No. 868,063. PATENTED OCT. 15, 1907.

W. ANGUS.

PULP FLAKER.

APPLICATION FILED MAY 26, 1902.

2 SHEETS—SHEET 1.

FIG. 1.

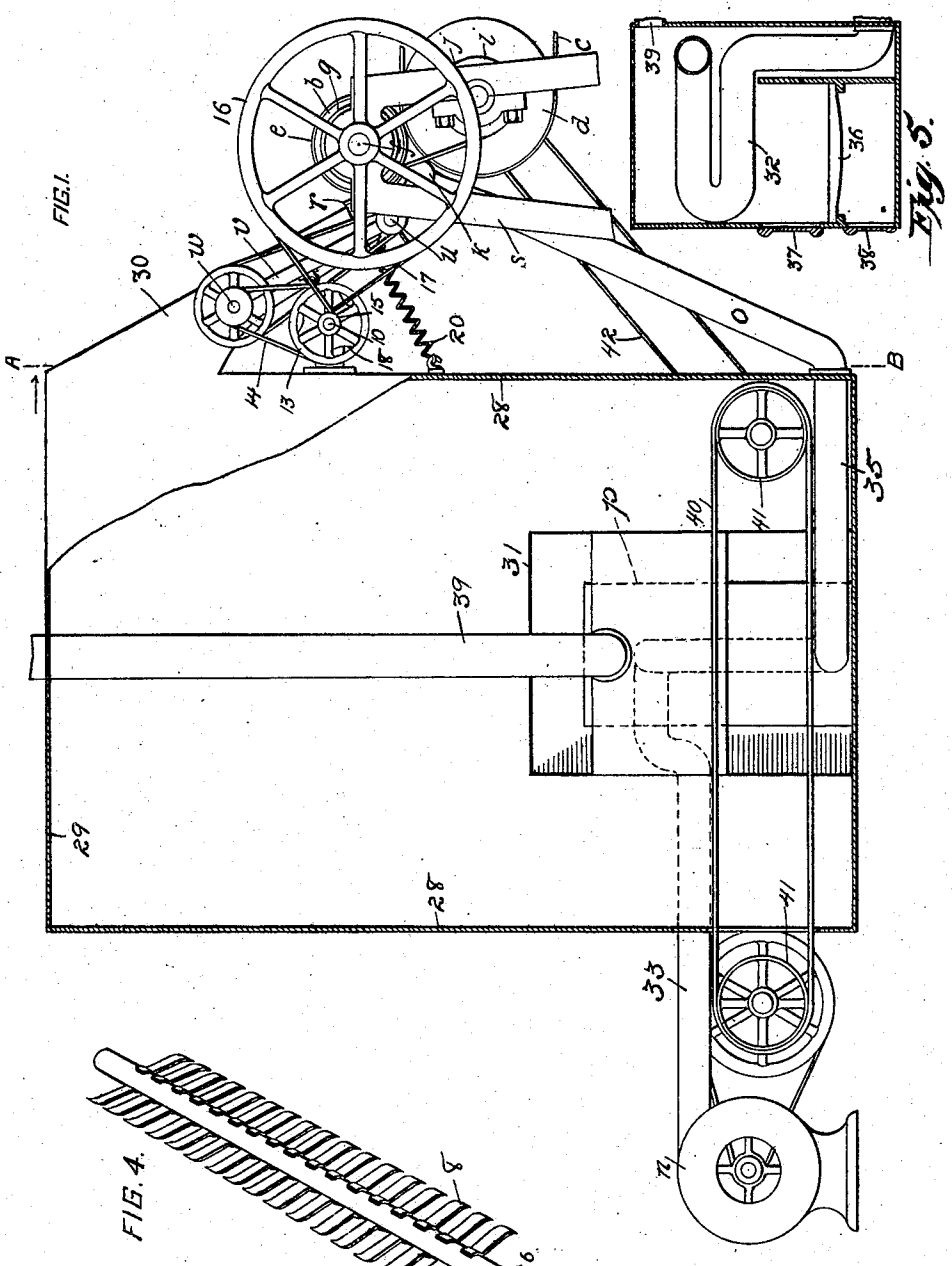


Fig. 5.

FIG. 4.

Witnesses

William D. McFeat

Fred J. Sears

Inventor

William Angus

By his Attorney

Otto N. Swan

THE NORRIS PETERS CO., WASHINGTON, D. C.

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2 SHEETS—SHEET 2.

FIG. 3.

