

M. S. & M. E. OTIS.

Wood-Grinders for Paper-Pulp.

No. 144,354.

Patented Nov. 4, 1873.

Fig. 1.

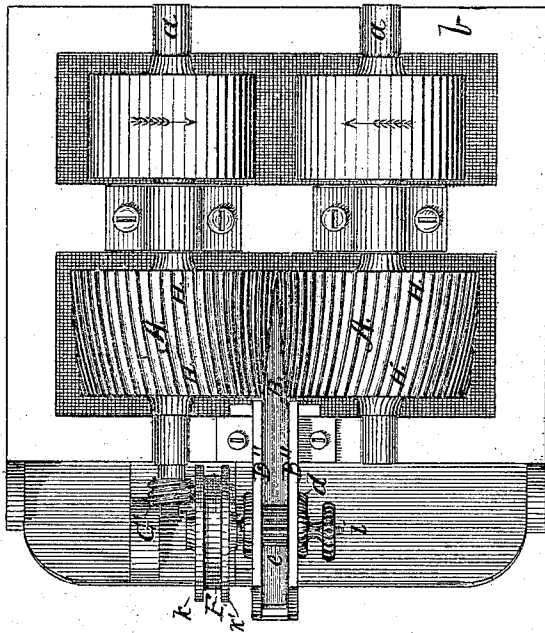


Fig. 2.

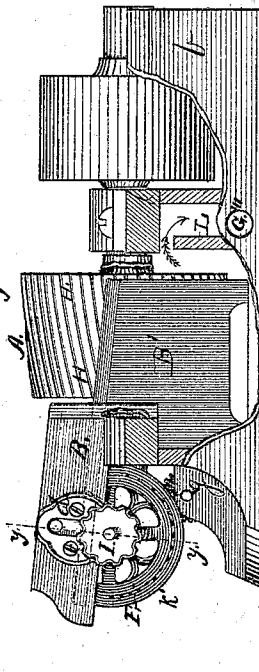


Fig. 3.

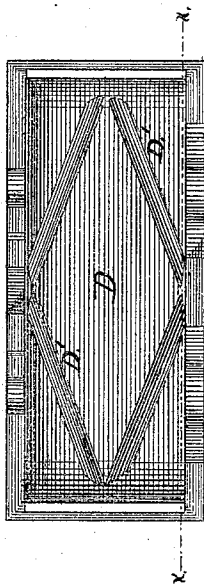
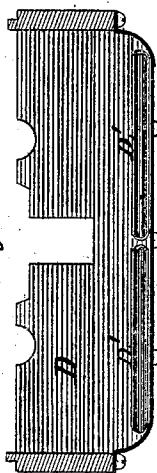
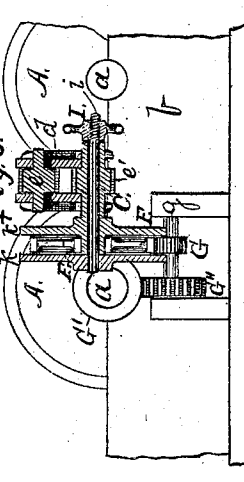


Fig. 4.



Figs. 5.



Witnesses.

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UNITED STATES PATENT OFFICE.

MARVIN S. OTIS AND MARVIN E. OTIS, OF ROCHESTER, NEW YORK.

IMPROVEMENT IN WOOD-GRINDERS FOR PAPER-PULP.

Specification forming part of Letters Patent No. 144,354, dated November 4, 1873; application filed October 18, 1873.

To all whom it may concern:

Be it known that we, MARVIN S. and MARVIN E. OTIS, of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Wood-Grinders for Paper-Pulp, of which the following is a specification; and we do hereby declare that in the same is contained a full, clear, and exact description of our said invention, reference being had to the accompanying drawing, and to the letters of reference marked thereon.

Our invention relates to means for grinding the fiber of wood to paper-pulp from blocks fed constantly between two revolving conically-shaped grinders, both turning over toward the wood, and grinding two sides thereof at the same time in a line diagonal to the plane of the fiber; and also to the means employed for feeding the wood to the grinders. Our invention further relates to a certain method of furrowing the grinders to adapt them to act more effectively upon the fiber being treated; and to a means of preventing a regrinding of the pulp produced.

In the further description of our invention which follows, due reference must be had to the accompanying drawing, in which—

Figure 1 is a plan view of the machine, the cover for the grinders being removed. Fig. 2 is a vertical side elevation of the same, a portion of the side frame being broken away to show the inner parts. Fig. 3 is an inverted plan of the cover. Fig. 4 is a longitudinal section of the same upon the line *x x*. Fig. 5 is a part end elevation of the machine, showing the feeding mechanism in section upon the line *y y*.

