

W. BURTON.
PULP MAKING MACHINE.
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959,307.

Patented May 24, 1910.

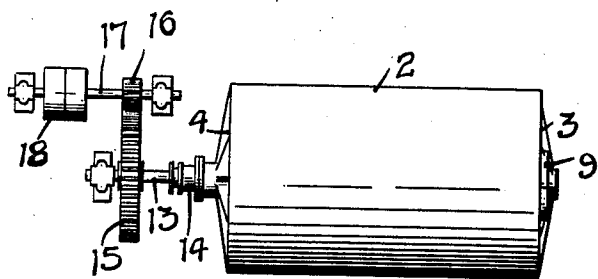


Fig 1.

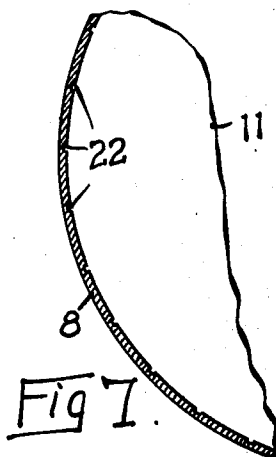


Fig 7.

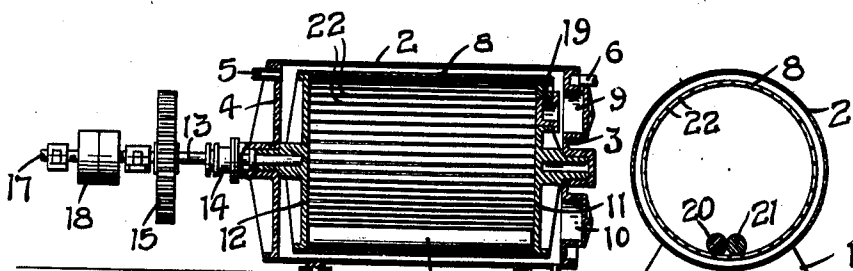


Fig 2.

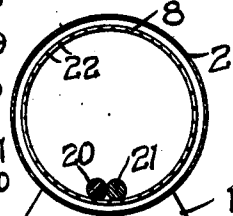


Fig 3.

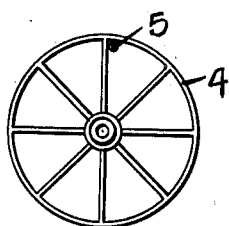


Fig 4.

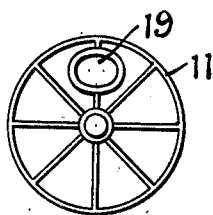


Fig 6.

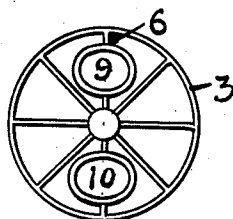


Fig 5.

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UNITED STATES PATENT OFFICE.

WILLIAM BURTON, OF ST. JOHN, NEW BRUNSWICK, CANADA.

PULP-MAKING MACHINE.

959,307.

Specification of Letters Patent.

Patented May 24, 1910.

Application filed January 29, 1909. Serial No. 474,979.

To all whom it may concern:

Be it known that I, WILLIAM BURTON, a citizen of the Dominion of Canada, and residing at St. John, Province of New Brunswick, Dominion of Canada, have invented certain new and useful Improvements in Pulp-Making Machines, of which the following is a specification.

My invention relates to wood pulp apparatus adapted for treating hard and soft wood chips.

The object of my invention is to provide an apparatus of simple inexpensive construction, wherein the hard and soft wood chips can be quickly and easily reduced to pulp, preserving the fiber of the woods.

A further object is to provide an apparatus wherein chips can be treated and reduced to pulp in a comparatively short space of time, thereby increasing the capacity of the apparatus and effecting a large saving in the cost of equipment and maintaining a plant of a given capacity.

Other objects of the invention will appear from the following detailed description:

The invention consists generally in a revolving receptacle, a casing inclosing the same and spaced therefrom and adapted to admit a heating agent, such as steam, to said space, and rolls provided within said revolving receptacle and said receptacle being adapted to contain a chemical solution which acts on the chips therein simultaneously with a crushing or rolling action of the rolls.

Further, the invention consists in various constructions and combinations, all as hereinafter described and particularly pointed out in the claims.

In the accompanying drawings forming part of this specification, Figures 1 and 2, are a plan and longitudinal sectional view of a pulp making apparatus embodying my invention. Fig. 3, is a transverse sectional view. Figs. 4, 5 and 6 are end views. Fig. 7 is a detail sectional view.

Referring to the drawing Figs. 2 and 3, 1 represents a suitable base upon which I arrange a stationary drum 2, which may be of any preferred dimensions, according to the desired capacity of the apparatus. The drum has heads 3 and 4, both of which are provided with a steam inlet pipe 5, 6 shown Figs. 4 and 5. An exhaust or draw off pipe 7, is placed in the bottom of

the stationary drum 2, Fig. 2. Through the pipes 5 and 6, Figs. 4 and 5, steam of any desired pressure (preferably about thirty pounds) may be admitted between the drums 2 and 8, Fig. 2. The head 3, Fig. 2, is provided with manholes 9 and 10, through which access may be had to the interior of the drum.

Within the drum 2, Fig. 2, and spaced therefrom, is a second drum 8, having heads 11 and 12, that are journaled in the heads 3 and 4, of the outer drum, and the head 12, has a drive shaft 13, connected therewith, through which power is applied to revolve the inner drum 8, at a suitable speed. The shaft 13, has a steam tight stuffing box 14, packed with soft packing. The shaft 13, that drives the inner drum 8, is driven with the ordinary spur and pinion 15 and 16, Fig. 1. Pinion shaft 17, is driven with common belt pulley 18.

