

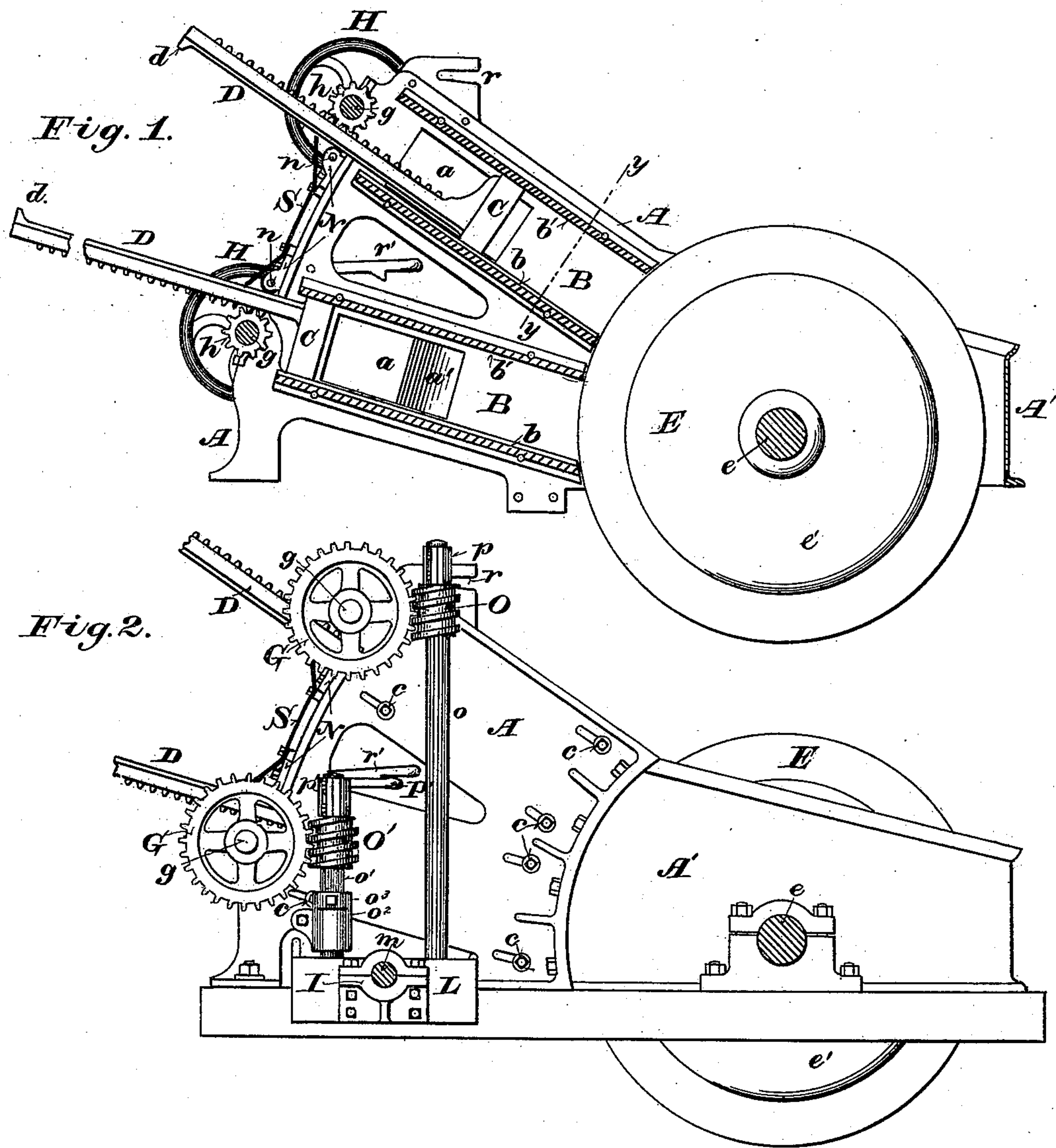
(No Model.)

2 Sheets—Sheet 1.

O. A. BYRNS.
PULP GRINDING MACHINE.

No. 361,207.

