(No Model.)

J. D. POWERS.

WOOD PULP GRINDER.

No. 342,759. Patented May 25, 1886.

Fig. 1.

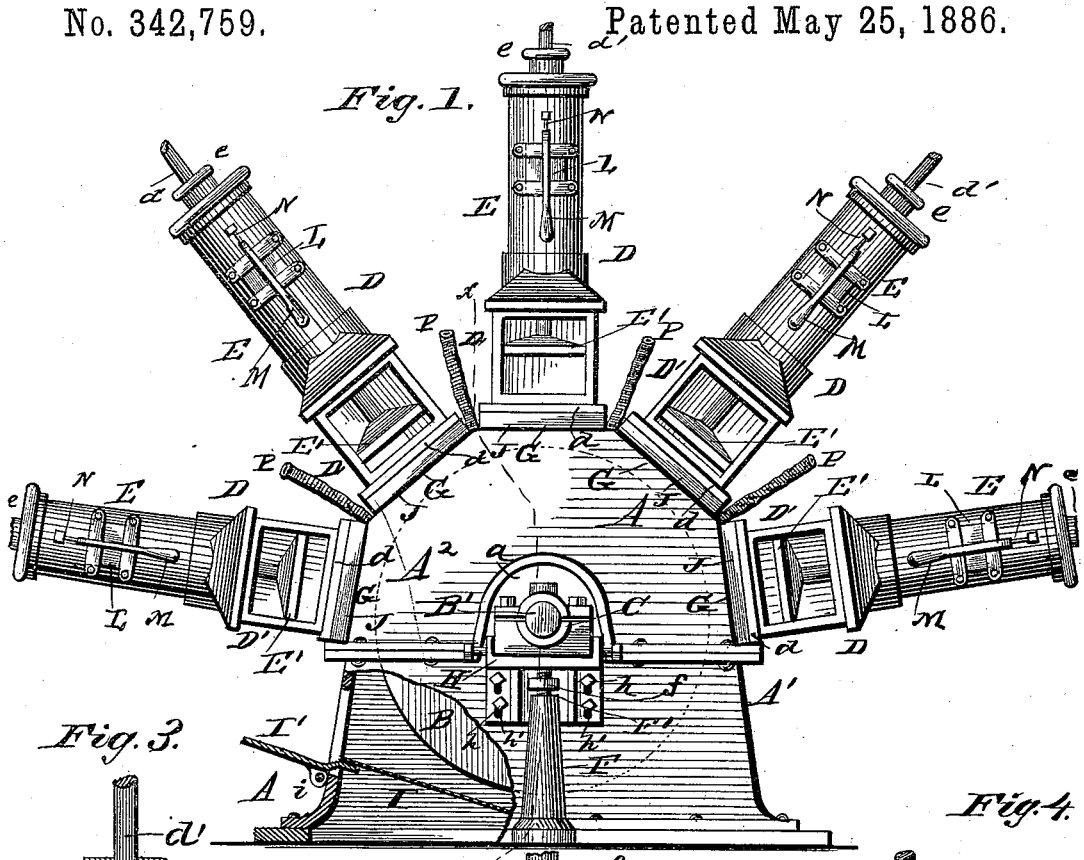


Fig. 3.

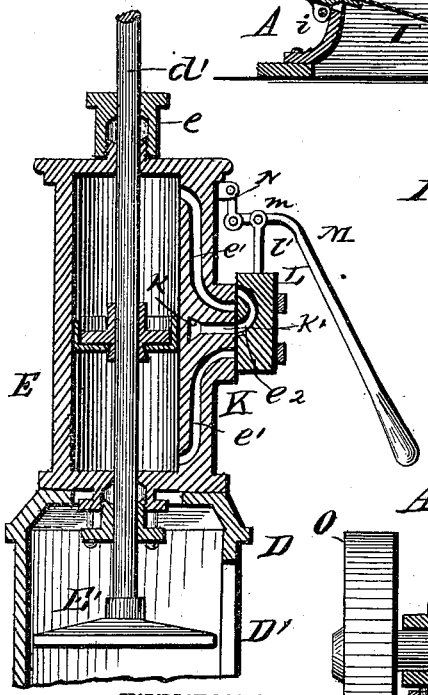


Fig. 2.

