

(No Model.)

W. JONES.

REFINING PAPER PULP AND APPARATUS THEREFOR.

No. 264,167.

Patented Sept. 12, 1882.

Fig. 1.

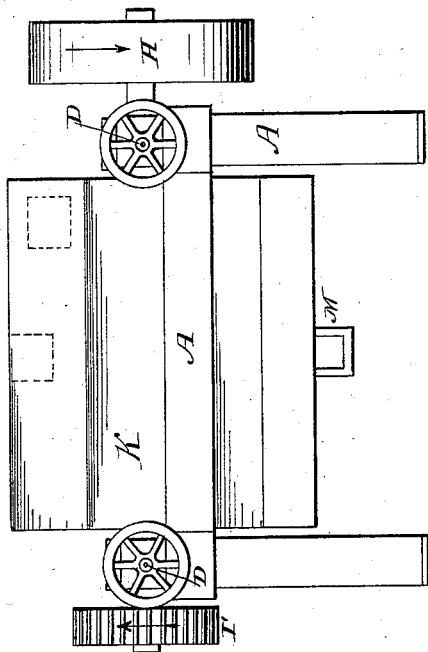
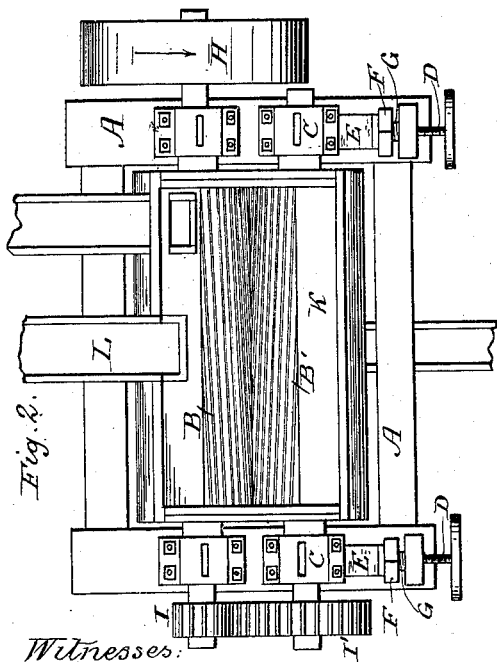


Fig. 2.



Witnesses:

E. E. Masson

W. B. Masson

Fig. 4.

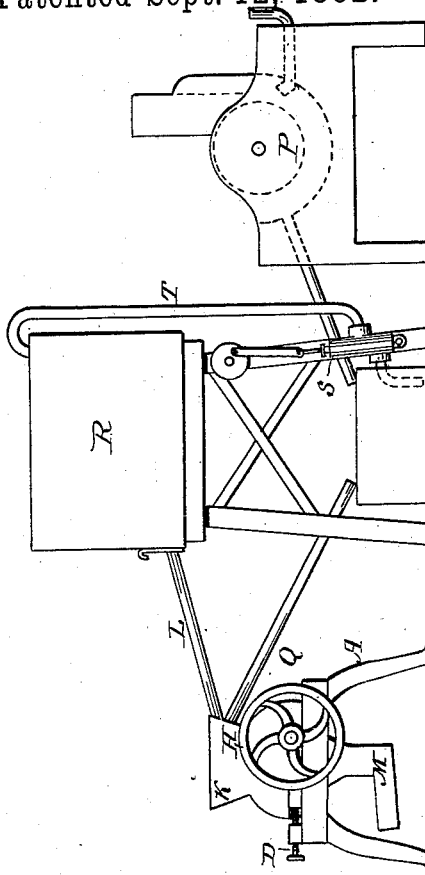
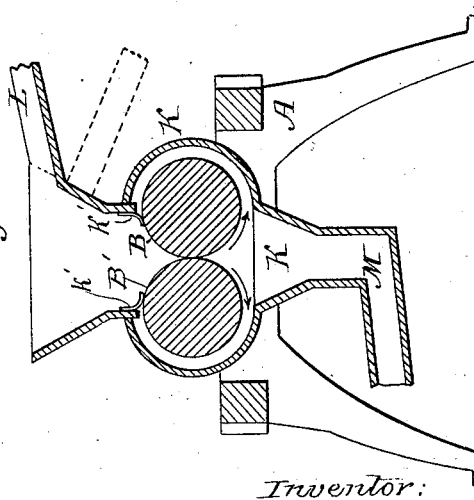


Fig. 3.



Inventor:

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UNITED STATES PATENT OFFICE.

WALTER JONES, OF NIAGARA FALLS, NEW YORK.

REFINING PAPER-PULP AND APPARATUS THEREFOR.

SPECIFICATION forming part of Letters Patent No. 264,167, dated September 12, 1882.

Application filed August 12, 1882. (No model.)

To all whom it may concern:

Be it known that I, WALTER JONES, of Niagara Falls, in the county of Niagara and State of New York, have invented a new and useful
5 Improvement in Refining Paper-Pulp and Apparatus therefor, which improvement is fully set forth in the following specification.

This invention has reference more particularly to the refining of coarse pulp of wood
10 fiber, such as obtained from emery-grinders or similar pulping-engines, but is not wholly limited thereto.

The invention consists, first, in refining the coarse pulp by passing it between rollers slightly
15 separated and running toward each other at different surface speeds, whereby the stock is crushed and has its fiber separated, while, owing to the small area of the two rolls in close proximity, it is released immediately and
20 the fiber is not liable to be destroyed or reduced to powder. The rollers are preferably provided each with small grooves set close together and at a slight inclination to the axis of the roller. The result of the refining operation upon wood pulp is the production of a
25 very soft article of great felting-power.

The invention consists, further, in the improved refining apparatus and in the combination thereof with a pulping-engine.