Patented Apr. 12, 1887.



Witnesses:
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George Goll

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(No Model.)

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Fig. 3.

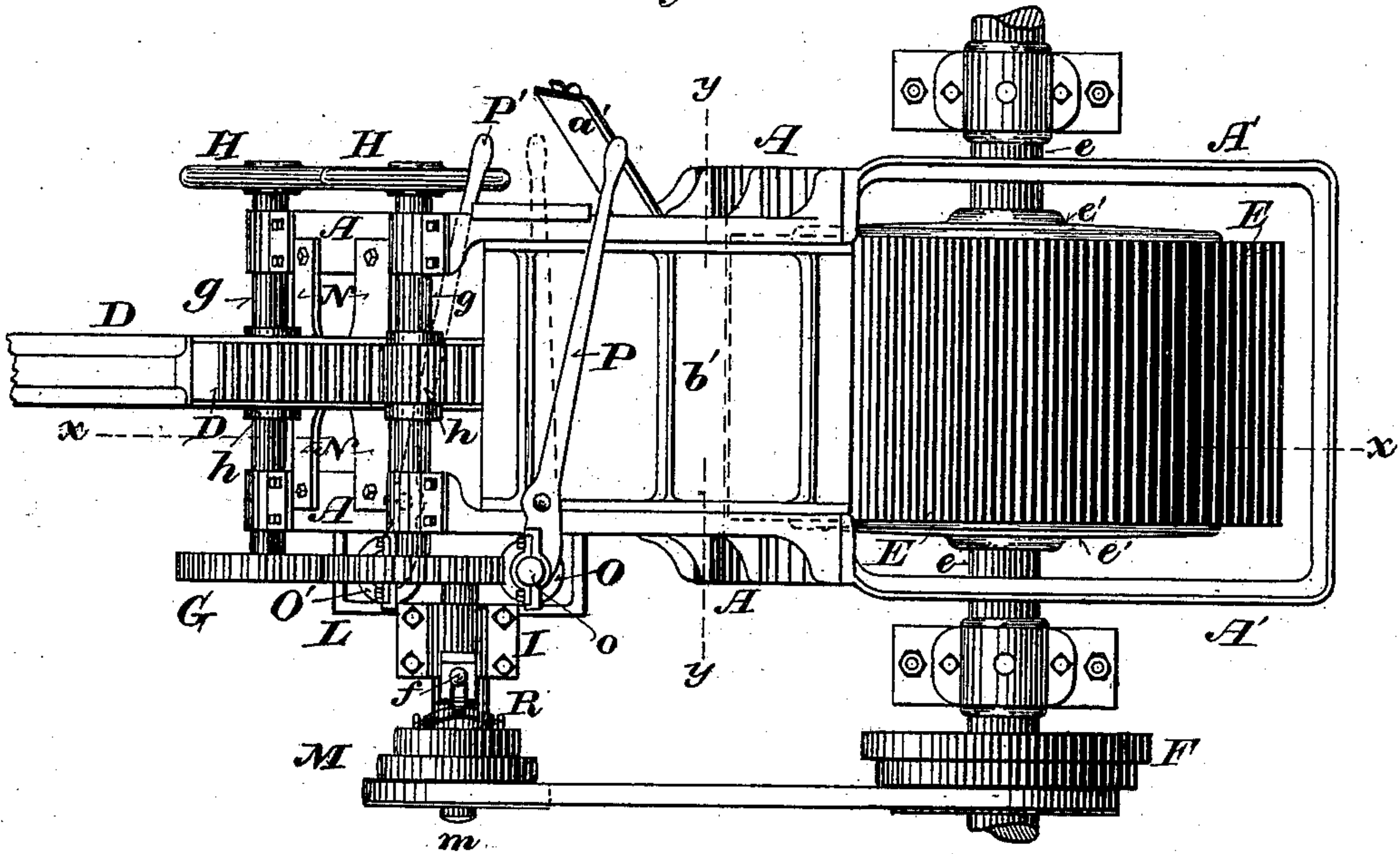


Fig. 4.

