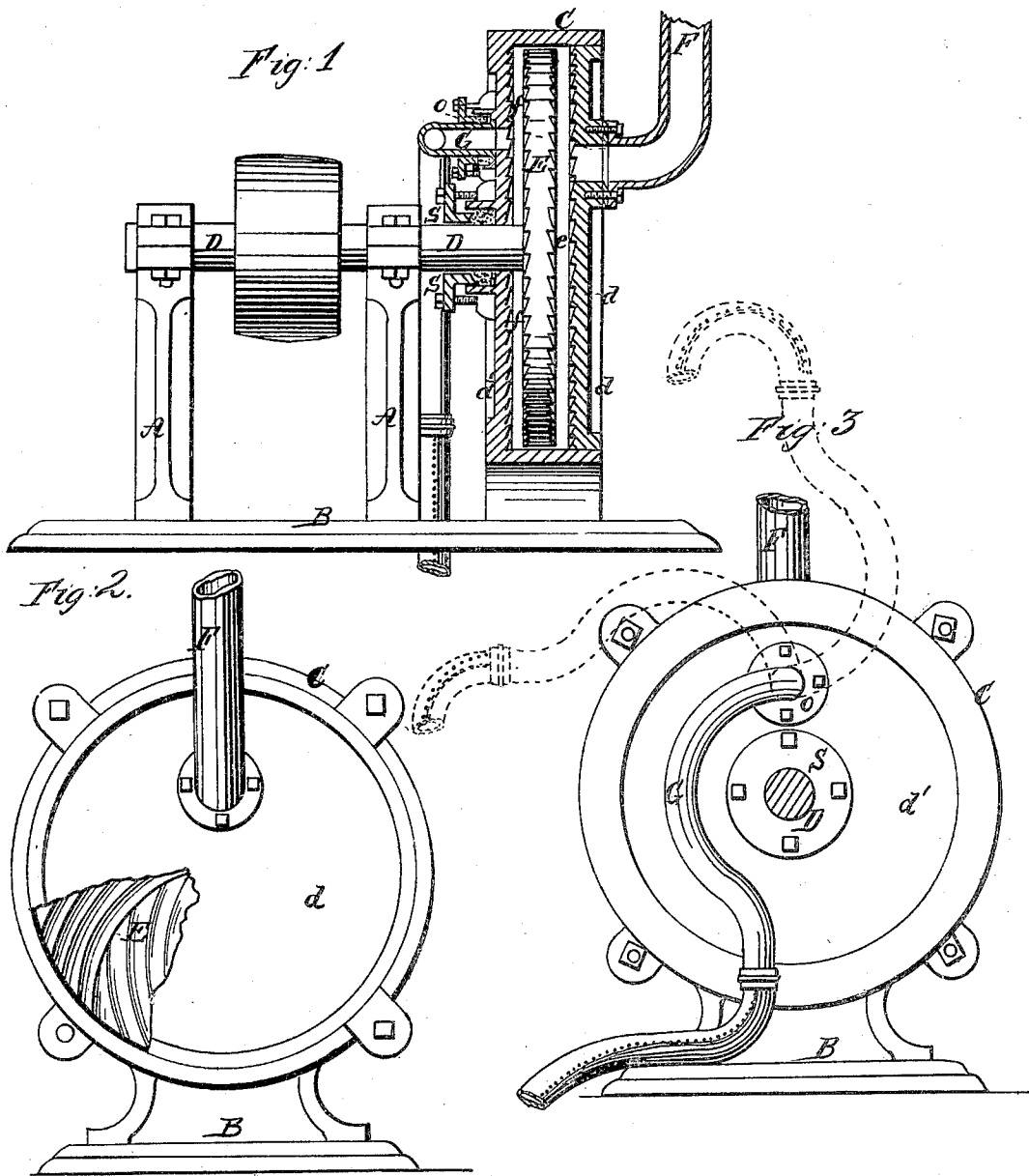


J. KINGSLAND, Jr.  
MACHINERY FOR PREPARING PAPER STOCK.

No. 16,278.

Patented Dec. 23, 1856.



# UNITED STATES PATENT OFFICE.

JOSEPH KINGSLAND, JR., OF FRANKLIN, NEW JERSEY.

## PAPER-PULP ENGINE.

Specification of Letters Patent No. 16,278, dated December 23, 1856.

*To all whom it may concern:*

Be it known that I, JOSEPH KINGSLAND, Jr., of Franklin, in the county of Essex and State of New Jersey, have invented a new and useful improvement in what is termed the "Beating or Stuff Engine," for grinding fibrous vegetable matter, in water, to pulp in the manufacture of paper, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which make part of this specification, and in which—

Figure 1 represents a vertical section of a "beating or stuff engine" upon my improved plan. Fig. 2 represents an elevation of one end, and Fig. 3 an elevation of the other end of the same.

