(No Model.)

M. J. CORLEY.

PULP REDUCING MACHINE.

No. 389,202. Patented Sept. 11, 1888.

Fig. 1.

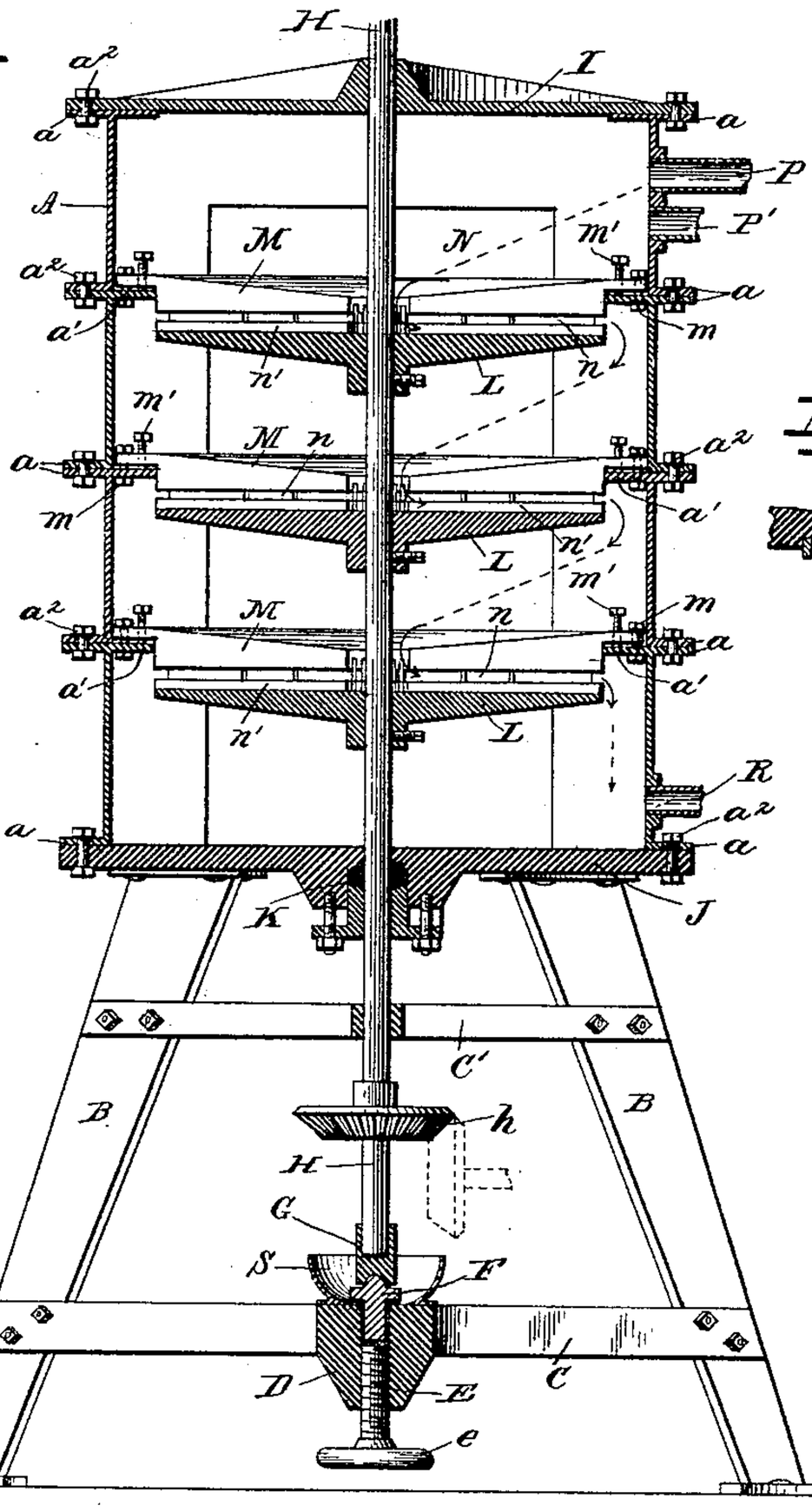


Fig. 4.

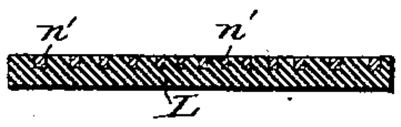


Fig. 5.

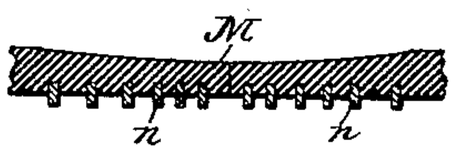


Fig. 2.