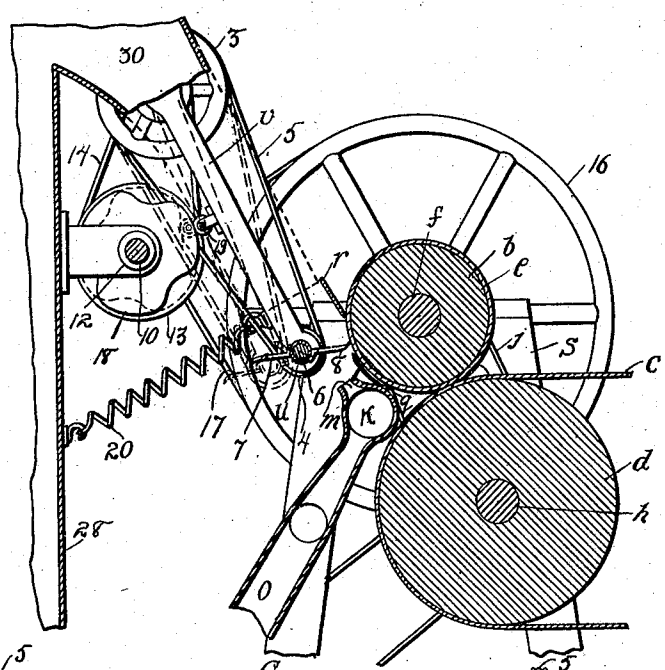
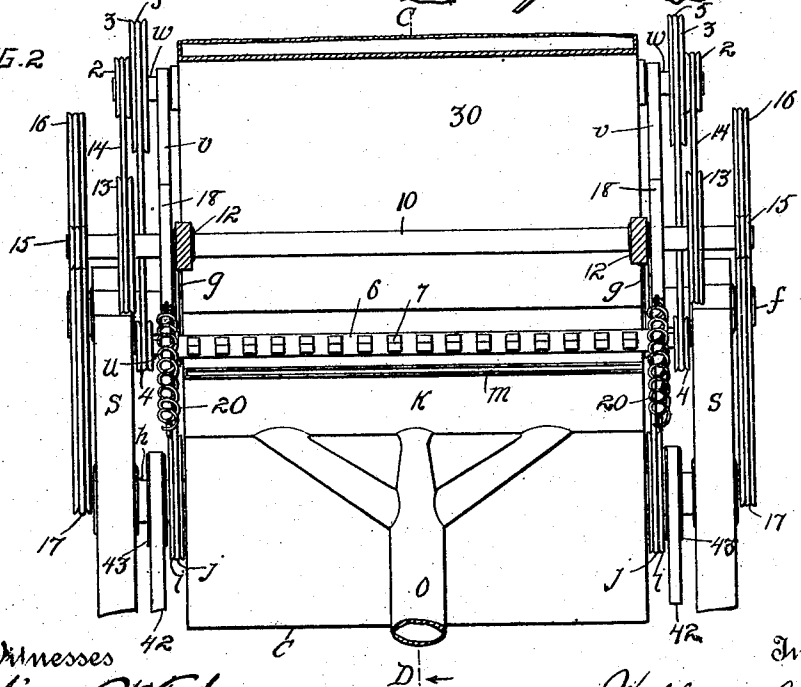


FIG. 2



Witnesses

Inventor:

William Angus

By his Attorney

THE NORRIS PETERS CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM ANGUS, OF MONTREAL, QUEBEC, CANADA.

PULP-FLAKER.

No. 868,063. Specification of Letters Patent. Patented Oct. 15, 1907.

Application filed May 26, 1902. Serial No. 109,103.

To all whom it may concern:

Be it known that I, WILLIAM ANGUS, of the city of Montreal, in the district of Montreal and Province of Quebec, Canada, manager, have invented certain new and useful Improvements in Pulp-Flakers; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention relates to the treatment of the sheet pulp as it is fed from the wet machine upon the felt, and it has for its object to break the sheet pulp into flakes for drying purposes.

The invention may be said briefly to consist in providing means for breaking the sheet pulp into fragments without injuring the fiber thereof by acting upon the edges only of the portions thereof constituting the fragments.

More specifically speaking the invention may be said briefly to consist in mounting one or more combs adjacent to a take-up roll for picking up the pulp from the felt, and operating same to act upon the sheet pulp upon the take-up roll and detach fragments therefrom, said fragments being projected into a heated chamber wherein they are dried and from which said dried fragments may be fed to any suitable baling press or receptacle.

For full comprehension, however, of my invention reference must be had to the accompanying drawings forming a part of this specification in which like symbols indicate the same parts and wherein

Figure 1 is a side elevation of a portion of a wet machine with my invention applied thereto; Fig. 2 is an enlarged transverse vertical sectional view thereof taken on line A, B, Fig. 1, looking in the direction indicated; Fig. 3 a longitudinal vertical sectional view theretof taken on line C, D, Fig. 2; Fig. 4 is a detail perspective view of my improved flaking roll removed, and Fig. 5 is a detail longitudinal vertical sectional view of the heater.

