G. H. MALLARY.

WOOD-GRINDERS FOR PAPER-PULP.

No. 187,292. Patented Feb. 13, 1877.

Fig. 1.

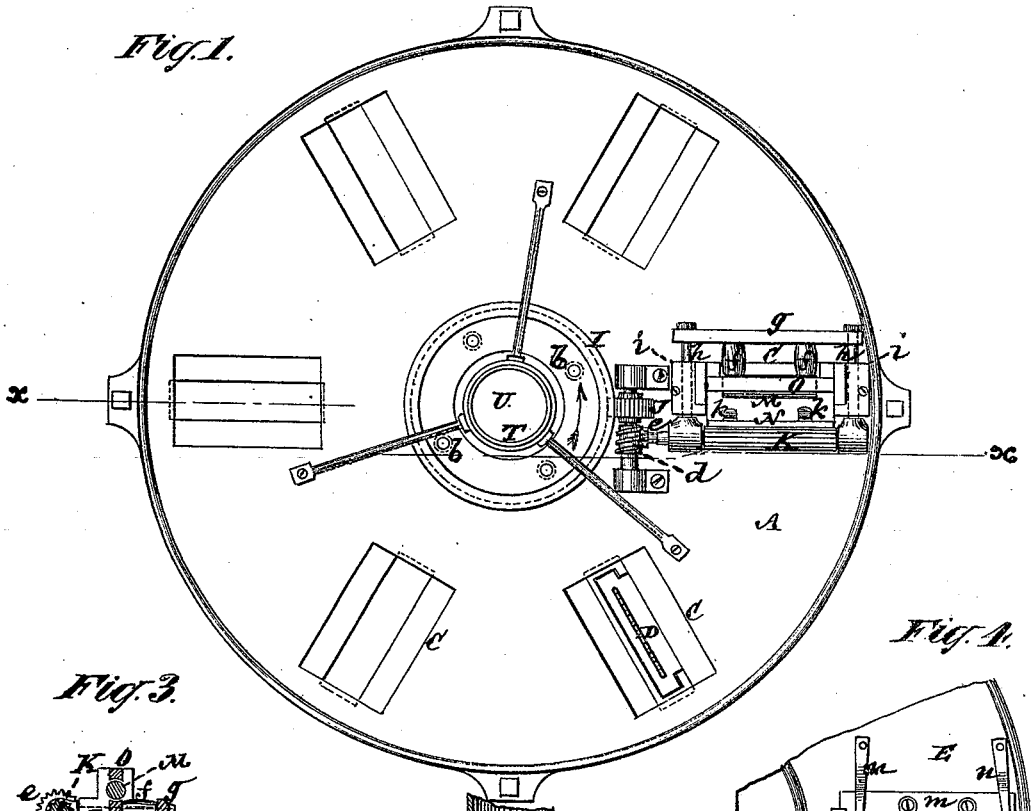


Fig. 4.

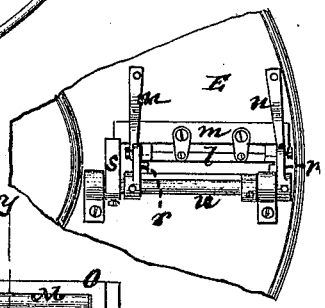


Fig. 3.

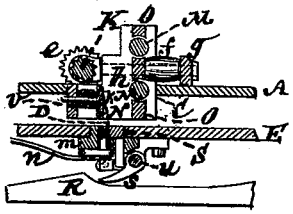


Fig. 2.

