

JAMES BRIDGE.

Improvement in Machines for Converting Wood or other
Fibrous Material into Pulp.

No. 115,274.

Patented May 30, 1871.

Fig. 1.

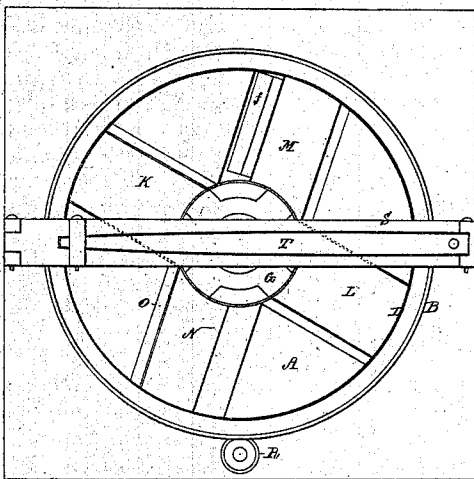


Fig. 2.

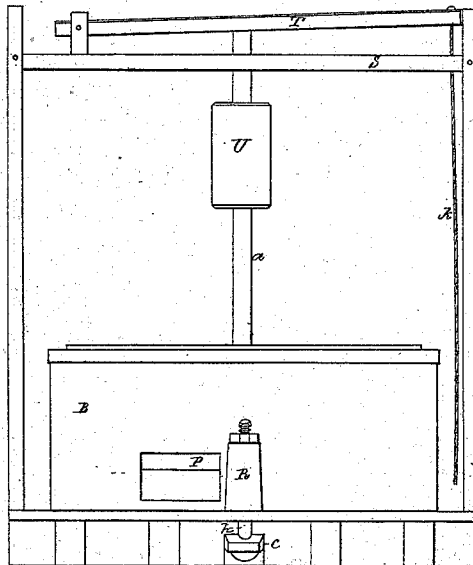


Fig. 3.

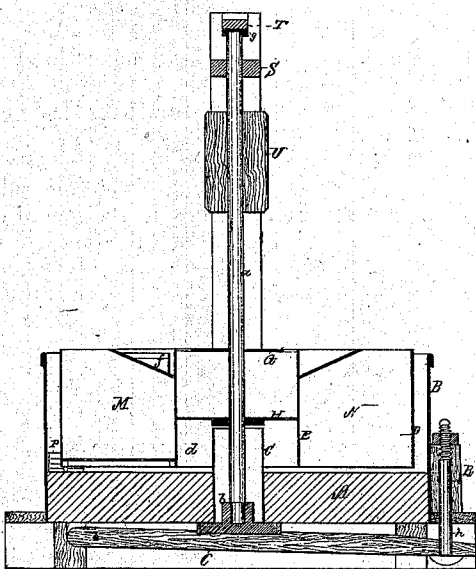
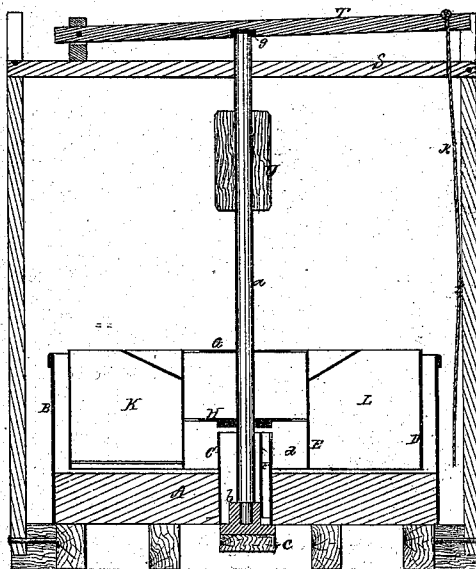


Fig. 4.



Witnesses

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UNITED STATES PATENT OFFICE.

JAMES BRIDGE, OF AUGUSTA, MAINE.

IMPROVEMENT IN MACHINES FOR CONVERTING WOOD OR OTHER FIBROUS MATERIAL INTO PULP,

Specification forming part of Letters Patent No. 115,274, dated May 30, 1871.

To all persons to whom these presents may come:

Be it known that I, JAMES BRIDGE, of Augusta, of the county of Kennebec and State of Maine, have invented a new and useful or Improved Machine for the Conversion of Wood or various other Fibrous Material into Pulp for the manufacture of paper or *papier-maché*; and I do hereby declare the same to be fully described in the following specification and represented in the accompanying drawing, of which—

Figure 1 is a top view, Fig. 2 a front elevation, and Figs. 3 and 4 transverse sections, of such machine.

In the said machine a stationary grinding-stone is arranged within a surrounding rim, and has over it a wheel provided with a series of partitions inclined to the upper surface of the stone, and revolved with and by the wheel arranged within the rim extended up from the stone.

