

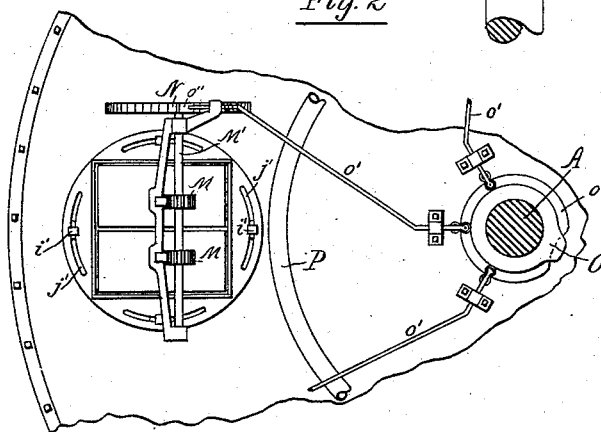
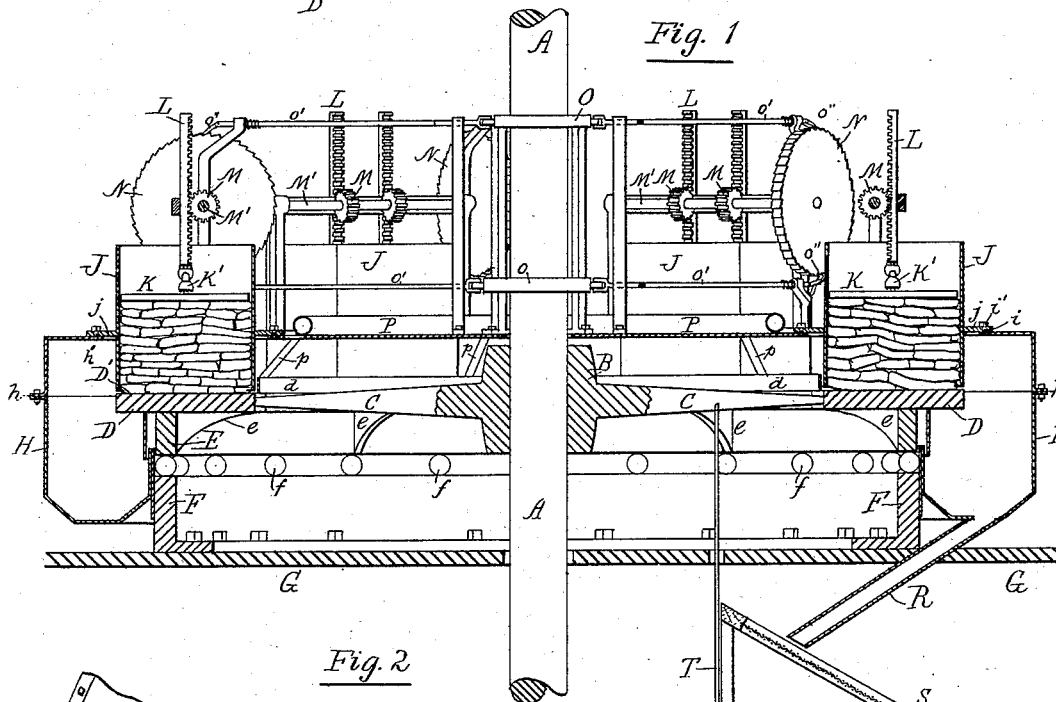
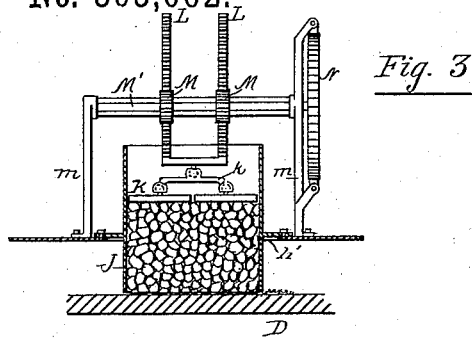
(No Model.)