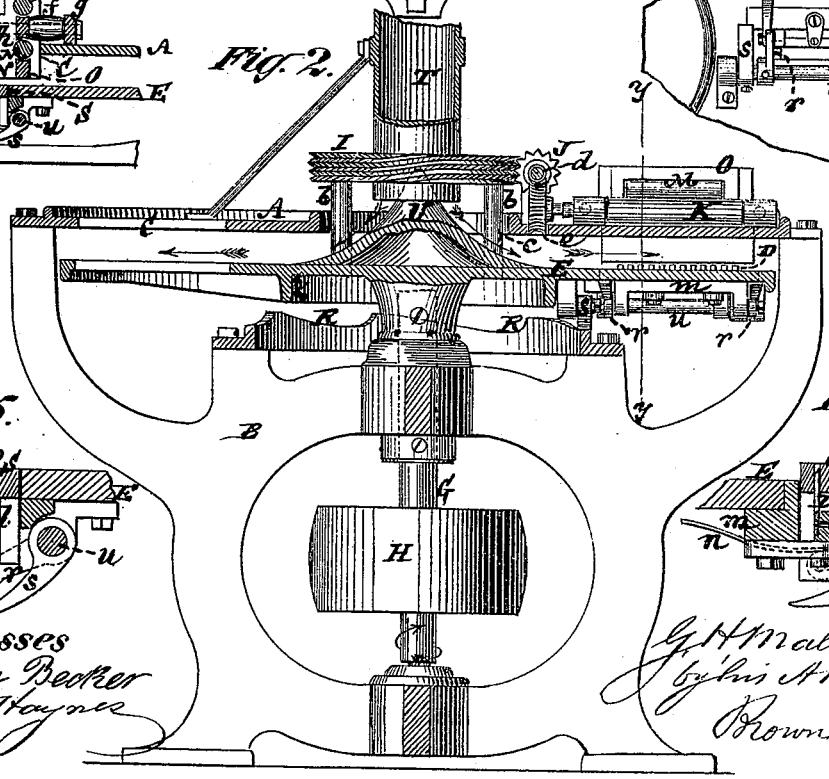


Fig. 5.

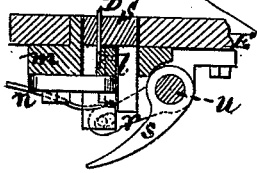
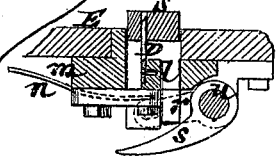


Fig. 6.



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IMPROVEMENT IN WOOD-GRINDERS FOR PAPER-PULP.

Specification forming part of Letters Patent No. **187,292**, dated February 13, 1877; application filed May 29, 1876.

To all whom it may concern:

Be it known that I, GEORGE H. MALLARY, of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in the Manufacture of Wood for Paper-Stock; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, which forms part of this specification.

This invention relates to the reduction of wood to fiber for making paper-stock, and other purposes; and the invention consists of novel devices for operating the feed-rolls which present the blocks of wood to scraping-blades, which reduce the wood to fiber. The invention also consists of a novel means of stripping from the said scraping-blades any fiber that may have a tendency to adhere to them. The invention also consists of certain other features, which will be fully hereinafter described, and specifically pointed out in the claims.

In the accompanying drawing, Figure 1 represents a plan of a machine, in part, for reducing wood to fiber in accordance with my invention. Fig. 2 is a vertical section of the same mainly on the irregular line *x x*. Fig. 3 is a vertical section, in part, on the line *y y*, mainly showing the block-feeding and holding devices, one of the toothed scraping-blades with its cleaver, and means for operating the latter. Fig. 4 is an under view of like devices, in part; and Figs. 5 and 6 vertical sections, upon a larger scale, of the same, with the cleaver of the scraper in different or reverse positions.

In the drawing, A is an upper feed-table or stationary frame for holding the wood to be reduced, said table being mounted on a suitable stand or substructure, B. This table, which may be of circular form, has any desired number of radially-arranged feed-openings C through it for passage of the wood, in the form of blocks, down through it to the toothed scraping-blades below, said blocks being inserted with the grain running horizontally or thereabout, and in transverse directions to the radii of the table.

By first bringing the wood to the form of blocks, its manipulation and subsequent reduction are facilitated. These blocks are not passed directly down through the openings C, for exposure on their under surfaces to the toothed-scrapers D, but are systematically fed downward, and held in position to insure a regular and progressive reduction of them into fiber as the toothed scraping-blades D, which are attached to a rotating disk, E, pass successively against and through them from below.

These block feeding and holding devices will now be described in connection with the rotating scraper-carrying disk E.

The disk E, or its equivalent, a circular plate or frame, interspersed by suitable openings, is arranged parallel with the table A, and at a limited distance below it, and is supported at its center and rotated by a lower vertical shaft, G, to which motion is communicated by a pulley, H. Mounted on this rotating scraper-carrying disk, by posts or uprights *b*, passing through a concentric opening, *c*, in the table A, is a threaded circular plate or ring, I, arranged to gear, by its circumferentially-arranged threads, with any number of wheels J, arranged around it; that is, one for each block-feeding opening C in the table A, and so that each wheel J receives a partial rotation once during each rotation of the carrier E, with its attached threaded plate or ring L, which latter may be constructed as a screw, with its threads continuously spiral, or it may be constructed with its threads so that they will only act upon the wheels J at intervals during each rotation of the carrier E, to give an intermittent feed of the blocks between the action of the toothed scraping-blades on them.