The special or particular construction of the above-mentioned parts, and their arrangement and mode of operation, I shall now proceed to explain with reference to the aforesaid drawing, in which—

A is a stationary millstone, having a plane or channeled upper surface. B is a metal or wooden case, inclosing and extending above such stone. C is a sleeve fixed in the stone, water-tight, and projecting some distance above its grinding-surface. The shaft *a* of the wheel passes through the sleeve, the step *b* of such shaft being fastened to a lever, *c*, arranged under the stone. The object of the sleeve is to aid in forming a reservoir for the water used in grinding, which passes upward through the sleeve in a conduit, F, arranged therein, as shown, and discharges into the space *d*, between it and the inner rim E of the wheel, from whence it must flow outward, carrying the pulp with it. The sleeve also serves to prevent the escape of the water and pulp into the space in the stone through which the shaft passes. D is the outer and E the inner rim of the wheel, they being concentric. G and H are spiders attaching the wheel to its shaft. K and L are inclined plates or buckets confined to the outer and inner rims of the wheel, and arranged between them, as shown. The lower edges of such plates should be as near the surface of the stone as they can safely be with-

out touching. The office of such plates is to draw over the surface of the stone solid wood, partially disintegrated wood, straw, rags, or other material for pulp. They are adjusted at such an angle that the substance to be operated upon will pass around with them and be pressed down by them upon the stone while the wheel may be in revolution. M and N are double plates or slides fastened to the outer and inner rims of the wheel. Between these latter, pieces of wood *f*, of suitable shape, either sawed or split, are placed. They will settle by their own gravity until they touch the stone, and will continue to settle as fast as they wear away, their inclination being such that the friction of the stone will have a tendency to draw the wood toward itself. A brace-bar, O, arranged at the bottom of the plate N, should be strong enough to hold the wood firmly to the face of the stone.

The operation of the slider, if used in connection with the buckets or single plates, will be as follows, viz: The disintegrated wood or other material of insufficient fineness for pulp which may pass under the buckets will be caught and held firmly to the face of the stone by the blocks or pieces of wood until the substance may be reduced to pulp. The plates M N may also be used independently of the bucket, their office then being to hold solid wood of suitable shape firmly to the grinding-surface, it being drawn over the stone by the motion of the wheel and pressed down upon the stone by the weight of the wheel and the inclination of the plates, also by further pressure, if desirable, as hereinafter mentioned. The upper box *g*, in which the shaft runs, is free, so that the wheel can rise should any unyielding substance get under it. As it, with its rigid partitions, passes over the material to be ground, it will have a tendency to rise and consequently there will be no heating of the lower box, which is often troublesome where a stone revolves with its shaft. Generally no other weight than that of the wheel itself will be needed for pressure upon the surface of the stone; but should more be desired it can conveniently be applied and graduated by a lever, T, arranged to press upon the head of the shaft. R is a perforated standard, through which passes a screw-bolt, *h*, connected with the step-lever of the wheel-shaft. A nut on the upper

end of the screw-bolt enables an attendant to adjust at pleasure the distance between the wheel and the stone. S is a beam, to which the upper end of the shaft is attached. It may be one of the beams of the building in which the machine may be placed. The supports are not necessarily connected with the machine. The lever T, resting on the top of the shaft, may have a rope, K, attached, for the purpose of applying pressure or weight to the lever when necessary. P P are apertures through the case of the wheel, through which the pulp escapes. When solid wood is ground no strainers will be necessary in the orifice; but when partly-disintegrated substances are ground one or more strainers will be desirable. The wheel may be driven either by a belt applied to a pulley, U, fixed on its shaft, or by gearing; but in either case there should be sufficient play to allow a rise or fall of two or three inches of the wheel.

The advantages to be derived from this machine over any other known to me are, first, the greatly-increased speed which may safely be adopted for the wheels in comparison with what may be employed in a machine using a revolving stone, there being no danger of bursting a stationary stone. Second, economy in cost. When movable, a grinding-stone, if of ordinary thickness, cannot safely be used after it is half worn out; but when stationary and properly bedded, the stone will be equally effective as at first when one inch thick or even of less thickness. Third, the cost of stationary stone and machinery, as described, will generally be very much less than that of a revolving stone and its machinery. Fourth, the power required for reducing to fine pulp material which has been partly disintegrated will be greatly less, while the quantity reduced to pulp in a given time will be increased. Fifth, the ordinary grinding-machine with movable stone is often incapable, as I believe, of properly reducing to pulp yielding substances, such

as rags, straw, partly-disintegrated wood, &c. My machine will serve as a valuable substitute for the pulp-mills in ordinary use in paper manufactories. Sixth, a series of double plates or slides similar to M and N is a convenient device for applying solid wood to a grinding-surface, particularly as the use of all weights, springs, and other modes of pressure is avoided.

Having thus described my improved machine for the manufacture of paper-pulp, what I claim therein as my invention is as follows, viz:

1. The combination of the stationary stone A and its rim B and sleeve C with the rotary wheel provided with the inclined buckets K L, or such, and double-inclined plates M N, or the latter only, all being arranged and combined substantially in manner and to operate as described.

2. The wheel as made of the two rims, the single buckets or inclined plates, and the double inclined plates, all arranged and applied to a shaft, as set forth.

3. The arrangement and combination of the water-induct with the sleeve C, the stone A, and its rim B furnished with an educt, all being as described.

4. The stone as provided with the rim and the sleeve, as set forth.

5. The combination of one or more wooden slides, as described, with the inclined plate, bucket, and wheel combined, and to operate with the stationary stone, as described, for the purpose of reducing to paper-pulp yielding or soft as well as solid substances.

6. The combination of buckets or plates and slides, each assisting the other in disintegrating soft and yielding substances, including cotton rags, straw, and partly-disintegrated wood shavings, &c.

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Witnesses:

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S. LANCASTER.