In order that the invention may be thoroughly understood it may be pointed out that the sheet of pulp carried upon the felt of a wet machine, is of exceedingly loose texture, and so thin as to be almost transparent, and, consequently it is most delicate and fragile and when in its wet state, as it lies upon the felt, is very easily broken into flakes or fragments, in fact it is difficult to remove it whole, in a self supporting way, from the felt.

My improved flaker which is particularly adapted to breaking the sheet pulp, when in the above described condition, into flakes or fragments without injuring the fiber of the pulp, consists of a take-up roll *b* bearing on the felt *c* drawn from the wet machine (not shown) by roll *d*. This take-up roll is preferably provided with a tight fitting jacket *e* of textile material, and it is mounted rigidly upon a shaft *f*, having a pair of pulleys *g* rigidly upon the opposite ends thereof and driven from pulleys *i* upon the shaft *h* of the felt roll by bands *j*.

A blast pipe *k* extends transversely of the take-up roll in a position to have its mouth *m* face in a direction tangential of and a short distance from the surface of the take-up roll, this blast pipe being fed from a blower *n* through a pipe *o* which passes through a furnace *p* to be presently further alluded to.

A baffle-plate *q* deflects the blast from the take-up roll, and a strip or knife *r*, constituting a doctor, doctors the sheet pulp off the take-up roll under certain conditions. This doctor and the baffle-plate are supported by a frame *s*.

A swinging counter shaft *u* is rotatably mounted in the lower ends of a pair of arms *v* between which it acts as a stay, and the upper ends of said arms are pivoted preferably upon a pair of stub-axles *w* which may be carried upon the wall of the drying chamber to be presently described. Upon each of these stub-axles and outside of the arms *v* is rotatably mounted a duplex pulley 2 and 3, and upon each end of the counter shaft *u* and also outside of the arms *v* is rigidly mounted a pulley 4, while bands 5 operatively connect the portions 3 of the duplex pulleys to the pulleys 4.

A roller 6 is mounted rigidly upon the countershaft *u* and is provided at diametrically opposite sides with a pair of combs 7 and 8, respectively, the teeth of one comb being in the circumferential plane of the spaces between the teeth of the other, and the ends of the teeth of each are preferably bent towards the direction of rotation of their carrying roll and slightly sharpened. A second counter-shaft 10 is rotatably mounted in bearings 12 also preferably upon the drying chamber, and has a pair of pulleys 13 rigidly thereon one in line with each of the portions 2 of the duplex pulleys to which they are connected by bands 14. A pair of small pulleys 15 are mounted upon the ends of this shalt in line with a pair of large pulleys 16 upon the shaft of the take up roll and which are connected to said small pulleys by crossed bands 17; while a pair of three-throw cams 18 which are secured rigidly upon said last mentioned counter-shaft and in line with the swinging arms *v*, impart an oscillatory movement to the arms, anti-friction rollers 19 upon the arms receiving the thrust of said cams, and retractile helical springs 20 yieldingly maintaining said anti-friction rollers constantly in engagement with said cams.

The drying chamber consists of walls 28 and top 29 and is preferably rectangular in plan view, and a duct 30 leads from within close proximity of the blast pipe to the upper end of said chamber and extends in width from end to end of said blast pipe, which is also preferably the width of the felt chamber. The chamber is heated by means of a stove or heater located in a small extension 31 which communicates

with the interior of the chamber and said stove or heater is constructed with a zig-zag flue 32 in its upper portion, with one end of which a pipe 33, leading from a blower *n*, is connected, while a second pipe 35 leads from the opposite end of this zig-zag flue to the blast pipe. The stove or heater is furnished with an ordinary fire grate 36 and fire and ash pit doors 37 and 38, respectively, while the products of combustion after passing around the flue 32 are taken off by means of pipe 39.

A traveling table is located at the bottom of the drier and constitutes a false bottom upon which the flakes of dried pulp fall and whereby they are carried outside of the chamber. This traveling table consists of an endless apron 40 passing around rollers 41 driven by a belt 42 from a pulley 43 upon the shaft of the felt roll, said apron projecting through an aperture in the lower portion of one of the side walls.

The operation of my improved flaker is as follows:— The take-up roll lifts the sheet pulp from the felt and winds it upon itself, and as the roll passes the point in the arc of oscillation of the rapidly rotating swinging shaft carrying the comb-roll, such comb-roll is intermittently moved by the cams to a position to have its teeth pass in close proximity to the face of the take-up roll, which action will cause the portion of the sheet pulp in advance of said arc, to be flicked from said take-up roll first by one series of comb teeth and then by the other series, the intervals between the approaches of the comb-roll being of sufficient duration to allow about one half inch, full width of the machine, of the sheet pulp to pass the arc. The portions thus flicked off are in the form of flakes or fragments, and are blown by the hot blast into the top of the drying chamber wherein the heat takes up what moisture is not absorbed by the blast and they fall upon the traveling apron which delivers them into any suitable receptacle.

