be it known that I, WILLIAM A. HALL, a citizen of the United States, residing at Bellows Falls, in the county of Windham and State of Vermont, have invented certain new and useful Improvements in Apparatus for Treating Wood-Pulp, of which the following is a specification, reference being had therein to the accompanying drawings.

10 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 accessible to the timber from which the pulp is made) to the paper-mills (which are frequently
15 located at long distances from the pulp-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 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 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 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 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, as dirt and cinders have a natural tendency to adhere to it.

45 The present invention has for its object to obviate the difficulties referred to by a novel apparatus for treating the wet pulp in such a manner 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 noted, incidental to shipping the pulp

in wet condition will be avoided. This object 55 is carried into effect by an apparatus for drying the wet pulp in broken sheets or shavings, preferably by subjecting the pulp successively to the action of a series of steam-heated rolls until it is practically but not absolutely dry, 60 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 will not be injured or burned by drying at high temperatures if the drying operation be continued only up to the point where the pulp still contains a very small percentage of moisture, though apparently or practically dry. 65

In the accompanying drawings, Figure 1 is 70 a sectional elevation of an apparatus embodying the invention; and Fig. 2 is a somewhat different form of apparatus from that shown in Fig. 1, also embodying the invention.

Referring to the drawings, 12 denotes a tank 75 for holding the finely-ground wood-pulp as it comes from the grinders and which contains a large percentage of water. In the tank 12 rotates what is known as the "mold," which is a perforated or foraminous roller 13, 80 connected with an interior suction apparatus, which draws the water from the pulp to the 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 85 is pressed in contact with the roll 13 in such a manner as to take a constantly-accumulating 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 90 and 17, which remove the surplus water from the pulp and which are mounted in a suitable frame 18, and which pressing-rolls are yieldingly forced together in any suitable manner by means of adjustable bearings, which may 95 be regulated, as by means of hand-wheels and screws, as shown in the drawings, to suit different conditions of work. In passing the wet wood-pulp between the pressing-rolls 16 and 17 on the apron 14 the pulp adheres to 100 the top roll 16 and is taken off the apron. In thus treating the pulp it has heretofore been customary to allow a comparatively thick sheet of pulp, composed of a series of thin layers or windings, to accumulate on the top 105 roll 16 by successive rotations of said roll, and such thick sheets were then cut so as to be removed from the roll and were folded and

bundled together for transportation, 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 the use of 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.

The invention is not to be understood as being limited to the particular forms of apparatus or to the details thereof herein shown and described, as wide variations in the forms or details of construction of the apparatus for carrying the invention into effect may be made without departing from the spirit of the invention.

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

1. In an apparatus for drying wood-pulp, the combination with means for breaking up or rendering non-continuous a sheet of pulp coming from a wet machine, of means for

thereafter repeatedly breaking up or disintegrating the mass of pulp to be dried, means for removing the moisture from said broken-up or non-continuous sheet or mass of pulp until the same becomes practically dry, and means for compressing the dried pulp into bales.

2. In an apparatus for drying wood-pulp, the combination with a series of heated drying-rolls, of an endless apron or carrier passing about the same, means for delivering pulp to the said endless apron or carrier, and means for breaking up or somewhat disintegrating the pulp as it comes from each of the drying-rolls, to permit the ready escape of steam therefrom, and so that the pulp will be successively presented to the rolls of the series in a more or less broken-up condition.

3. In an apparatus for drying wood-pulp, the combination with a series of heated drying-rolls, of an endless apron or carrier passing about the same, means for delivering pulp to the said endless apron or carrier, and a series of stationary knives or doctors for breaking up or somewhat disintegrating the pulp as it comes from each of the drying-rolls, to permit the ready escape of steam therefrom, and so that the pulp will be successively presented to the rolls of the series in a more or less broken-up condition.

4. In an apparatus for drying wood-pulp, the combination with a series of heated drying-rolls, of an endless apron or carrier passing about the same, means for breaking up and delivering pulp to the said endless apron or carrier, and means for breaking up or somewhat disintegrating the pulp as it comes from each of the drying-rolls, to permit the ready escape of steam therefrom and so that the pulp will be successively presented to the rolls of the series in a more or less broken-up condition.

5. In an apparatus for drying wood-pulp, the combination with a series of heated drying-rolls, of an endless apron or carrier passing about the same, means for delivering pulp to the said endless apron or carrier, means for breaking up or somewhat disintegrating the pulp as it comes from each of the drying-rolls, to permit the ready escape of steam therefrom and so that the pulp will be successively presented to the rolls of the series in a more or less broken-up condition, and means for compressing the dried pulp into bales; so that, at one continuous operation, the pulp coming from a wet machine may be dried and baled for cheap and convenient transportation.

6. In an apparatus for drying wood-pulp, the combination with a series of heated drying-rolls, of an endless apron or carrier passing about the same, means for breaking up and delivering pulp to the said endless apron or carrier, means for breaking up or somewhat disintegrating the pulp as it comes from each of the drying-rolls, to permit the ready escape of steam therefrom and so that the pulp will be

successively presented to the rolls of the series in a more or less broken-up condition, and means for compressing the dried pulp into bales; so that, at one continuous operation, the pulp coming from a wet machine may be dried and baled for cheap and convenient transportation.

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

WILLIAM A. HALL.

Witnesses:

HENRY CALVER,

GERTRUDE M. STUCKER.