G. C. HOWARD.

APPARATUS FOR THE PRODUCTION OF MECHANICAL WOOD PULP.

APPLICATION FILED NOV. 15, 1911.

1,039,286. **Patented Sept. 24, 1912.**

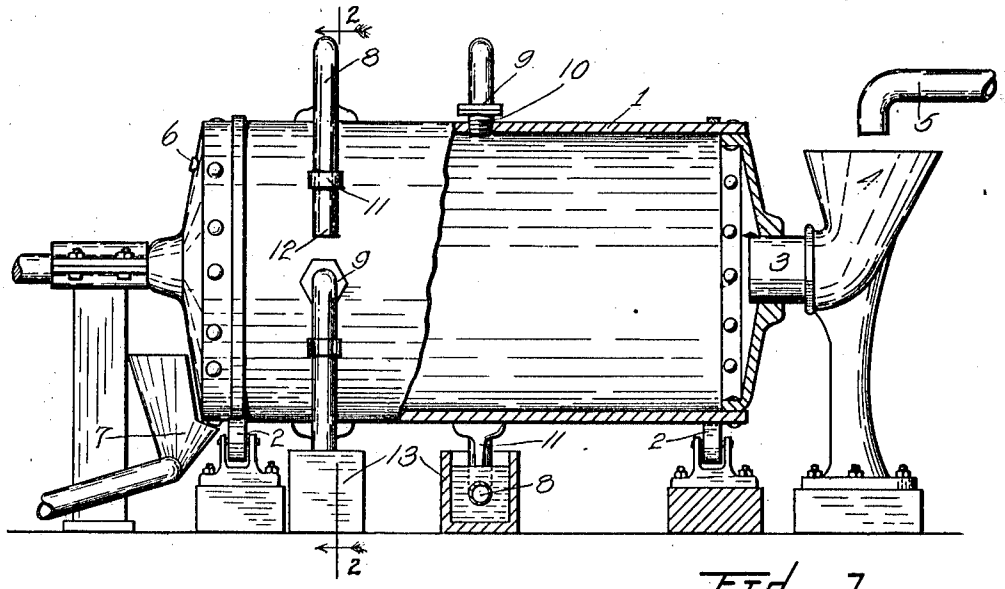

FIG. 1

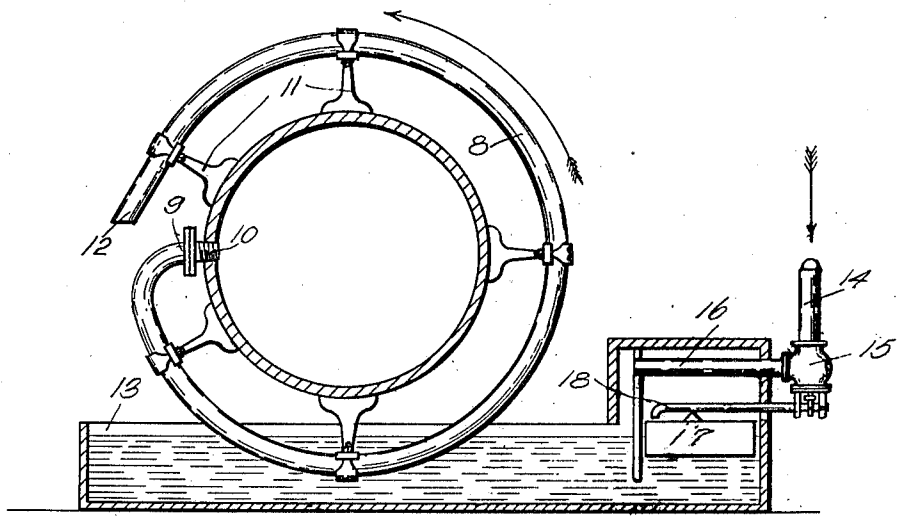

FIG. 2

WITNESSES:

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APPARATUS FOR THE PRODUCTION OF MECHANICAL WOOD-PULP.

1,039,286. Specification of Letters Patent. Patented Sept. 24, 1912.

Application filed November 15, 1911. Serial No. 660,423.

To all whom it may concern:

Be it known that I, GUY C. HOWARD, a citizen of the United States, residing at Everett, in the county of Snohomish and State of Washington, have invented certain new and useful Improvements in Apparatus for the Production of Mechanical Wood-Pulp, of which the following is a specification.

This invention relates to apparatus for grinding fibrous vegetable material for paper pulp and particularly to improvements in the method described in my prior Patent No. 997,064, dated July 4, 1911.

The grinding or disintegration of the fibrous vegetable material into its individual fibers suitable for use in paper manufacture as described in said patent is effected in tube mills in which the material is charged in one end, exposed to the grinding action of suitable sized balls or pebbles and discharged from the other end in a partially or wholly disintegrated condition.

