No. 660,699. Patented Oct. 30, 1900.

J. J. FOLEY.

PULP REFINING ENGINE.

(Application filed Mar. 25, 1899.)

(No Model.) 2 Sheets—Sheet 1.

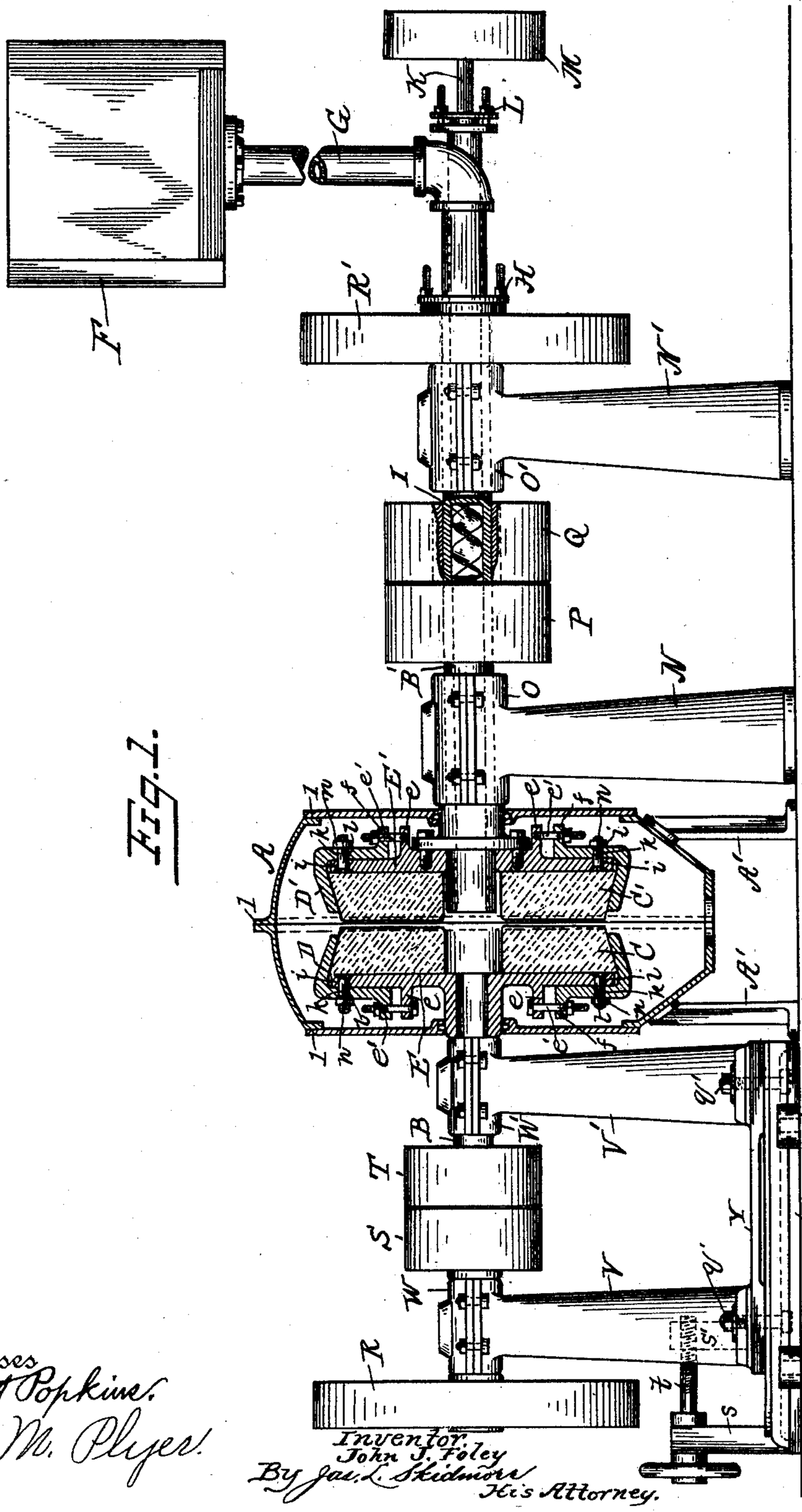

Fig. 1.