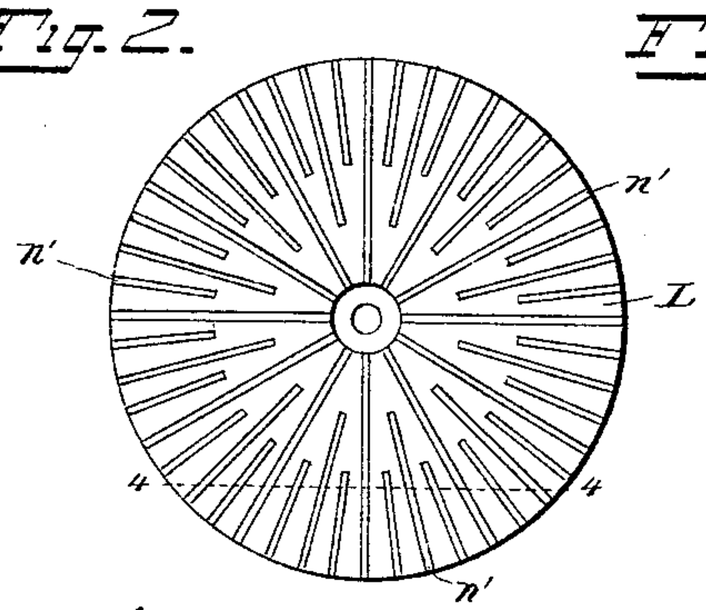
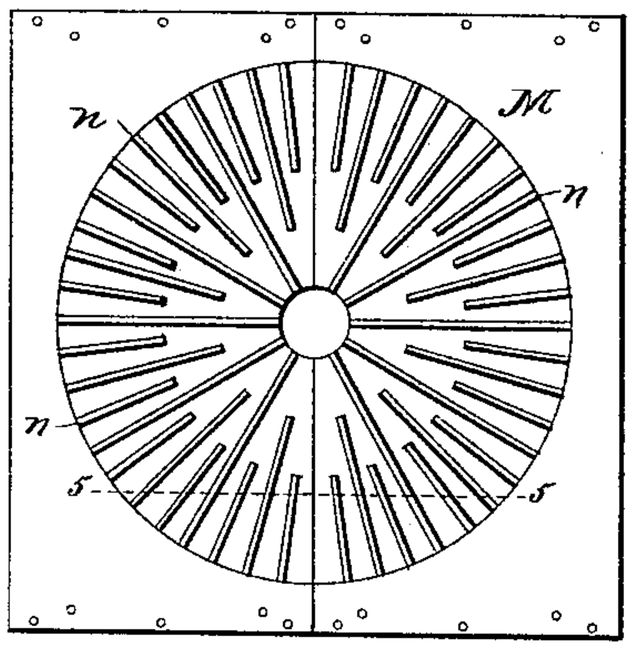


Fig. 3.



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UNITED STATES PATENT OFFICE.

MICHEAL J. CORLEY, OF JERSEY CITY, NEW JERSEY.

PULP-REDUCING MACHINE.

SPECIFICATION forming part of Letters Patent No. 389,202, dated September 11, 1888.

Application filed October 29, 1887. Serial No. 253,743. (No model.)

To all whom it may concern:

Be it known that I, MICHEAL J. CORLEY, a citizen of the United States, residing at Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Pulp-Reducing Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to that class of machines employed for the purpose of reducing pulp for use in making paper.

In reducing pulp it is desirable that the fibers should be separated from each other by crushing rather than by a rubbing grinding, as the latter has the effect of reducing the material to powder, and thus making the fibers too short to felt together. It is also desirable to subject the pulp to successive operations in one and the same machine, so that it may be reduced to the required degree of fineness without being passed through different machines, as the latter plan is slower and more expensive; and the object of my invention is to provide a convenient pulp-reducing machine which will meet these requirements.

In the drawings, Figure 1 is a central vertical section of my improved machine. Fig. 2 is a detail plan view of one of the rotary reducing disks or plates. Fig. 3 is a bottom view of a set or pair of the stationary reducing-plates. Fig. 4 is a section on line 4 4, Fig. 2; and Fig. 5, a section on line 5 5, Fig. 3.

The casing A, which contains the crushing or grinding plates, is supported on suitable standards, B, connected together by cross-bars C and C'. The lower cross-bar, C, is provided with a swell-piece or thickened portion, D, in which is tapped a screw, E, having a hand-wheel, *e*, the said screw abutting against an adjustable support, F, on which rests a socket-piece, G, and in the latter is stepped the vertical shaft H, having a beveled gear-wheel, *h*, to be engaged by a driving beveled gear-wheel. The upper cross-bar, C', affords a vertical bearing for the shaft H, and the cap or cross-piece I at the top of the casing affords an upper vertical bearing for the shaft. The standards B are bolted to the head J, to which the lower section of the casing A is attached, the said head being provided with a stuffing or packing box, K, through which the shaft H passes. The casing or shell A may be either cylindrical or rectangular in shape, the latter form being preferred, and the said casing consists of as many sections as there are sets of reducing-plates in the machine, these sections being preferably of cast-iron and having outer flanges, *a*, at their tops and bottoms and inner flanges, *a'*, at their tops, forming T-shaped tops and L-shaped bottoms, as shown in Fig. 1. The sections are secured together by screw-bolts a^2 passing through the outer flanges, *a*.

