(No Model.) 2 Sheets—Sheet 1.

J. C. KEMP.

PULP GRATING MACHINE.

No. 588,340. Patented Aug. 17, 1897.

Fig. 1.

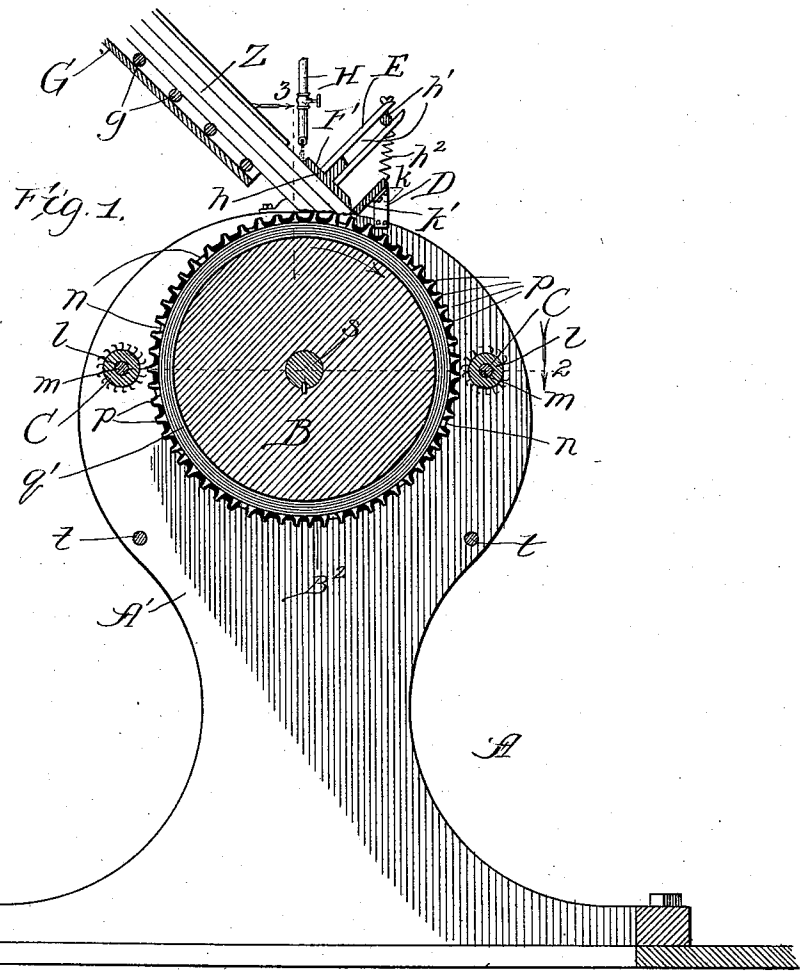
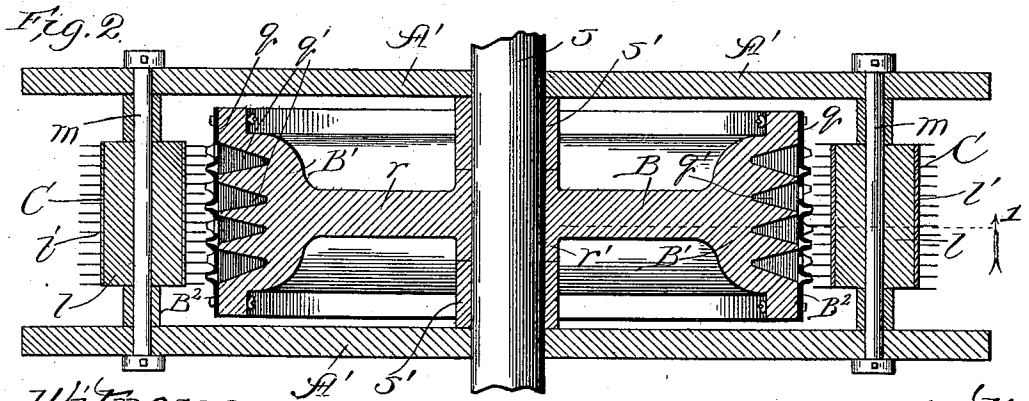


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

J. C. KEMP.

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Fig. 3.

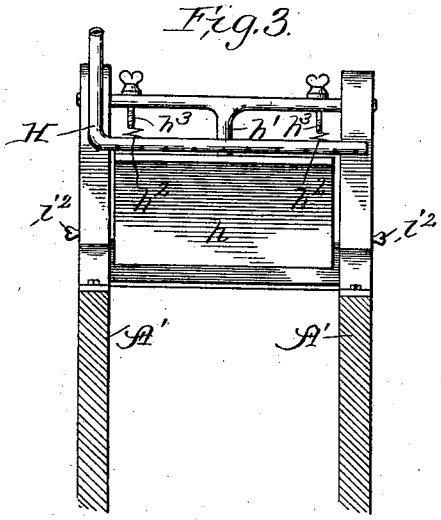


Fig. 4.