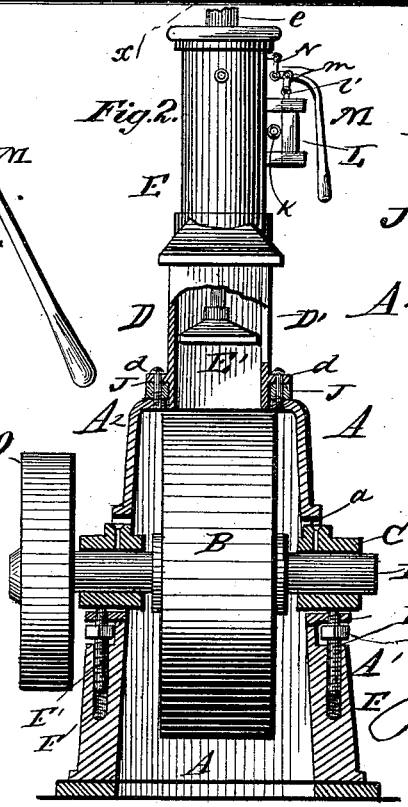
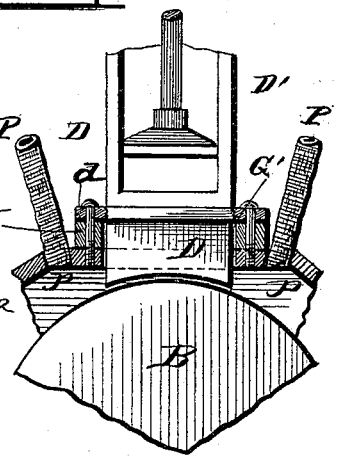


Fig. 4.



WITNESSES

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JOHN D. POWERS, OF HADLEY, NEW YORK.

WOOD-PULP GRINDER.

SPECIFICATION forming part of Letters Patent No. 342,759, dated May 25, 1886.

Application filed July 15, 1885. Serial No. 171,695. (No model.)

To all whom it may concern:

Be it known that I, JOHN D. POWERS, of Hadley, in the county of Saratoga and State of New York, have invented certain new and useful Improvements in Wood-Pulp Grinders; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification, in which—

Figure 1 is a side elevation of the invention, partly in section, to show the inclined screen. Fig. 2 is a central vertical section on line *x x*, Fig. 1. Fig. 3 is a central vertical section of one of the cylinders and part of one of the follower-cases. Fig. 4 is a detail sectional view of a portion of the machine.

This invention relates to mechanism for grinding wood into pulp, the said mechanism being actuated by hydraulic pressure; and it consists in the construction and novel arrangement of parts hereinafter described, and pointed out in the appended claims.

Referring to the accompanying drawings by letter, A designates the main case of the machine; B, the grindstone or emery-wheel turning in bearings C, supported as hereinafter described upon the case; D, the follower cases or boxes in which the blocks of wood are placed to be driven down on the stone by the follower D′, and E the cylinders in which the pistons E′, having the followers on their inner ends, are reciprocated by hydraulic pressure.

The lower part, A′, of the case A is rectangular in transverse section and flanged outwardly around its upper and lower edges, the lower edge being bolted down to any proper support.

F F are vertical ribs or pillars rising from the lower flange of the casing A′, on which they are cast, and running centrally upward on the outside of the same. The said pillars have vertical threaded bores, in which engage the screws F′ F′, which support the journal-boxes of the shaft of the grindstone, hereinafter described.

The upper part, A^2, of the casing A is flanged outwardly around its base and bolted to the lower casing, A′, through the meeting flanges, as shown. The periphery of the upper casing, A^2, is formed into the similar flat surfaces or faces, G, each of which is provided with a rectangular opening, G′, for the insertion of the lower end of one of the follower's cases.

a a are semicircular openings made centrally on the lower edge of the sides of the casing A^2, and flanged outwardly. The said openings give passage to the ends of the shaft of the grindstone.

The grindstone or emery-wheel B is provided with the shaft B′, the ends of which pass through the openings *a a* and turn in the journal-boxes C C, upon the upper part of which proper oil-openings are made, as shown. The journal-boxes rest upon the upper horizontal plates of the brackets H H, the said plates having their ends flanged upward, so as to fit against the sides of the journal-boxes, which are secured in position by set-screws passing through the flanges. The brackets H are held in place by the screws *h*, which pass through slots *h′* in the brackets and engage in threaded recesses in the casing A′. The horizontal plates of the brackets rest upon the upper ends of the screws F′, which are raised and lowered by the nuts *f*, resting upon the upper ends of the pillars F and engaging the said screws. By this means the journal-boxes, and consequently the grindstone, may be raised or lowered when necessary.

I is a screen or sieve, for the ground wood falling from the grindstone. The screen inclines upward from the center of the base of the casing A′ to one end of the same, and stands over a suitable discharge-opening for the screenings.

I′ is a door in the end of the casing A′, to which the screen runs. The door is provided with perforated ears on its sides, near its lower edge, which lie within similar ears on the sides of the door-opening in the casing, the door being held in place and hinged on the casing by a rod, *i*, which passes through the ears, as shown. The door is so placed that when opened the part below the rod *i* will turn in under the edge of the screen, and form therewith an inclined plane, over which splinters or slivers of wood or other refuse from the stone may be easily drawn out of the machine without catching or hanging.

Each follower casing is rectangular, and has its inner or lower end formed to fit snugly in an opening, G'. The sides of the said ends are made concave on the arc of a circle, which, when the casing is in place, is concentric, or nearly so, with the periphery of the grind-stone.

d is an outstanding flange around the casing D', near its lower end, the front or face of the casing being open above said flange.