30 In the accompanying drawings, which form a part of this specification, Figures 1, 2, and 3 are respectively a side elevation, a horizontal section, and a vertical section of the refining apparatus; and Fig. 4, a diagram showing the pulping-engine and the refining apparatus
35 and an intermediate pump and vat.

Referring to Figs. 1, 2, and 3, A is the machine-frame, in which the refining-rollers B B', of chilled iron or steel or other like substance,
40 are journaled. These rollers are provided with a number of small oblique grooves, (see Fig. 2,) set close together. About one twenty-fourth of an inch apart will answer. The journal-boxes C of the roller B' are adapted to slide, and are adjustable by means of the screws
45 D, which regulate the distance between the surfaces of the rollers. The screws D limit the forward movement only of the boxes C. Springs E, the pressure of which is regulated
50 by nuts F, turning on the stationary screws G, hold the roller B' to its work, but allow it to

spring back to allow any hard material to pass. The rollers are geared to turn toward each other, as indicated by the arrows, Fig. 3, and at different surface speeds. As shown, (see
55 Fig. 2,) the roller B is driven by a belt running on the pulley H, and power is conveyed to the roller B' through the small and large gears I I', the former fixed to the shaft of the roller B and the latter to the shaft of roller B'.
60 With rollers of equal size a good proportion is eight revolutions to three; but this may be indefinitely varied. The rollers are inclosed in a suitable water-tight casing, K. The upper part of this casing forms a supply-hopper and
65 the lower part a collecting-chamber for the refined pulp. Flaps K', of rubber or similar material, at the bottom of the hopper rest against the surface of the rollers, and while allowing the rollers to turn prevent the stock
70 from passing out. An inlet-spout, L, admits the pulp to be refined above the rollers, and a discharge-spout, M, carries off the refined pulp which collects below. An overflow, N, carries off the surplus pulp when the supply is greater
75 than the rollers can dispose of.

Referring to Fig. 4, P is an emery-grinder—such, for example, as described in Letters Patent No. 229,073, granted to S. M. Allen, June
22, 1880, or other suitable pulping-engine. Q
80 is the refining apparatus, constructed as above described; R, a vat; S, a pump, and T a pipe.

The operation is as follows: Wood is reduced to pulp in the engine Q, and is pumped through the pipe T into the vat S, whence it flows through
85 the spout L into the refining apparatus, wherein it is subjected to the action of the revolving rollers B B'. Their absolute as well as relative speed of rotation may be varied. Good results are obtained with rollers of eight to
90 ten inches in diameter and eighteen to thirty-six inches in length by revolving the faster one four hundred to eight hundred times a minute and the slower one hundred and fifty to three hundred.

One passage between the rollers will ordinarily suffice; but, if desired, the pulp may be passed repeatedly between them, and at each passage the rollers may be brought closer and closer together. Ordinarily they are separated
100 by a very small distance, equal to the thickness of writing-paper. They should not be

allowed to touch. The rubber strips prevent the pulp flowing around the back of the rollers instead of between them. Surplus pulp passes off by the overflow and is returned to the vat by the pump. Where the pulp is to be passed more than once between rollers a series of refining apparatus is employed, the pulp flowing from one to the other. The refined pulp passes off by the outlet, and can be made at once into paper, with or without admixture of rag pulp, or it can be utilized in any known or suitable way.

It is obvious that modifications may be made in the details of construction without departing from the spirit of the invention. For example, various forms of gearing can be used to revolve the rollers. Each roller could be driven by a separate belt. The apparatus can be used to refine as well pulp from ordinary beaters or other known pulping-engines as from emery-grinders, and not only wood pulp, but pulp from rags, straw, and other materials, single or combined. It readily reduces the knots or joints in the stalks, which is done with difficulty by the ordinary means. It can also be used as a pulping-engine, sawdust, shavings, and the like being introduced with water or with a chemical solution that will not attack the metal of the rollers. Instead of grooving the rollers, they may be dressed in other ways, or they may be smooth-faced.

It may be observed that an apparatus has heretofore been devised for reducing wood to pulp by crushing pieces of suitable size between a series of smooth-faced rollers arranged in pairs, each pair running toward each other and at unequal speeds, the said pieces being inserted between the rollers, with their fibers parallel with the axes thereof, and sufficient water being supplied to aid in forming a pulp. This apparatus and the process employed therein differ essentially from those constituting the present invention, and are not covered thereby.

Having now fully described my said invention and the manner of carrying the same into effect, what I claim is—

1. The method of refining the coarse pulp from wood-grinders and similar pulping-engines by passing said pulp between rollers turning toward each other at different surface speeds, substantially as described.

2. The method of reducing or refining paper-stock of wood or other material by passing it, mixed with water, between grooved rollers turning toward each other, substantially as described.

3. The combination, with a wood-grinder or similar pulping-engine, of a refining apparatus supplied with coarse pulp therefrom, said apparatus having rollers for acting on the pulp, substantially as described.

4. The combination, with smooth-faced, grooved, or other suitable rollers and means for revolving the same, as described, of the water-tight supply-hopper and inlet-spout, substantially as set forth.

5. The combination of the rollers, smooth-faced or dressed, the supply-hopper, the flaps at the bottom of the hopper, the inlet-spout, the means for revolving the rollers, and the discharge-spout, substantially as described.

6. The apparatus described, comprising the machine-frame, the grooved or smooth-faced rollers, means for revolving the same, the casing, with its supply-hopper and collecting-chamber, the flaps at the mouth of the hopper, the inlet-spout, the overflow, and the discharge-spout, substantially as described.

In testimony whereof I have signed this specification in presence of two subscribing witnesses.

WALTER JONES.

Witnesses:

L. E. BROWN,
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