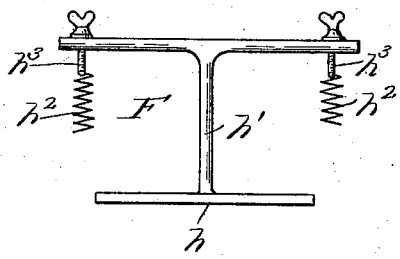


Fig. 6.

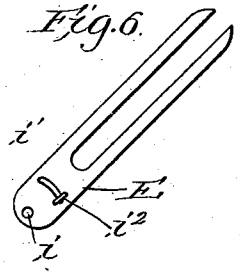


Fig. 5.

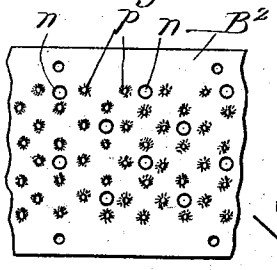
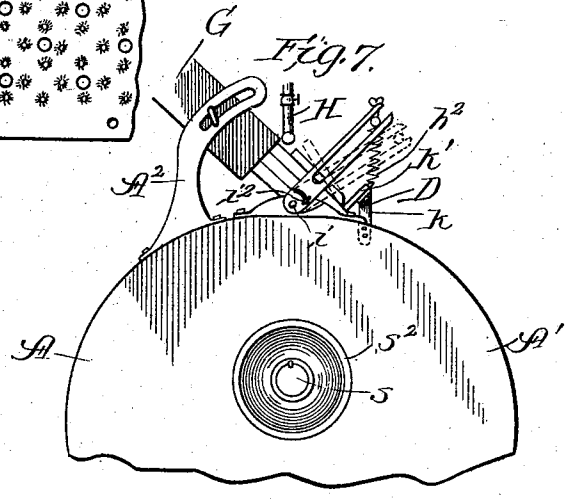


Fig. 7.



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UNITED STATES PATENT OFFICE.

JOHN C. KEMP, OF TIPTON, INDIANA.

PULP-GRATING MACHINE.

SPECIFICATION forming part of Letters Patent No. 588,340, dated August 17, 1897.

Application filed July 27, 1896. Serial No. 600,614. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. KEMP, a citizen of the United States, residing at Tipton, in the county of Tipton and State of Indiana, have invented a new and useful Improvement in Pulp-Grating Machines, of which the following is a specification.

My object is to provide a machine of improved construction for the mechanical production of wood-pulp which shall have a grating action, as distinguished from a grinding action, upon the wood and produce pulp of comparatively long fiber and free from lumps.

To the above ends my invention consists in the general construction of my improved machine, as well as in details of construction and combinations of parts, all as hereinafter set forth and claimed.

In the drawings, Figure 1 is a broken vertical section taken centrally and longitudinally of the machine on line 1 of Fig. 2, but upon a reduced scale; Fig. 2, an enlarged broken plan section taken on line 2 of Fig. 1; Fig. 3, an enlarged broken section of the frame portion of the machine, taken on line 3 of Fig. 1 in the direction of the arrow; Fig. 4, a view in elevation of a presser-foot detail; Fig. 5, a face view of a portion of the grater-plate, forming the circumferential face of the wheel shown in Fig. 1; Fig. 6, a perspective view of one of the presser-foot guides, and Fig. 7 a broken side elevation of the upper portion of the machine.

A is a supporting-frame having side cheeks held together by cross-bars t or otherwise and affording bearings for the opposite end portions of a rotary shaft s. Keyed upon the shaft between the cheeks is a support or wheel B, formed preferably with a solid center r, hub r', and expanded rim B'. The rim has a flat outer surface q, provided with a series of circumferential recesses q', as shown. Extending around the surface q and securely bolted in place at opposite edges is a plate B^2, forming the circumference of the wheel. The plate is provided with numerous burs p, punched outward from the inner or under side of the plate to present hollow ragged points or projections, and they should not only be as numerous as possible, but disposed in straight lines transversely of the plate, the burs of successive lines alternating, as indicated in Fig. 5. The plate is also provided with circumferential series of comparatively large openings n, the series being coincident with the recesses q' in the wheel-rim. The wheel B is held in position centrally between the cheeks A' by collars s' s' upon the shaft, and beyond one of the cheeks the shaft carries a pulley s^2, at which it may be belted to a suitable driving power.