The object in providing the doctor is to cause any portions of the sheet pulp not flicked from the roll by the comb teeth to be doctored off and caused to fall back into the hot blast the impact of which will flake said portion thus disengaged and precipitate the flakes into the drier.

When the sheet pulp is of excessive fragility the belt 17 driving the cam shaft can be shipped from either of its pulleys when the comb roll is in its position away from the take-up roll. The sheet pulp will then be doctored from said take-up roll and fall over the baffle-plate into the hot blast which will tear this portion of the sheet from the main portion and practically shatter it into flakes, to be followed similarly by other portions.

It is obvious that the hot blast and the comparatively high temperature in the chamber will cause the flakes of pulp to fall upon the bottom of the tank in a perfectly dry state, or, by reducing the temperature of the blast and interior of the chamber the flakes can be delivered with any degree of moisture required. Or if desired a cold blast alone may be utilized when the pulp needs but slight drying.

What I claim is as follows:—

1. A flaker comprising a carrier for the material to be flaked; a take-up roll for lifting said material from its carrier; a roll having an isolated row of resilient metallic teeth in the form of a comb upon and extending axially of the perimeter thereof; means for rotating said comb-roll, and means for drying said flakes, substantially as described and for the purpose set forth.

2. A flaker comprising a carrier for the material to be flaked; a take-up roll for lifting said material from its carrier; a roll parallel to the take up roll and a pair of comb-like devices carried by the last mentioned roll at diametrically opposite sides thereof and extending axially along the face of the said roll, each comb-like device consisting of an isolated row of resilient flat metallic teeth, and means for rotating the comb-roll, substantially as described and for the purpose set forth.

3. A flaker comprising a carrier for the material to be flaked; a take-up roll for lifting said material from its carrier; a device adapted to flick the material in flakes from said take-up roll; and means for causing a blast to act upon said flakes as they are detached by said device, substantially as described and for the purpose set forth.

4. A flaker comprising a carrier for the material to be flaked; a take-up roll for lifting said material from its carrier; a roll having a comb upon and extending axially of the perimeter thereof; means for intermittently moving said comb-roll towards said take-up roll; means for rotating said comb-roll to, when adjacent to said take-up roll, break the material thereon into flakes; and means for drying said flakes, substantially as described and for the purpose set forth.

5. The combination with the felt roll of a pulp making wet-machine, of a take-up roll bearing upon the felt upon said felt roll; means for driving said rolls in opposite directions; a swinging carrier adapted to swing in an arc intersecting the perimeter of said take-up roll; a roll mounted in the end of said swinging carrier; a pair of combs mounted upon and extending axially of said last mentioned roll one at each side thereof and with the teeth of one in circumferential line with the spaces between the teeth of the other; a counter-shaft; means for supporting said counter-shaft adjacent to said swinging carrier; a cam upon said counter-shaft; a retractile helical spring yieldingly retaining said swinging carrier in contact with said cam; a band connecting the take-up roll to said counter-shaft; a shaft mounted in the line at which said swinging carrier is pivoted; a pulley upon said shaft; a band connecting said counter-shaft to said last mentioned shaft; a band connecting said last mentioned shaft to the comb-roll; and means for causing a blast to project across the point at which the teeth of said combs are located when adjacent to the take-up roll; and means for heating said blast, substantially as described and for the purpose set forth.

6. A flaker comprising a roll carrying the material to be flaked; a device for removing the material intact from said roll; and means for causing a blast to impinge upon the material thus removed, for the purpose set forth.

7. A flaker comprising a roll carrying the material to be flaked; a doctor extending longitudinally of said roll in contact with the perimeter thereof for removing the material intact therefrom; and means for causing a blast to impinge upon the material thus removed, substantially as described and for the purpose set forth.

8. A drier comprising, in combination with a roll, a device for removing the material to be flaked from said roll; a blast pipe, the blast from said pipe impinging upon the material thus removed; a drying chamber; a duct leading from a point in line with said blast to the upper end of said drying chamber; a heater communicating with said drying chamber; a blower; a pipe leading from said blower to said heater; a flue extending through said heater and communicating at one end with said pipe; and a second pipe leading from the opposite end of said flue to said blast pipe, substantially as described and for the purpose set forth.

In testimony whereof, I have affixed my signature, in presence of two witnesses.

WILLIAM ANGUS.

Witnesses:
WILLIAM L. MCFEAT,
FRED. J. SEARS.