J is a rectangular frame of wood or other suitable material, fitting around the casing below the flange *d*, and when the casing is in place lying on one of the faces G. The follower-casing is secured to the main casing by bolts, which pass through proper openings in the flange *d* and frame J and enter threaded recesses in the face G.

When it is desired to bring the follower-casing, and consequently the follower, nearer the stone, the frame J is removed and planed down and replaced, thus bringing the flange D nearer the face G.

The follower D is rectangular and provided with the rod *d'*, which passes through stuffing-boxes *e' e'* at each end of the cylinder E, opening centrally in the top of the follower-casing, and has secured to it the piston E' within said cylinder. One side of the cylinder E is reenforced or thickened, and provided with the canals *e'*, which run from its ends to near its center, and open on a valve-seat, e^2, within a valve-casing, K, cast in one piece with the cylinder, and provided with a receiving-port, *k*, to the outer side of the valve-seat, and a discharge-port, *k'*, to the inner side of the valve-seat, and opening thereon between the orifices of the canals *e'*, as shown.

L is a slide-valve of ordinary construction, moving on the valve-seat e^2. The stem *l'* of said valve passes through a stuffing-box in the top of the valve-casing, and has its outer end pivoted to the curved lever-handle M at *m*.

N is a link pivoted at its lower end to the upper ends of the lever-handle and at its upper end between the ears *n* on the cylinder. The said link enables the valve-stem to travel straight when actuated by the lever-handle.

O is a pulley on the rear end of the shaft of the grindstone, which is rotated by a belt running over said pulley from any proper source of power.

When the stone is rotating, the blocks of wood are inserted in the follower-casing below the follower, and the latter is made to move inward by moving the slide-valve in the proper direction by means of the lever-handle, the water flowing through tubing from any proper source into the receiving-port *k* of the cylinder, and out through the discharge-port *k'* in the well-understood manner. The water admitted to the wood being ground by the stone flows in through tubes P P from any proper source. The tubes P have their ends secured in openings *p p*, which are made in the upper casing, A^2, between the follower-casings.

The upper casing, A^2, is cast in one piece, and when it is bolted on the lower casing, and the follower-casings are bolted to it through the intervening wooden frames, J, the joints are all very tight, and the water poured down on the stone and which mixes with the ground wood is prevented from being thrown and spattered out of the machine by the centrifugal force of the stone.

The water is not introduced into follower-casing D nor into the cylinder E, but flows directly upon the face of the grind-stone B through the tubes P and openings *p* in the upper casing, A^2. The stone, moreover, turns on a horizontal shaft, so that the water can fall on its face, and will be carried down with the formed pulp as the stone rotates. This action would be impossible if the stone were horizontal, or, in other words, turned on a vertical shaft. The water would then descend and fall from the lower edges of the stone, and would not exert such efficient action in pulp making. The frames J, by their capability of being reduced in thickness, allow the follower-casings to be set farther inward, so as to give the followers a closer throw toward the stone, when desirable. This is a material advantage in causing the stone and followers to coact evenly together.

I am aware that the pistons and followers actuated thereby have been used in combination with a rotating grindstone, and such I do not claim, broadly.

Having described my invention, I claim—

1. In a machine for grinding wood-pulp, the combination, with a grindstone, of the main frame provided with a series of follower-cases, each case having a cylinder and each cylinder provided with stuffing-boxes at both ends, and also with pistons reciprocating therein, all arranged to operate substantially as herein described.

2. The combination of the grindstone turning on a horizontal shaft, the journal-box C, rendered vertically adjustable by means of the screws F', brackets H, provided with the slots *h'* and the nuts *h* and *f*, the follower-cases secured to the upper portion of the main casing of the machine, the cylinders opening into the said casings, and the pistons and followers connected and reciprocated together by the piston-rods, substantially as specified.

3. The combination of a grindstone turning on a horizontal shaft, the upper casing, A^3, having the follower-casings secured over openings in its edge, the cylinders opening into the outer ends of said casings, the followers and pistons connected together and reciprocating, substantially as described, and the lower casing, A', having the upper casing, A^2, secured to and supporting vertically-adjustable bearings for the grindstone, substantially as specified.

4. The combination of the grindstone rotating on a horizontal shaft, the main casing composed of the upper and lower casings, A^2 and A', respectively, the follower-casings open-

ing into the edge or rim of the upper casing, A^2, the followers reciprocating in the follower-casings, the hinged door I′ in the lower casing, A′, inclined screen I, by means of which the pulp may be drained before removing through the door I′, substantially as specified.

5. The combination of the grindstone turning on a horizontal shaft, the main casing composed of the lower section, A′, and the upper section, A^2, provided with the faces G and rectangular openings G′, the reciprocating followers, the follower-cases D′, provided with the flanges *d* and rectangular wooden frames J, each standing between a flange, *d*, and a face, G, of the casing A^2, substantially as specified.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JOHN D. POWERS.

Witnesses:
W. R. KEYWORTH,
THEODORE S. WEST.