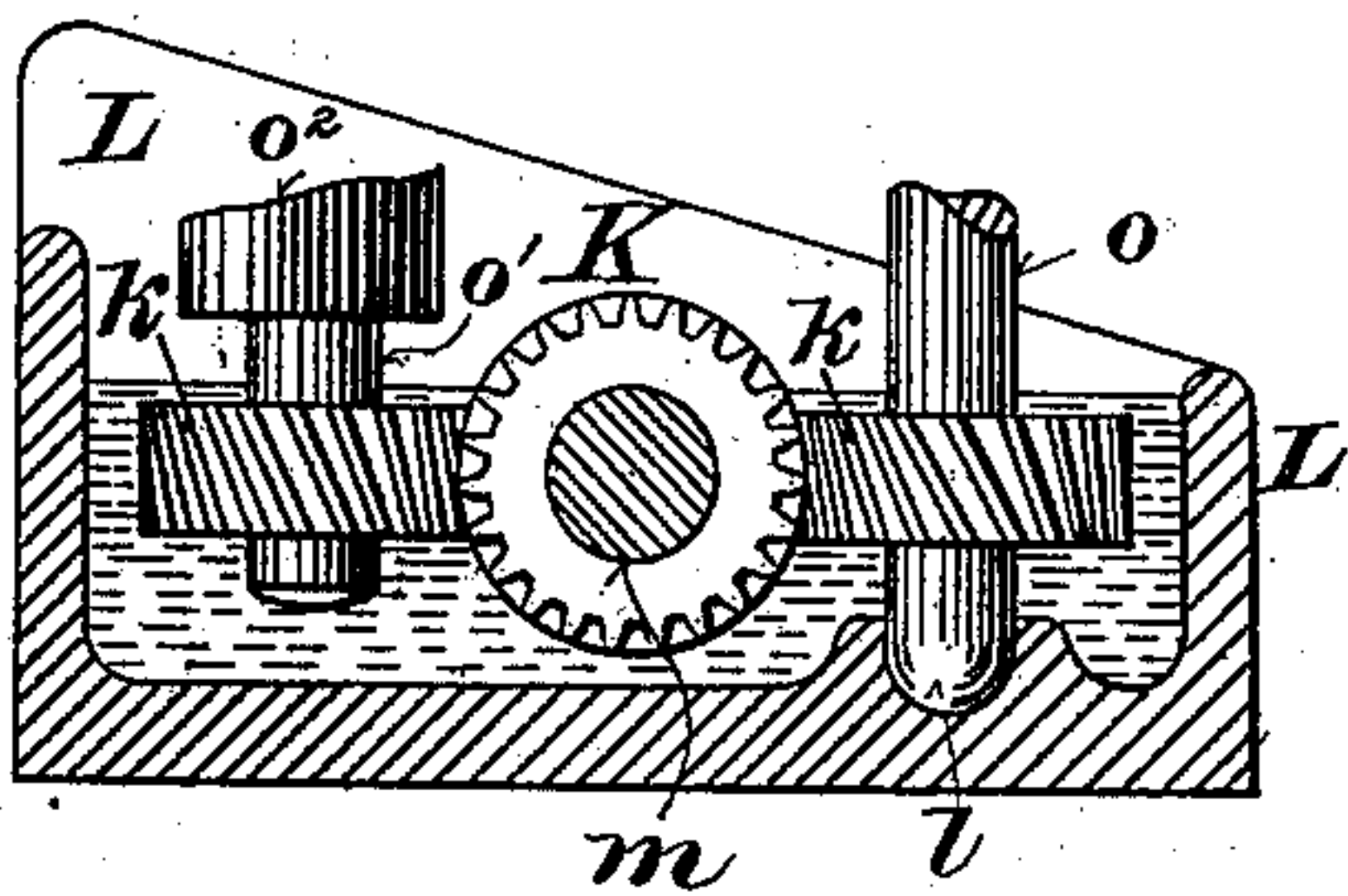