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Fig. 2.

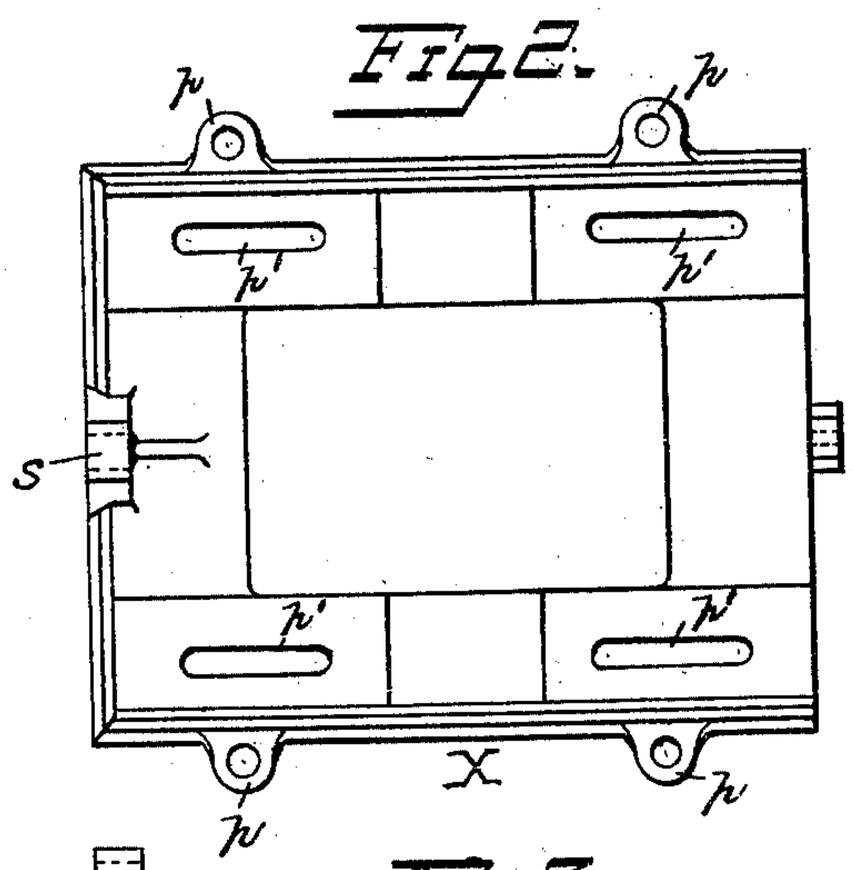


Fig. 3.

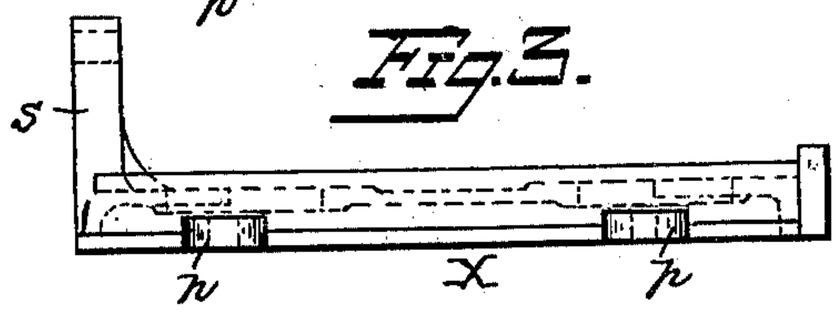


Fig. 4.