The head 11, Fig. 2, has a manhole 19, adapted to register with either one of the manholes 9 and 10, in the outer drum head 3, and through access may be had to the interior of the inner drum 8, for the purpose of inserting the chips and the chemical solution, and for the removal of the pulp, or having access to the rolls. Within the inner drum 8, I provide two loose rolls 20 and 21, Fig. 3, which normally lie by gravity on the lower walls of the inner drum 8, and roll on the inner surface of the drum 8, as it revolves. The walls of the inner drum 8, Fig. 2, have corrugations 22, one-quarter inch wide and one-eighth deep, cut longitudinally between heads 11 and 12, and spaced about four inches apart around about. The rolls extend from end to end of the inner drum 8, and consist of shells of steel or other metal filled with lead, or of solid steel or other metal, and being of weight and diameter suitable to the size of the machine in which they are used and to the character of the wood to be treated. The dimensions of each roll in the inclosed drawing is five-and-a-half inches in diameter, and the weight of each roll about nine hundred pounds, approximately. These rolls exert a crushing, disintegrating action on the chips caught between the rolls themselves or between them and the walls of the drum. By allowing the rolls to lie loosely in the drum, they may spread apart or draw together, as the passage

of the chips between them permits, their tendency being, of course, owing to the circular form of the drum, to roll together and crush and squeeze the chips moving between them or under them.

The elimination of intercellulose matter from hard or soft woods is possible by means of the apparatus covered by this specification, used in conjunction with a preparation of caustic soda, one hundred pounds, approximately, being employed for each ton of chips. The crushing of the chips and the heating of them from the envelop of steam inclosing the inner drum, or by means of any other suitable heating agent, facilitates the action of the caustic soda, which will so soften the wood fibers that the action of the rolls simultaneously with the chemical treatment, will reduce the chips to a pulpy state in a comparatively short space of time. Generally speaking, the sulfite process necessitates the use of expensive digesters, acid plants and the like and from twelve to sixteen hours time is required to cook the chips. With the apparatus described herein, I am able to reduce the wood chips to a pulpy condition ready for the bleachers in about three hours time, thus effecting a very large saving in time and enabling me, with a small plant and an inexpensive equipment, to equal the capacity of a large, expensive mill employing the sulfite process.

In using the apparatus, the manhole covers are removed and chips placed in the inner drum with the caustic soda, the covers are replaced and the inner drum revolved. The rolling and crushing action of the rolls will begin as soon as the inner drum is set in motion and will continue as long as it is revolved. When the chips have been reduced through the action of the rolls and solution to the desired state, the covers are removed and the contents of the inner drum taken out. The drum is again filled and the operation described, repeated.

I have designed this apparatus for use in the manufacture of pulp from hard and soft wood chips.

I claim as my invention:—

1. The combination with an outer receptacle, of an inner receptacle spaced therefrom, the space between said receptacles being adapted to contain a heating agent, said receptacles having openings and covers therefor through which chips may be placed in said inner receptacle, crushing rolls provided in said inner receptacle, and driving connection for said inner receptacle.

2. The combination, with an outer stationary receptacle, of an inner revolving receptacle spaced therefrom, means for admitting a fluid heating agent to said space, said receptacles having filling openings and covers therefor, and idle rolls provided in said inner receptacle.

3. The combination, with a stationary drum, of a revolving drum arranged within said stationary drum and spaced from the walls thereof, means for admitting a fluid heating agent to said space, said drums having filling openings and covers therefor, and idle rolls provided within said inner drum and adapted to roll on the inner walls thereof as said drum revolves, substantially as described.

4. The combination, with an outer stationary drum of an inner drum arranged within said outer one and spaced from the walls thereof, means for admitting a fluid pressure such as steam to the space between said drums, said drums having openings therein and covers for said openings and a series of smooth-surfaced idle rolls provided within said inner drum and adapted to roll on the walls thereof for the purpose specified.

5. The combination, with a revolving drum having a filling opening and a cover therefor and provided with a corrugated inner surface, of a series of idle rolls provided within said drum and extending from end to end thereof and normally connecting with one another on the bottom of said drum and capable of rolling on the inner surface of said drum wall as the drum revolves, said rolls having a crushing action on the material passing between them and between them and the drum walls, substantially as described.

6. The combination, with a stationary drum, having steam intake and discharge pipes and a manhole opening and cover therefor, of a revolving drum provided within said stationary drum and spaced from the walls thereof and also having a manhole opening and cover, and idle rolls provided within said revolving drum and normally lying loosely on the bottom thereof and adapted to follow the curvature of the walls of said revolving drum when it is in motion, substantially as described.

7. The combination, with a stationary drum, of a revolving drum having a corrugated inner surface inclosed by said stationary drum and spaced from the walls thereof, said drums having manhole openings, means for admitting a heating agent to the space between said drums, and a driving connection for said inner drum, substantially as described.

8. The combination, with a stationary drum, of a revolving drum arranged within said stationary drum and spaced from the walls thereof, means for admitting a fluid heating agent to said space, said drums having filling openings and covers therefor, and an idle crushing means provided within said inner drum and adapted to roll on the walls thereof as said drum revolves.

9. The combination, with a stationary

drum, of a revolving, imperforate drum in-
closed by said stationary drum and spaced
from the walls thereof, said drums having
suitable filling openings, means for admit-
5 ting a heating agent to the space between
said drums and a driving connection for
said inner drum.

In witness whereof, I have hereunto set
my hand this twenty-fourth day of Decem-
ber 1908.

WILLIAM BURTON.

Witnesses:

I. H. BELQUEA.

J. ROY CAMPBELL.