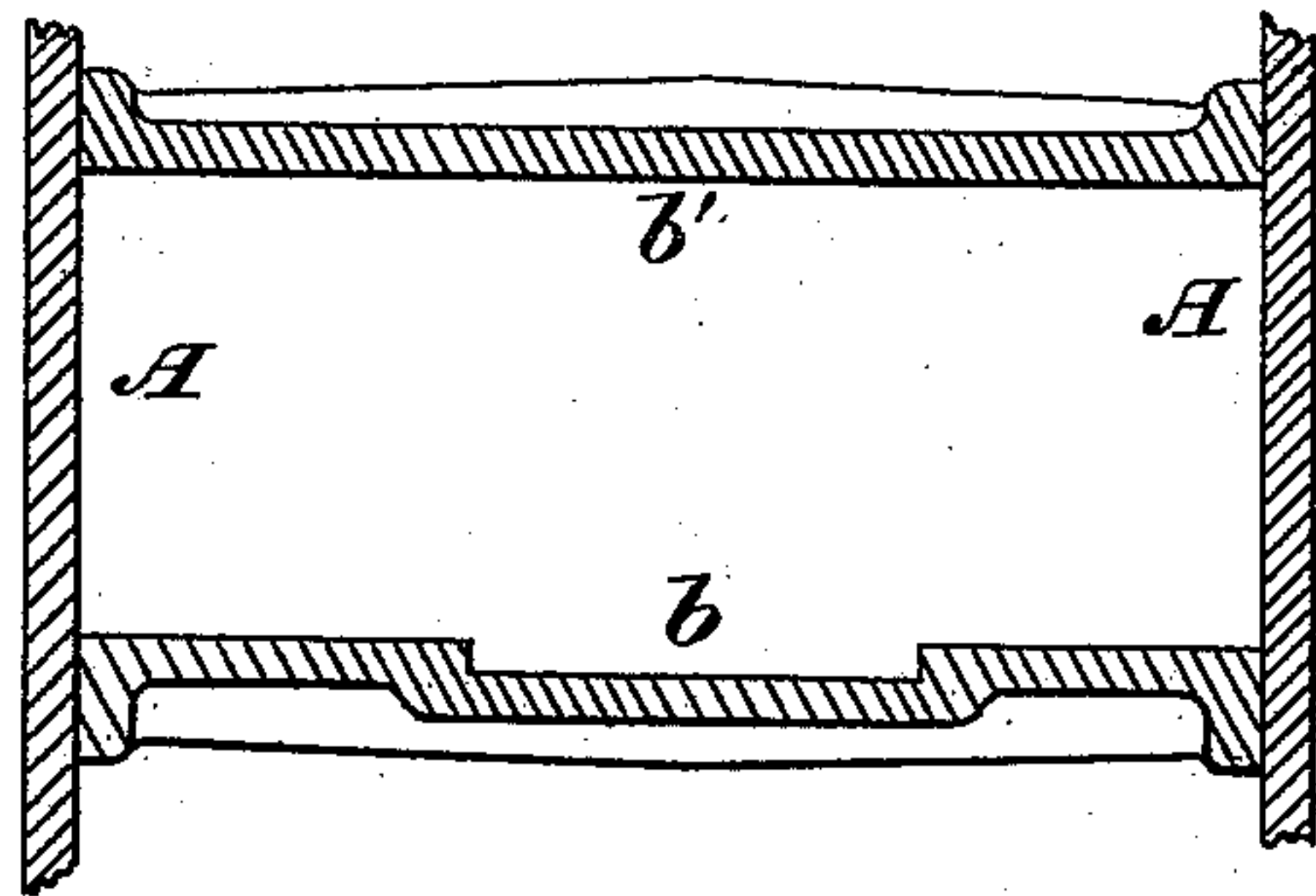