Upon the shaft of each of these wheels J, which is supported in bearings mounted on the table A, is a screw, *d*, which works into a worm-wheel, *e*, on the end of a block-feeding roll, K, arranged along the one side of and above the opening C in the table A. Said feed-roll works in a yielding bearing, being kept pressed forward in relation with the motion of the carrier E by means of one or more springs, *f*, applied to a bar, *g*, which is connected, by sliding rods *h* passing through guides *i i*, with the feed-roll K. Pressure-

rolls M M, working in fixed bearings, are combined with the feed-roll K to support the block on the side opposite said feed-roll and guide as it is fed through the opening C.

The blocks to be reduced into fiber are introduced down between these feed and pressure rolls, and are held and systematically fed by them to the scraping-blades D of the revolving disk E below.

To give a solid bearing to each block after it has left or passed below its respective feed-roll K, and continues to be fed till worked up by the introduction of a succeeding block above it, there is arranged below each feed-roll K a presser-plate, N, acted upon by springs *v* at its back, and, if necessary, furnished with spring-flaps *k* in front. The presser-plates hold the feed-blocks in between them and a fixed plate, O, on the pressure-roll side of the feeding devices, and which is the resistance side as regards the action of the scrapers on the blocks. Said plates, however, in nowise interfere with the systematic feed of the blocks down to the scrapers D, but at the same time restrain them from any rubbing contact with the rotating disk E. Furthermore, the spring feed-roll K and spring presser-plate N, in conjunction with the pressure-rolls M and fixed plate O, provide for the accommodation of blocks of different widths or thicknesses, as well as to hold the same from dropping down of their own weight.

The toothed scraping-blades D, of which there may be one or more, but preferably three or more, occupy a radial relation on or rather in and slightly above the top surface of the disk E, such scraping-blades being arranged one behind the other at either equal or varying distances apart, and so that the teeth of each successive blade are out of line with the teeth of the blade preceding it, in order that the joint action of the several scraping-blades will reduce the whole under-exposed surface of the blocks in direction of the grain of the wood. These scraping-blades are perpendicular or thereabout to their plane of rotation, so that they do not cut the wood, but simply scrape it.

A plain or straight-edged scraper may be combined with the series of toothed scrapers, such straight-edged scraper taking the place of one of the toothed scrapers, and having its operating-edge set below the points of the teeth of the toothed scrapers, for the purpose of scraping off any irregularity of surface left by the toothed scrapers.

Each toothed scraping-blade D is carried by a bar, *l*, adjustably secured by set-screws to a frame, *m*, fast to the under side of the disk E, and each blade provided with a stripper, S, arranged to hug both sides of it, and projecting through an opening in the disk, but not above the latter except when raised to strip or clear the toothed portion of the blade lying above the surface of the disk E of adhering fiber or matter. Each stripper S is thus depressed and held in its lowered position by means of springs *n*, fast to the under side of the rotating carrying-disk E, and arranged to bear down upon cranks *r* of a rock-shaft, *u*, carrying said stripper, and hung in bearings on the under side of said disk. A toe, *s*, on the rock-shaft *r*, traveling over a fixed cam, R, arranged below the disk E, serves to intermittently lift the scraper S during each revolution of the disk to clear the scraping-blade, as required.

Mounted on or above the table A is a wind or blast tube, T, having arranged below or entering up within it a conical distributer, U, which may be fast to the rotating disk E, and which serves to scatter or distribute in an outward direction air forced down the tube T by a fan or other suitable blower, and so to blow out or deliver from off the disk the fiber reduced by the action of the scraping-blades.

The fiber obtained by this machine differs essentially in its character from that produced by the numerous processes heretofore essayed and practiced—viz., shaving, rasping, filing, grating, tearing, and grinding—most, if not all, of which operate upon the wood more or less directly across the grain. This fiber, though longer than that produced by other processes, is yet in a condition to be easily reduced by the subsequent processes to which all wood fibers have to be submitted to bring them to a state of pulp

I claim—

1. The rotating threaded plate or ring I, in combination with the wheels J, the screws *d*, the wheels *e*, the feed-rolls K, and the table or stationary frame A, essentially as described.

2. The combination, with the strippers S, of the arms or cranks *r*, the rock-shafts *u*, the springs *n*, the fixed cam R, the toe *s*, and the toothed scrapers D of the carrier E, substantially as specified.

3. The combination, with the table or frame A and rotating disk E, of the central conical air-distributer U and pipe T, arranged and operating to blow out or discharge the reduced or separated fibers from between said table and said disk, essentially as described.

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