It is found when working on certain fibrous vegetable materials that more water is necessary to be added to keep the fluidic consistency of the contents at the proper state for economical maceration. Addition of water to the pulp material during reduction may be required through loss of available water by absorption, increase in bulk and space occupied by the material through disintegration, and the swelling of the fibers through the absorption of water.

Assuming that the material is fed to the mill in approximately the proper proportions of fiber and water for efficient grinding, the progress of the material through the length of the mill with the increasingly diminishing size of the fiber-bundles requires that water be added at predetermined intervals in its course to maintain what has been found as the proper state of dilution for the best reducing action.

The invention consists in the adaptation and combination with a tube mill of novel devices for introducing water therein, as will be hereinafter described, illustrated in the accompanying drawings, and finally set forth in the appended claims.

In the drawings, Figure 1 is a view partly in side elevation and partly in vertical section of an embodiment of my invention. Fig. 2 is a cross sectional view through 2—2 of Fig. 1.

Referring to said drawings, the reference numeral 1 designates a tube mill adapted to contain a quantity of balls or pebbles of suitable size for the disintegration of fibrous vegetable material continuously fed thereinto. Said mill may be supported upon rollers 2 and rotated at desired speed through power applied in any suitable manner. At one end of said mill it is provided with an axially arranged charging tube 3 whose outer end communicates with a hopper 4 into which a mixture of water and pulp material to be ground is received as from a conveyer pipe 5. At the opposite end of the mill it is formed with a discharge opening 6 which allows a portion of the contained fiber material to exude from the mill at each revolution. The material thus issuing is caught by the receptacle 7 and conveyed where desired.

The introduction and discharge of material is a continuing operation and the material thus progressively travels from one end to the other of the mill during its maceration and disintegration. For reasons previously explained, it may be desirable to increase the amount of water at intervals within the mill as the pulp is reduced in its passage therethrough. One or more devices for introducing water may be provided for each mill, and may severally consist in a pipe 8 connected at its end 9 with a flanged nipple 10 having communication with the mill interior and bent or coiled circumferentially about the mill, a plurality of brackets 11 fixedly secured to the mill exterior being utilized to maintain the pipe in generally concentric spaced relation to the perimeter of the mill. The other end 12 of the pipe terminates in proximity of the inlet 9 and affords an opening into the bore of the pipe.

13 indicates a trough adapted to be partially filled with water into which the lowermost portion of the pipe 8 is more or less submerged. The height of water in said trough may be automatically regulated to be maintained at a predetermined height by any suitable means. That illustrated in the drawings consists in a water supply pipe 14 leading into a valve casing indicated at 15, and provided with a pipe 16 discharging into said trough. A float 17 impinging upon a lever arm 18 connected to said valve regulates the admission of water by its rise or fall according to the height of water in the trough.

In operation, the mill is rotated in the

direction indicated by the longer arrow in Fig. 2. In each revolution the open end 12 of the pipe 8 enters the water in the trough 13 and scoops up a portion of said water. As the rotation of the mill continues this water is progressively conducted along the length of the pipe by gravitating downwardly in a contrary direction to such rotation until the inlet 9 is reached whereupon the continued rotation causes the water to flow into the interior of the mill. In the meantime the rotation of the mill has caused another scoop of water to be engulfed within the pipe 8 and the same operations are repeated and continued as desired by the operator. The amount of water received each revolution by said pipe is regulated within limits by the depth of water in the trough 13 and the latter may be maintained automatically at a desired height by adjustment of said valve and float.

As stated, one or more of the described or equivalent devices may be provided for each mill at spaced intervals along its length. In the reduction of various varieties of wood to pulp more or less water may be required and this may be readily accomplished by the foregoing means, through the utilization of all such devices to the degree desired or cutting out one or more such devices in their entirety by the prevention of flow of water into the respective trough.

The devices are simple and accessible, do not obstruct in any way the interior of the mill and are very well adapted for the purposes intended.

What I claim, is—

1. In a mill for reducing wood pulp material, the combination with a revolving cylinder having an intake for material and a discharge, of a supplementary inlet or inlets for water intermediate said intake and said discharge.

2. A mill for the reduction of wood pulp, consisting of a revolving cylinder, provided with intake and discharge devices for material and water, means within said drum for mechanically macerating said material, and means for intermittently introducing additional water within the cylinder intermediate said intake and said discharge.

3. A mill for the reduction of wood-pulp consisting of a revolving cylinder provided with intake devices for pulp material and water at one end, and discharge devices therefor at its other end, means within said mill for macerating said material, a peripherally arranged pipe about said cylinder having an open end and an end opening into said cylinder, and a receptacle for water into which said open end of the pipe may be submerged at each revolution of the cylinder.

GUY C. HOWARD.

Witnesses:
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HORACE BARNES.