Fig. 5.



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UNITED STATES PATENT OFFICE.

OSCAR A. BYRNS, OF APPLETON, WISCONSIN, ASSIGNOR TO THE VALLEY IRON WORKS, OF SAME PLACE.

PULP-GRINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 361,207, dated April 12, 1887.

Application filed July 3, 1886. Serial No. 207,072. (No model.)

To all whom it may concern:

Be it known that I, OSCAR A. BYRNS, of Appleton, in the county of Outagamie and State of Wisconsin, have invented certain new and useful Improvements in Pulp-Grinding Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention consists, essentially, of a rotary grinding stone or cylinder, one or more feeding chutes or cells radiating from the face of said stone or cylinder, and independently-operated plungers or followers arranged to force the wood against said stone or cylinder at a rate controlled by the movement of said stone or cylinder, and of certain details hereinafter described. Its objects are, first, simplicity of construction and operation; second, economy of time and labor, and, third, strength and durability.

In the accompanying drawings, like letters designate the same parts in the several figures.

Figure 1 is a longitudinal vertical section of my improved machine, (except the grinding cylinder or stone,) taken on the line *x x*, Fig. 3. Fig. 2 is a side elevation of the same. Fig. 3 is a plan view. Fig. 4 is a sectional detail, on an enlarged scale, of a part of the feeding-gearing and the device for lubricating the same; and Fig. 5 is a transverse section on the line *y y*, Figs. 1 and 3, of one of the feeding-cells.

A A represent that part of the cast-iron frame-work of the machine which forms the sides of the feeding-cells. The tops and bottoms of said cells are formed by cast-iron plates *b b'*, secured to the side plates or frames, *A A*, by means of bolts *c c* passing through slots formed in said side plates, *A A*, which permit of the longitudinal adjustment of said top and bottom plates, *b b'*, to insure close joints between them and the face of the stone *E*.

E is the grinding-stone, mounted in the

usual manner between heavy flanges *e' e'* upon shaft *e*, which is provided with the cone-pulley *F*.

C C are followers adapted to and arranged to travel longitudinally through the cells *B B*. They are formed or provided with rack-bars *D D*, which project at the outer ends of said cells, and are engaged by pinions *h h* upon shafts *g g*.

M is a cone-pulley, keyed to the outer end of the short shaft *m*, which has a bearing in bracket-box *I*, secured to the frame of the machine, and is arranged to be driven from the pulley *F* on the stone-shaft *e*. Upon the other end of the shaft *m* is secured the screw-gear *K*, which works at opposite sides with similar gears, *k k*, upon the lower ends of the upright shafts *o o'*. Said shafts *o o'* bear at their upper ends in boxes *p p'*, formed upon or secured to the ends of levers *P P'*, which are fulcrumed to and extend transversely across the machine. The longer shaft *o* bears at its lower end below its gear *k* in a step, *l*, and the shorter shaft *o'* bears just above its gear *k* in a box, *o²*, pivoted to the frame of the machine. A collar, *o³*, bears upon the upper edge of the box *o²*, and sustains the shaft *o'* in place. Upon the upper ends of shafts *o o'*, adjacent to boxes *p p'*, are mounted the large worms *O O'*, which are arranged to be thrown by the levers *P P'* into and out of engagement with the worm-gears *G G*, keyed to the adjacent ends of shafts *g g*. To the opposite ends of said shafts *g g* are secured hand-wheels *H H* upon the same side of the machine with the projecting handles of levers *P P'* and the openings *a a* into the cells *B B*.

The rack-bars *D D* bear at their backs opposite pinions *h h* against friction-rollers *n n*, journaled in cross-braces *N N*, bolted to the side plates, *A A*. By means of a lever, *f*, and clutch *R*, applied to shaft *m* and cone-pulley *M*, the feeding mechanism may be thrown out of gear and instantly stopped. The screw-gears *K* and *k k* are placed in an iron box or trough, *L*, in which they may be immersed in oil and, together with the step *l*, constantly and thoroughly lubricated, thus preventing unnecessary wear. The openings *a a* into the cells *B B* are closed by doors *a' a'*, hinged to the

adjacent side plates, A. The stone E is inclosed at the sides by iron plates A' A', bolted to the side plates, A A.

To prevent the racks D D from being driven out of engagement with the pinions *h h* when the followers C C approach stone E, I secure a spring, S, to the cross-braces N N, as seen in Fig. 1, so that its ends will engage with stops *d d* at the ends of rack-bars D D when they reach the limit of their advance movement. The levers P P' are supported and retained in place adjacent to their handles by the guide *r* and catch *r'*, secured to the frame of the machine.