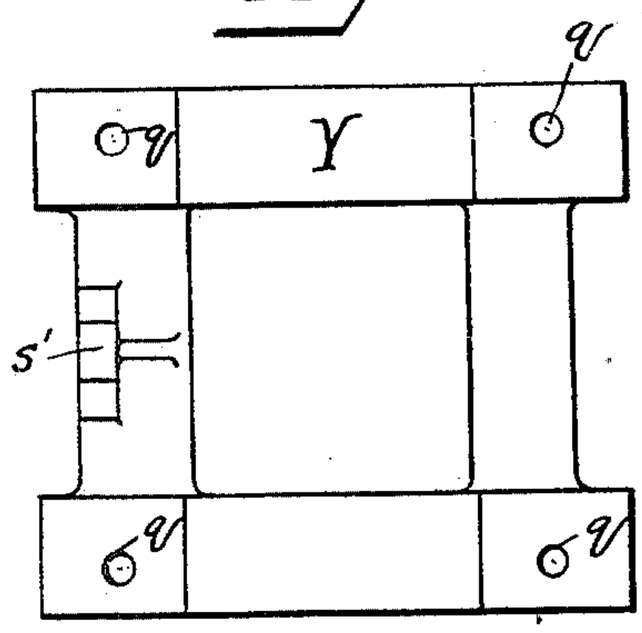


Fig. 5.

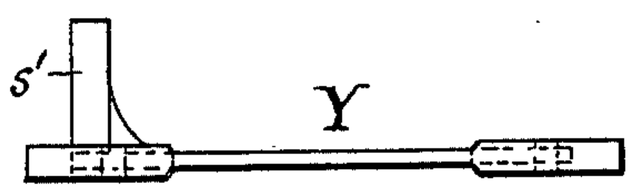
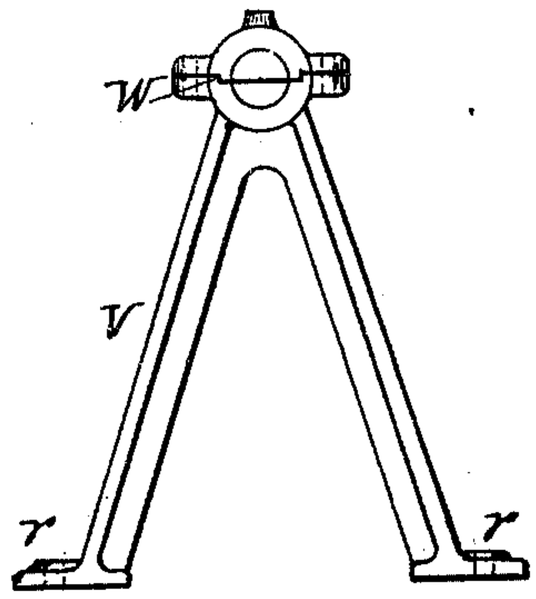


Fig. 6.



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UNITED STATES PATENT OFFICE.

JOHN J. FOLEY, OF JAY, MAINE.

PULP-REFINING ENGINE.

SPECIFICATION forming part of Letters Patent No. 660,699, dated October 30, 1900.

Application filed March 25, 1899. Serial No. 710,439. (No model.)

To all whom it may concern:

Be it known that I, JOHN J. FOLEY, a citizen of the United States, residing at Jay, in the county of Franklin and State of Maine, have invented certain new and useful Improvements in Pulp-Refining Engines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

My invention relates to pulp-refining engines especially designed for the purpose of refining coarse pulp for pulp and paper mills.

The primary object of my invention is to construct a pulp-refining engine comprising simple, economical, and efficient mechanism whereby the coarse stock may be thoroughly brushed out and refined during its passage between two brushing or grinding surfaces.

Another object of the invention is to utilize two stones, constituting the grinding or brushing surfaces, and so feed the stock thereto that the said stock will pass between the stones at the center and be discharged at the periphery thereof by centrifugal force.

A further object of my invention is to run or drive the stones at different rates of speed in the same direction, thereby producing different results in the grades of stock produced by my improved mechanism.

An additional object of the invention is to provide certain improved pulp or stock feeding mechanism and novel adjustments of certain parts of my device which are combined in the construction of my engine.

The above and such other objects as may occur from the ensuing description are attained by the mechanism hereinafter more fully described, and pointed out in the appended claims, forming a part of this specification, and in which—

Figure 1 represents a side elevation, partly in section, of the mechanism embodying my invention. Fig. 2 is a plan view of a base or bed plate to which are removably and adjustably secured two supports or standards. Fig. 3 is a side elevation of the base-plate shown in Fig. 2. Fig. 4 is a plan view of an adjustable plate adapted to rest on the upper surface of the base-plate. Fig. 5 is a side elevation of the plate shown in Fig. 4, and Fig. 6 illustrates a side elevation of one of the supports or standards and the bearing at the upper portion thereof.