E. P. ELY.

MACHINE FOR THE REDUCTION OF WOOD PULP.

No. 305,062.

Patented Sept. 16, 1884.



Witnesses

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# UNITED STATES PATENT OFFICE.

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## MACHINE FOR THE REDUCTION OF WOOD PULP.

SPECIFICATION forming part of Letters Patent No. 305,062, dated September 16, 1884.

Application filed October 24, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD P. ELY, a citizen of the United States, residing at South Wallingford, Vermont, have invented certain new and useful Improvements in Machines for the Reduction of Wood Pulp, of which the following is a specification.

My invention relates to means for grinding and reducing wood fiber to any desired fineness, and to means for automatically feeding the wood in the adjustable hoppers, and mechanism for sifting and assorting the particles when ground; and my device consists, primarily, of a vertical spindle or power-shaft journaled at its terminals, adapted to receive motion from any suitable source, and provided with a hub having spokes or arms radiating therefrom, and which engage with slots or openings formed in the inner periphery of an emery ring. This emery ring is supported on and connected to a circular track, and is provided with suitable brackets for giving greater strength to the connection. Below, and formed complementary with the above track, is a second track, also circular in shape, and which rests upon a platform or other support. Between these two tracks are anti-friction balls or rollers for facilitating the movement of the rotating parts, as hereinafter more fully described. Surrounding the emery ring is a hollow frame, and at suitable distances apart and upon said frame are placed boxes or hoppers for the reception of the wood to be ground. These boxes or hoppers extend through the hollow frame as far as the emery ring, leaving a narrow slit at the bottom for the escape of the ground fiber into the hollow frame or receptacle. The boxes or hoppers are square in shape, and are provided with circular flanges or wings, which ride upon the cover of the hollow frame. The openings in the latter through which the hoppers extend are also circular. By this arrangement the hoppers may be turned and adjusted to various positions and securely locked therein by means of bolts attached to the cover of the hollow frame, and which extend through slots in the flanges of the hoppers. By this means the hoppers may be turned and their contents adjusted in relation to the revolving emery ring,

so that the fibers removed from the wood may be long or short, as desired, according to the angle at which the wood is placed relatively to the ring. The bolts above mentioned, which extend through the flanges of the hoppers, are provided with nuts for locking them when set in position. Pressure upon the wood within the hoppers is produced by means of a follower, formed in two sections for its more convenient manipulation, having a bridging-arm connected by means of a ball-and-socket joint to a pair of vertical pinions, which are automatically depressed by mechanism connected to the power-shaft as follows: Arranged upon the power-shaft are two cams projecting in opposite directions with encircling-rings having arms extending outward toward the hoppers. The outer ends of these arms are supplied with dogs which engage with and rotate a ratchet-wheel whose axle is suitably journaled in supports arranged upon both sides of the hopper. Upon this axle are also placed cog-wheels to gear with the vertical pinions above mentioned. It will be seen by this arrangement that as the power-shaft rotates, the ratchet-wheel will be revolved by virtue of the arms with their dogs moving in opposite directions, and the vertical pinions gearing with the axle of the ratchet-wheel will be gradually pressed downward, thus providing an automatic feed for the contents of the hoppers. Pipes for conveying water for clearing the emery ring of the ground fiber are provided in suitable places. The pulp within the hollow frame is conducted by means of a suitable pipe to a double sieve, which is periodically agitated by means of an upwardly-extending arm engaging with the spokes of the main shaft.

Referring to the accompanying drawings, Figure 1 represents a side elevation of my improved machine, showing a portion of the same in section. Fig. 2 is a plan view of one of the feed boxes or hoppers. Fig. 3 is a sectional elevation of the same.

A represents the vertical power-shaft, suitably journaled and receiving motion from any appropriate source.

B is a hub keyed thereto and provided with arms or spokes C.