Similar letters of reference indicate similar parts of the invention in all the views.

A A represent the grinders secured to the shafts *a*. The grinders, made, as aforesaid, of "Medina sand-stone," may be three or more feet in diameter, and sixteen or more inches in face, and have a taper of about seven or eight degrees on each side, from a line parallel with their axes, so that the opening between the two at the minor diameters will be four or five inches when their major diameters are close together. The grinders A are turned off true on their shafts, and have a dress of fur-

rows, H, or cracks, curved forward in the line of motion lengthwise of their surface. The object of this curved dress is to give a shearing cut across the fiber, and also to incline the wood to be drawn into the machine. The grinders and shafts are mounted upon a suitable frame-work, *b*, of wood or iron. Within the space between the grinders we insert a wedge-shaped rest, B, for the wood to be ground, supported by the frame-work, and also by a stand, B', resting upon the floor of a water-tight box, hereinafter described. The rest B, extending from the machine at a slight upward incline, is provided with sides, which with it form a box or channel, B'', through which the wood is passed, by means hereinafter specified, constantly and automatically to the grinders. The feeding mechanism is specially designed to be capable of such increased or diminished power as may be found necessary in treating different qualities of hard or soft wood, and also to be constant, and operated by either the same power that moves the grinding parts of the machine, as shown in the drawing, or other motive mechanism. Within the bearings *d*, attached to the sides of the feeding box or channel B'', are placed two small fluted feeding-rollers, *e e'*, the roller *e* operating at the upper, and that *e'* at the lower, surface of the block of wood to be fed to the machine. The lower roller *e'* extends slightly above the upper surface of the rest B, the upper roller *e* being with its shaft vertically yielding or adjustable in slots in the bearings *d*. The roller *e'* is upon, as a part of, a hollow shaft, C, through which a rod, *i*, passes, having a threaded end and a hand-wheel, I, thereon. The other end of the rod *i* is tapped into a flange, *k*, which, with the rod *i*, is free to be moved longitudinally of the hollow shaft. A corresponding flange, *k'*, is attached to, as a part of, the hollow shaft; and between the flanges *k k'* is a loose friction-wheel, F. Below the friction-wheel F is a shaft, *g*, having a small pulley, G, the shaft and pulley being operated by the worm-wheel G' upon one of the grinding-shafts, and the wheel G'' on the shaft *g*. A rotary motion being transmitted to the shaft *g*, the friction-wheel F is revolved by the pulley G by belt; or the wheels F G may be geared, and the hollow shaft rotated by the

action of friction produced between the sides of the friction-wheel F and the flanges *k k'*. The power of the feed is regulated by the amount of friction created by drawing the flange *k* against the side of the wheel F by means of turning the hand-wheel on the rod *i*. Within the frame is constructed a water-tight box, in which the grinders revolve. As the grinders revolve rapidly, a certain quantity of water with pulp intermixed is thrown upward; and, to prevent the regrinding of the pulp by its return to the machine, we place inside the cover D of the grinders troughs D', which consist of metallic plates bent in the form of spouts having their opposing sides open, arranged in a manner best calculated to catch the water, preferably in the manner shown in Fig. 3. As the water is thrown upward it partakes of the forward movement of the grinders, and thus is ejected through the spouts at a given momentum; and, because of the greater velocity of the peripheries of the grinders at their larger diameter, the water is thrown off from them at those points, being caught by the troughs D', and discharged from them to the water-tight box. As the pulp is ground it floats to the surface of the water in the water-tight box, the water being at a proper height therein, and over the board L, through the opening G''', to some suitable receptacle.

Having described our invention, what we claim as new, and wish to secure by Letters Patent of the United States, is—

1. The two conical grinding-stones A on shafts *a*, revolving over toward each other, in

combination with the wedge-shaped rest B, upon which the wood is fed to the grinders, substantially as described.

2. In combination with the rest B, which forms the bottom of the box or channel B'', and which rest is wedge-shaped at its end extending between the grinders, the fluted vertically-yielding feed-roller *e* and stationary feed-roller *e'*, substantially as and for the purpose described.

3. The sleeve C, having the flange *k'*, and carrying the loose friction-wheel F, in combination with the shaft *i* and its flange *k*, and hand-wheel I, constituting a variable feeding device, substantially as described.

4. The two conical grinding-stones A, each provided with curved furrows H, running longitudinally upon its periphery, said furrows being curved for the purpose of grasping and drawing in the wood, and giving it a shearing cut diagonally across its fiber, substantially as described.

5. In combination with the conical grinders A, the troughs D', fixed by one edge to the inside of the cover D, for the purpose of catching and conveying to the sides of the stones such ground wood as may have been thrown up by them, thus preventing any regrinding, substantially as set forth.

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