Referring to Fig. 1 of the drawings, the letter A indicates the stationary casing, resting in supports A′, and said casing is constructed of any suitable material, preferably cast-iron, and formed with water-tight joints at 1. Supported within the casing and on the inner end of the shafts B B′ are two grinding-stones C C′, which are revolved in the same direction and at different rates of speed. The periphery of each of these stones is beveled or so shaped that the annular clamping-rings D D′ will secure them firmly against the face-plates E E′, which latter are secured to the shafts B and B′, respectively, and the said clamping-rings and face-plates are constructed and adjusted as will be hereinafter explained.

The hollow shaft B′ is provided near the inner end thereof with a flange, to which the hub portion of the face-plate E′ is suitably secured, and said shaft serves as a pipe, to which the pulp or stock is fed from a stuff-box or tank F by a feed-pipe G, connected at one end to the tank and the other end passing through a gland or stuffing-box H and communicating with the outer end of the hollow shaft, and the said stock or pulp is caused to pass through the shaft by force or gravitation and be discharged at the inner end thereof and at a point at the center of the stones, from whence it passes between the rapidly-revolving grinding or brushing surfaces of the stones and is discharged from between the same by centrifugal force, striking against the inner surface of the casing and thence flowing to the outlet at the bottom of said casing. To insure the steady flow of the stock through the hollow shaft and to center of stones, I arrange a worm I within the said shaft, said worm terminating at its outer end in a shaft K, which passes through a stuffing-box L and is provided at its outer end with a driving-pulley M, whereby the worm is caused to rotate, and thus force the stock through the shaft. This worm may be caused to rotate by being cast on the inside of the

shaft, or the worm may be held stationary and the hollow shaft caused to revolve around the same. The hollow shaft is supported by standards N N', each provided with a bearing O O', and said shaft is also provided with a driving-pulley P, keyed thereto, a loose pulley Q, and a balance-wheel R', as shown.

The solid shaft B is supported by two standards V V' and their bearings W W', and the inner end of the shaft constitutes a support for the grinding-stone C through the medium of the face-plate E and clamp D. The other end of said solid shaft is provided with a balance-wheel R, and intermediate the ends of this shaft is located the fast driving-pulley S and the loose pulley T.

The purpose of the balance-wheels R and R' is to counteract the weight of the stone on the end of each shaft B B'. Thus the shafts will not wear more upon one bearing than they will upon the other.

The face-plate E is keyed to the inner end of the solid shaft B, and both of the face-plates E and E' are provided with an outwardly-projected annular flange *e*, perforated to receive screw-bolts *e'*, which latter pass through perforations in an outwardly-projected annular flange *f*, formed on each of the clamping-rings D D', and said screw-bolts are provided with adjusting-nuts, whereby the clamps are secured to the periphery of the stones and to the face-plates. The face-plates and clamps are also perforated at *i k* to receive bolts *l*, provided with nuts *n*, thus constituting an additional means for securing the clamps around the periphery of the stones and to the face-plates. It will be seen that the clamping-rings are so constructed that they conform to and rest flush against the beveled peripheral face of the stones, thereby firmly securing said stones against their respective face-plates, which latter are secured firmly to their respective shafts, thereby insuring safety of the stones when revolving at a high rate of speed.

As shown in Figs. 2, 3, 4, 5, and 6, the letter X indicates the base or stationary bed-plate, Y the adjustable plate resting thereon, and V V' the shaft-supporting standards. The bed plate or base is provided with perforated ears or projections *p*, adapted to receive suitable securing means. Its under side is hollowed out, as shown by dotted lines, Fig. 3, and its upper surface is slotted therethrough at *p'*. The adjustable plate rests on the surface of the bed-plate and is perforated at *q* to receive the headed bolts *q'*, which latter pass through the bed-plate, adjustable plate, and the foot portions *r* of the standards V V'. The bed-plate and the adjustable plate carrying the standards are each provided with an upright post *s s'*, perforated near the upper end and adapted to receive a tension or adjusting screw *t*, as shown in Fig. 1.