Mounted at opposite end portions in the cheeks A' and extending parallel with the shaft s are shafts m, carrying stripping-rollers C. The stripping-rollers C may each be formed with a solid center l, revolving upon a shaft m and surrounding the said center with a rim or covering of wire-clothing l', having bent stripping-teeth, as illustrated in Fig. 1. The rollers extend against the surface of the wheel B and are revolved by friction of the plate or grating-surface B^2 against the stripping-teeth.

D is a stop or guide comprising supports k upon the cheeks of the frame and an inclined cross-plate k', which at its lower edge is close to but out of contact with the circumferential surface of the wheel B.

Pivotally mounted at i upon the cheeks are bifurcated supporting-arms E. The arms are provided near the pivots with segmental slots i', through which extend thumb-screws i^2 into the cheeks. The arms E may be adjusted to different angles upon their pivots and tightened in place by means of the thumb-screws.

F is a presser-foot having a flat base h upon the end of a T-shaped frame h', which fits and slides at opposite ends between the forks of the arms E. Springs h^2 are fastened at their lower ends to the opposite ends of the stop D, and at their upper ends to tensioning-screws h^3 on the ends of the frame h'.

Mounted between brackets A^2 on the cheeks A' is a chute or feed-trough G, provided with transverse antifriction-rollers g. The chute may be mounted as shown or in any other suitable way, but preferably so that the angle of its extent or inclination may be changed. Extending across the lower end of the chute at the upper side thereof is a perforated water-supply pipe H.

In operation strips of wood Z are fed by gravity down the chute G and along the under surface of the presser-foot, whereby they

are pressed at their end portions firmly against the grater-wheel B. The wheel is rotated in the direction of the arrow in Fig. 1. The action of the burs upon the strips or blocks of wood is to tear them into very fine, but comparatively long fibers. The presser-foot holds the blocks firmly against the grater, while the stop D prevents anything more than very thin strips from the upper blocks from passing without being reduced to fiber. It is desirable in practice that different woods be fed to the grater at different angles, and the angle of the chute or trough G may be changed, as desired, and also the supporting-arms E, so that the presser-foot will extend at the same angle as the chute. Water from the pipe H drenches the lower end portions of the blocks and tends to wash the fibers from the surface of the grating-wheel. A large proportion of the material passes through the openings in the burs *p* to the recesses *q'* in the rim of the wheel B, and in the rotation of the latter the material as it accumulates in the recesses is thrown off by centrifugal force through the outlet-openings *n*. Thus the burs are prevented from clogging. The strippers C by revolving against the grating-wheel cause the points of the stripping-wires to engage and strip off the fibers which lodge between the burs. The stripping mechanism, outlets *n*, and the water constantly playing upon the surface of the wheel tend to maintain the latter comparatively clean by discharging the fibers as fast as formed.

By practicing the grating process as described I produce fibers that are much longer and therefore much better adapted for paper-making than it is possible to produce by any grinding process of which I am aware. It also, on account of the length of the fibers produced, effects a great saving of material over any other method.

To rotate my improved grating-wheel requires less than one-fourth the power required to rotate the grinding-stones usually provided and the wheel has double the capacity for pulp production over a stone presenting the same working surface. Substantially the same results could be produced by providing a flat rotary grating-plate or a reciprocating grating-plate in place of the revolving wheel shown and described, and the gist of my invention lies in employing a grater formed with burs and a holder for the wood relatively movable, whereby the grater acts upon the wood as set forth.

While I prefer to construct my improvements as shown and described, the construction may obviously be modified in the matter of details without departing from the spirit of my invention as defined by the claims.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a machine for reducing wood to pulp, the combination with the supporting-frame, of a rotary grater comprising a wheel having a circumferentially-recessed rim portion, a plate secured upon the wheel about the said rim portion and formed with a series of hollow projecting burs, and a series of discharge-openings, all communicating with said recess, mechanism for feeding the wood and holding it against the said plate, stripper mechanism engaging and moving against the said plate, and a water-discharge pipe for wetting the grater, substantially as and for the purpose set forth.

2. In a machine for reducing wood to pulp, the combination of a grater comprising a wheel surrounded by a plate having a working face formed with hollow projecting burs, and means for feeding the wood and holding it against the plate, comprising a chute, a presser-foot between said wheel and chute, and spring mechanism for said presser-foot, substantially as and for the purpose set forth.

3. In a machine for reducing wood to pulp, the combination of a grater, comprising a wheel surrounded by a plate having a working face formed with hollow projecting burs, and means for feeding the wood and holding it against the plate, comprising a chute, a stop D close to the wheel, a presser-foot between the said stop and chute, spring mechanism for said presser-foot, and means for changing the angle of the chute and presser-foot, substantially as and for the purpose set forth.

JOHN C. KEMP.

In presence of—
JOHN W. RICHARDSON,
JAMES STEPHENSON.