The bottom plates, *b b*, are formed with longitudinal depressions or grooves, as shown in Fig. 5, to guide the followers C C, which are provided on their lower faces with corresponding projections.

My improved machine operates as follows: The stone E being first put in motion the cells B B are supplied with wood through openings *a a*, the followers C C having been previously withdrawn by means of hand-wheels H H. The followers C C are then brought snugly up against the wood in the cells B by means of said hand-wheels H H. The worms O O are moved into engagement with the gears G G by means of levers P P', which are locked in place by the guide *r* and catch *r'*. Whenever the wood in either cell is consumed its plunger C is disconnected from the feeding mechanism, throwing the proper worm, O or O', by means of one of the levers P P', out of engagement with its gear G without interfering with the advance movement or operation of the follower in the other cell. The top and bottom plates, *b b'*, of the cells B B are constantly kept close to the grinding-face of stone E by means of their adjusting-bolts *e e*, so as to prevent the thin piece of wood to which the blocks are ultimately reduced from being carried through between stone E and said plates into the pulp.

The machine is fed and operated by the attendant from one position, thereby saving time and enabling one person to run a greater number of machines than he otherwise could.

As the working parts of my improved machine are few in number, made large and strong, and located in plain view of the operator, the machine wears longer, runs easier, is less liable to break, and is more easily operated and repaired than when a greater number of lighter parts are employed. The feeding mechanism being driven from the shaft of the grinding-stone, the advance movement of the followers C C varies in exact accordance with the speed of said stone E, thus producing a uniform grade of pulp, and utilizing the power to the best advantage.

The details of my machine may be variously changed without departure from the spirit of the invention. In place of the two feeding-cells shown in the drawings, a single cell or greater number may be employed in the same manner.

I claim—

1. In a pulp-grinding machine, the combination, with a rotary grinder, of a follower provided with a rack, a cell in which said follower works and the material to be ground is placed, and a driving-pinion working with said rack and driven from the shaft of said rotary grinder, substantially as and for the purposes set forth.

2. In a pulp-grinding machine, the combination, with a rotary grinder, of a follower provided with a rack, a cell in which said follower is arranged to work and the material to be ground is placed, a shaft provided with a pinion working with said rack and with a hand-wheel for withdrawing said follower from said grinder, a shaft provided with a worm working with a gear on said pinion-shaft and driven from the shaft of said rotary grinder, and means for disconnecting said pinion from the driving mechanism, substantially as and for the purposes set forth.

3. In a pulp-grinding machine, the combination, with the stone E, of a feeding-cell, B, follower C, provided with rack D, shaft *g*, carrying pinion *h*, working with said rack, and gear G and shaft *o*, carrying worm O, working with gear G, and arranged to be moved into and out of engagement with said gear G, substantially as and for the purposes set forth.

4. In a pulp-grinding machine, the combination, with the follower C, of rack D, pinion *h*, and spring S, substantially as and for the purposes set forth.

5. In a pulp-grinding machine, the combination of the stone E, feeding-cell B, follower C, rack D, pinion *h*, and friction-roller *n*, substantially as and for the purposes set forth.

6. In a pulp-grinding machine, the combination, with the stone E, of the follower C, rack D, shaft *g*, carrying pinion *h*, and gear G, shaft *o*, carrying worm O, and gear *k*, shaft *m*, carrying gear K and cone-pulley M, pulley F, and feeding-cell B, substantially as and for the purposes set forth.

7. In a pulp-grinding machine, the combination, with the gears K and *k k*, of the oil-box L, substantially as and for the purposes set forth.

8. In a pulp-grinding machine, the combination, with the follower C, of the rack D, shaft *g*, carrying pinion *h*, and gear G, shaft *o*, provided with the worm O, which works with gear G, and lever P, provided with box *p*, in which said shaft *o* bears, substantially as and for the purposes set forth.

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

OSCAR A. BYRNS.

Witnesses:

LEOPOLD HAMMEL,
S. BAIRD.