By the above-described construction it will be seen that the stationary bed-plate allows the movable plate carrying the standards to slide on its surface. Hence by operating the adjusting-screw the movable plate, standards, shaft, and one of the grinding-stones are all simultaneously adjusted, and the desired proximity of the grinding-stones with respect to each other is thereby regulated.

As hereinbefore stated, each grinding-stone is carried by an independent shaft, each shaft having independent means for driving or revolving the same. Hence I am enabled to revolve the stones at different rates of speed in the same direction.

It will be readily perceived that by regulating the proximity of the stones with respect to each other and running or revolving them in the same direction at different rates of speed the stock is discharged by the centrifugal force created by the fact of so running the stones and different results in the grades of stock produced are attained.

It will be understood by those skilled in the art to which my invention relates that many changes might be made in the detail construction and arrangement of the various parts of my improved mechanism without departing from the spirit and scope thereof, and hence I do not limit my invention to the precise construction and arrangement of the parts as hereinbefore described.

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

1. A pulp-refining engine, comprising two independent shafts, each shaft having a grinding-stone mounted on the inner end thereof, and independent means for revolving the said shafts and grinding-stones in the same direction and at different rates of speed.

2. A pulp-refining engine having two revoluble grinding-stones and two independent shafts, each stone having its entire peripheral face beveled or inclined, a face-plate secured to the inner end of each shaft, a clamping-ring secured to the back of each face-plate and constructed so as to fit flush against said beveled or inclined face of each stone, and means for adjustably securing said clamping-ring to the stone and the back or rear portion of the face-plate, respectively.

3. A pulp-refining engine comprising two independent shafts, one of said shafts being solid and the other hollow, a grinding-stone mounted on the inner end of each shaft, independent means for revolving each shaft in the same direction, and independent means within the hollow shaft for feeding the pulp or stock to the center of the grinding-stones from whence it is discharged by centrifugal force.

4. A pulp-refining engine comprising two independent shafts, one of said shafts being hollow and the other solid, a grinding-stone mounted on the inner end of each shaft, independent means for revolving each shaft in the same direction and at different rates of speed, means within said hollow shaft for

feeding the pulp or stock to the center of the stones, and independent means for driving said feeding devices.

5. A pulp-refining engine comprising two independent shafts, a grinding-stone mounted on the inner end of each shaft, independent means for driving each shaft in the same direction, independent bearings and supports for each shaft, a fast and loose pulley carried by each shaft and a balance-wheel mounted at or near the outer end of each shaft, substantially as described and for the purpose set forth.

6. A pulp-refining engine comprising two grinding-stones, two independent shafts, one of said shafts being solid and the other hollow, means for revolving each shaft and its grinding-stone in the same direction, independent means for feeding the pulp or stock through said hollow shaft, and a pipe for feeding the stock from the tank or stuff-box to and within the outer end of the hollow shaft, substantially as shown and described.

7. A stationary bed-plate for pulp-refining engines, said plate being recessed on its under side and provided with elongated slots, an adjustable plate adapted to rest on the upper surface of the bed-plate and provided with bolt holes or perforations, standards resting on said adjustable plate, headed bolts passing through the feet of the standards, the adjustable plate and the slots in the bed-plate, and means for shifting and regulating the adjustment of the bed-plate, adjustable plate and standards.

8. A pulp-refining engine having a solid shaft and a grinding-stone mounted on one end thereof, standards and bearings for supporting said shaft, a bed-plate provided with an upright post, an adjustable plate resting on said bed-plate and provided with an upright post, means for adjustably securing the standards and adjustable plate to the bed-plate, and means connected to both the bed-plate and adjustable plate for regulating the lateral movement of the stone, shaft, standards and adjustable plate.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN J. FOLEY.

Witnesses:
E. H. STROUT,
J. E. MCINTIRE.