The shaft H carries a series of reducing disks or plates, L, which are attached to the said shaft by set-screws which pass through their hubs. Above the rotary disks or plates are the stationary reducing-plates M, which are, for convenience, made in the shape shown in Fig. 3, or in halves, so that two of the plates M are placed together to form a circular plate to co-operate with one of the plates L. The plates M have openings at their inner edges, and are inclined inwardly on top, so that the pulp to be ground will readily work inwardly to be fed downward between the plates.

The inwardly-projecting flanges *a'* of the sections of the shell or casing A support the plates M, the latter being secured to the said flanges by bolts *m*, the said plates being provided with set-screws *m'* abutting against the said flanges, and by means of which the plates may be adjusted vertically to regulate the distance between each set of reducing-plates independently of the other sets.

The plates L and M, which are preferably of iron, are cast with grooves in their faces, and in these grooves are secured, by wedges or otherwise, steel knives, the knives *n* on the plates M projecting considerably from the faces of the said plates to form suitable pockets or channels to carry the material properly. The knives *n'* of the revolving plates L are of hardened steel, and are set flush with the faces of the said plates. The channels between the downwardly-projecting knives *n* of the upper or stationary reducing-plates, M, permit the pulp to flow outward properly and to be evenly distributed on the revolving reducing-plates L. I have found in practice that by arranging the stationary plates above the rotary plates and by setting the knives of the said stationary

plates so that they will project below the surfaces of the said plates, as shown, and by setting the knives of the rotary plates flush with the surfaces of the said rotary plates, I am enabled to produce a better quality of pulp than by the old arrangement of the reducing plates and knives; and although it may be difficult to understand just why this improved result is effected, it is nevertheless a fact, and I attribute it to the varying effect of the centrifugal force on the pulp being acted on, the fiber, with my arrangement of plates and knives, naturally traveling lengthwise as it moves outward, so that it is presented longitudinally to the action of the reducing-knives.

The shaft H, which carries the rotary plates L, can be adjusted vertically to regulate the distance between the grinding-plates by turning the adjusting-screw E by its hand-wheel, and the plates M can be adjusted independently by the set-screws m', as above stated.

I prefer to provide the casing on two sides with doors N, which may be of wrought or cast iron or of wood, the said doors permitting of ready access to the interior of the casing, and the latter (which is practically water-tight) is provided with supply and overflow tubes or openings P and P′ at or near its top, and with a discharge pipe or opening, R, at its bottom. The overflow tube or pipe P′ permits of the escape of surplus pulp or water if too much material be supplied to the machine. A water dish or receptacle, S, on the cross-bar C may surround the step of the shaft H.

In the attrition incidental to the grinding operation the reducing-plates sometimes become heated, and this heat is communicated to the shaft H, by which the rotary plates are carried, and to keep the socket-piece G, in which the said shaft is stepped, cool water may be supplied to the said dish to cool the lower bearing of the shaft.

The pulp to be reduced follows the course through the machine indicated by dotted lines in Fig. 1, working inwardly down the inclined upper sides of the stationary plates M, and through the openings at the inner edges of the said plates to pass outward between the plates L and M, the said material passing successively through the different sets of plates, and being reduced to the desired consistency (which may be determined by the adjustment of the plates) before it is discharged from the machine. In the drawings I have shown three sets of reducing-plates; but a larger number may be used, if desired.

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

1. In a pulp-reducing machine, the combination, with a vertical rotary shaft and a series of reducing disks or plates, L, carried thereby and provided with steel knives *n*, set flush with the surfaces of the said plates, of a casing and a series of stationary reducing-plates, M, supported by said casing above said rotary plates, said plates M being provided with openings at their centers and with steel knives *n*, projecting below their lower faces, substantially as set forth.

2. In a pulp-reducing machine, the combination, with a vertical rotary shaft and a series of reducing disks or plates, L, carried thereby and provided with steel knives *n*, set flush with the surfaces of the said plates, of a casing and a series of stationary reducing-plates, M, supported by said casing above said rotary plates, said plates M having inwardly-inclined upper surfaces, and being also provided with openings at their centers and with steel knives *n*, projecting below their lower faces, substantially as set forth.

3. The combination, with the casing A, consisting of a series of sections having the outer flanges, *a*, and the inner flanges, *a′*, of the screw-bolts a^2, passing through the said outer flanges, *a*, the stationary plates M, attached to the said inner flanges, the vertical shaft H, and the rotary plates or disks L, carried by the latter, substantially as set forth.

4. The combination of the casing A, the standards B, the cross-bars C and C′, the screw E, the adjustable support F, the socket piece or step G, the shaft H, the rotary reducing plates or disks carried by said shaft, and the stationary reducing-plates secured to said casing, substantially as set forth.

5. In a pulp-reducing machine, the combination, with the casing A, consisting of a series of sections having the outer flanges, *a*, and the inner flanges, *a′*, of the stationary plates M, bolted to the said inner flanges, the bolts m', for adjusting said plates vertically independently of each other, the vertical shaft H, and the rotary plates or disks secured to said shaft, substantially as set forth.

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

MICHEAL J. CORLEY.

Witnesses:
FERGUS T. KELAHER,
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