D is an emery ring, provided with slots *d*, into which the spokes mesh. The wheel or ring D is supported on an annular track, E, and is provided with strengthening-brackets *e*. The grinding portion of the ring is its upper surface, D'.

Arranged below the track E is a second track, F, and between the two are placed anti-friction balls or rollers *f*. The track F rests upon a platform, G.

H is a hollow frame or receptacle, which surrounds the ring D, and into which the pulp is received as it falls from the ring D. The hollow frame is formed in two portions—an upper and a lower part—and these two portions are secured together at *h*. The hollow frame H is provided with circular openings *h'*, through which the hoppers J extend. These hoppers are provided with flanges or wings *j*, which ride upon the cover of the frame H. Bolts *i*, attached to the frame H, extend upward through slots *j'*, formed in the wings *j*. These bolts are provided with nuts *i'* for locking the hoppers in position.

Arranged within the hoppers J are followers K, constructed preferably in sections, as shown, connected by a bridging-arm, *k*, and provided with a ball-and-socket or universal joint, K', and vertical pinions L, which gear with the cog-wheels M, arranged upon the axle M' of the ratchet-wheel N. The axle M' is journaled in supports *m*.

Upon the main shaft A are placed cams O, arranged diametrically opposite each other, provided with encircling-rings *o*, having arms *o'* extending outward and adapted to rotate the ratchet-wheel N by means of the dogs *o''*.

A pipe, P, is provided for conveying the water from any suitable source, and throwing it by means of the smaller pipes *p* to the emery-wheel for removing the loose particles of wood fiber. These pipes may be distributed in any approved manner, the drawings showing one arranged between each hopper.

The frame H is provided with a conduit or pipe, R, which conveys the pulp to the vibrating sieves S S' below. These sieves are of any desired mesh and may be regulated according to the fineness of the fiber or pulp desired. A rod, T, is provided with a lug, *t*, which rests under the sieves, the arm extending upward and arranged to be tripped by the spokes C as they revolve.

A trough, U, is placed below the sieve S', and is adapted to receive the pulp as it finally leaves the machine.

It will be seen that by virtue of the ball-and-socket joint the hoppers may be adjusted upon the frame carrying the followers with

them without disturbing the feeding mechanism which is rigidly attached to frame.

It will be seen that by reason of the hoppers J being fitted loosely in the opening *h'* in the annular case, and the top of said case being itself detachable, the emery or other grinding ring may be readily removed and replaced.

Whatever novel subject-matter I have shown and not claimed herein, I have claimed in my co-pending applications for patents, Serial No. 111,086, filed November 7, 1883, and Serial No. 114,201, filed December 11, 1883.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. In a machine for reducing wood pulp, the removable emery ring having means of rotation, substantially as described, and anti-friction bearing-surfaces, as set forth.

2. The emery ring rotating in a hollow frame and connected to and resting upon a circular track, in combination with a second track and interposed anti-friction balls or rollers.

3. In a wood-pulp machine, the combination of a rotary emery ring and one or more feed-boxes fixed over the face of said ring, said boxes having flanges slotted, as shown, and bolts for fixing at any desired position according to the desired staple of fiber, as set forth.

4. In a machine for the reduction of wood pulp, in combination with a supporting frame or wheel, an emery ring, and means for attaching said ring to said wheel, whereby the former may be bodily removed, substantially as set forth.

5. In combination with the hoppers of a wood-pulp machine, the adjustable feeding mechanism, substantially as hereinbefore described.

6. The combination of the vertical power-shaft or spindle having cams formed on diametrically-opposite sides, the encircling-rings provided with arms having dogs, and the ratchet-wheel for automatically feeding the wood within the hoppers, as described.

7. In combination with the wood-pulp machine, substantially as hereinbefore described, the vibrating sieve and screen-plate adapted to operate for the purpose set forth.

8. In combination with the wood-pulp machine, a vibrating wire sieve placed at any desired angle above a screen-plate, the sieve and screen-plate being fastened together, and adapted to operate in conjunction, as described.

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