In reducing "half-stuff" to pulp it is frequently important to vary the rate at which the fibrous matter is fed through the grinder while the motion of the grinder remains constant, but heretofore no means of accomplishing this object have been in use.

It is the object of my invention to provide the means by which the feed of grinders fed and discharged by hydraulic pressure, is rendered adjustable, and my invention consists in varying the level of the nozzle of the discharge-pipe, relative to the level of the head of water on the feed-pipe, whereby the effective head of pressure is varied, and, as a matter of course, the velocity of the feed-current is correspondingly varied.

By reference to the accompanying drawings, the construction and operation of an improved stuff-engine, embracing my mode of regulating the feed, will more fully appear.

It consists of a bed-plate (B) which supports two standards (A, A,) and a hollow cylinder (C) whose diameter is equal to about four times its length. In a line with the axis of this cylinder, a shaft (D) is mounted in bearings in the heads of the standards (A, A) in such manner as to give it free end play. This shaft (D) passes through a stuffing-box (S) on the inner head (*d'*) of the cylinder (C), and projects about two-thirds of the way across the space within the cylinder toward the outer head (*d*). On this projecting end of the shaft, a disk (E) is secured at right angles to the shaft, and concentric with it, and the cylinder; this disk is somewhat less in diameter than, and in thickness about

half the length of the interior of the cylinder, so as to leave between it and the heads and periphery of the cylinder, a free space for a current of water and rags, "half-stuff" or paper pulp to flow through.

The inner surface of the heads of the cylinder and the sides of the disk are grooved in the usual manner of metallic grinders, or they may be armed with teeth or knives of any suitable kind. An orifice is made in each head of the cylinder as near the center as possible. The orifice in the outer head is connected by a pipe (F) with a tank above, containing half-stuff mingled with water and ready to be ground to pulp. To the discharge orifice, a pipe (G) is attached by means of a joint, rendered tight by a stuffing-box (*o*) that permits the pipe to be turned to set it with its mouth upward, downward, or in any intermediate position, to vary the height between its mouth (which is the level at which the pulp is discharged from the grinders) and the level of the water in the feeding-tank, and in this way vary the hydraulic pressure which feeds the fiber through the grinder. This is a simple and effective means of regulating the rate of the feed with both nicety and facility. Instead of making the discharge-pipe rigid and arranging it to turn on a joint, it may be made flexible and its mouth suspended by a cord, on a hook, or in a rack, at various heights. Numerous other modes, it is quite obvious, can be adopted, of varying the difference between the feed and discharge level to regulate the feed, but it is not necessary to particularize these modifications of my invention.

The operation of the engine is as follows. Rotary motion is communicated to the shaft (D) through the pulley near its middle, and the end-play of the shaft is sufficient to permit the disk (E) to run freely from end to end of the cylinder (C), to grind close at either end, or open at both, as may be required. The mixed half-stuff and water may now be let into the feed-pipe (F) from the tank above, and the hydraulic pressure will force it into the cylinder through the space (*e*) between the disk and the outer head (*d*), around the periphery of the disk and through the space (*f*) to the orifice of the discharge-pipe (G), where it will leave the cylinder, and entering the discharge-pipe, will pass through the same into any suitable receptacle; if the feed-current runs

too fast the mouth of the pipe (G) must be raised, and vice versa.

The centrifugal motion of the disk will coöperate with the hydraulic pressure to pass the half-stuff from the feed-orifice near the center where the motion of the disk is slow and but little grinding takes place, toward the periphery, where the motion is greater, and the grinding more energetic; but when the current of water and fiber turns the periphery of the disk and enters the space (f) on the opposite side, its passage to the discharge orifice is retarded by the centrifugal action of the disk. This retarding force acts with the greatest effect upon the largest fibers. Moreover, the current carries the fibers through the grinder at a speed inversely proportioned to their size, the more reduced fibers having an area of surface for the current to act upon, relatively far greater than that of the larger fibers. In this way the reduced fibers are withdrawn from the action of the grinder, while the coarser are left for further reduc-

tion. This separation of the finer from the coarser fibers during the process of grinding, is facilitated by the increased mobility which they acquire by reduction.

The fineness of the grinding it will be seen, depends upon the hydraulic pressure on the feed and the speed with which the disk of the grinder runs, while the rate of feeding depends upon the hydraulic pressure alone.

What I claim as my invention and desire to secure by Letters Patent is—

The method of regulating the feeding of the fiber to the grinder by varying the hydraulic pressure, by means of an adjustable discharging nozzle or the equivalent thereof, substantially as herein set forth.

In testimony whereof, I have hereunto subscribed my name.

JOSEPH KINGSLAND, JR.

In presence of—

EDWARD MURPHY,  
L. C. STUART.