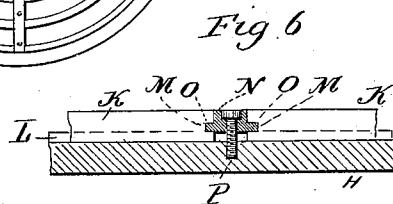
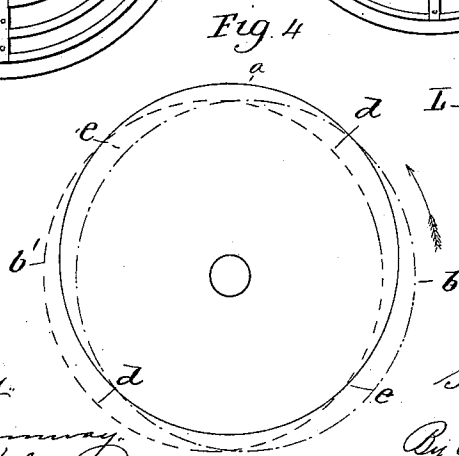
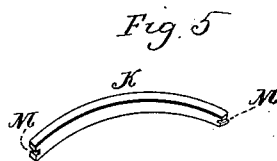
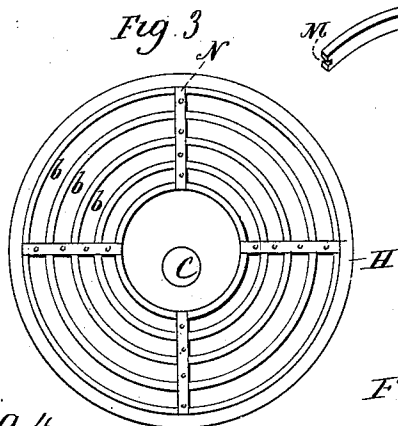
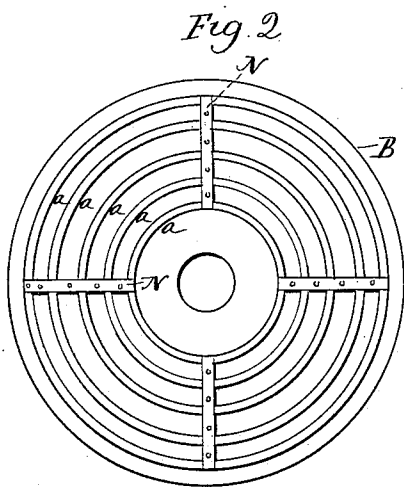
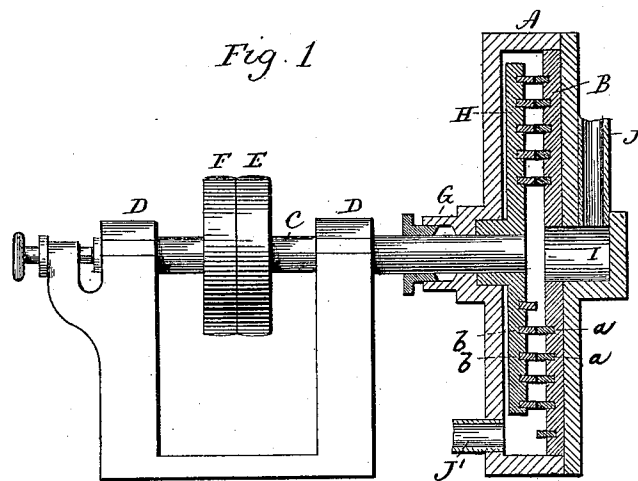


(No Model.)

S. D. BEACH.
PULP BEATING AND REFINING MACHINE.

No. 463,823.

Patented Nov. 24, 1891.



Witnesses:

J. H. Shumway.
William D. Kellogg.

Inventor

Sharon D. Beach

By Atty.

Earle Seymour

UNITED STATES PATENT OFFICE.

SHARON D. BEACH, OF SEYMOUR, CONNECTICUT.

PULP BEATING AND REFINING MACHINE.

SPECIFICATION forming part of Letters Patent No. 463,823, dated November 24, 1891.

Application filed June 1, 1891. Serial No. 394,638. (No model.)

To all whom it may concern:

Be it known that I, SHARON D. BEACH, of Seymour, in the county of New Haven and State of Connecticut, have invented a new Improvement in Pulp Beating and Refining Machines; and I do hereby declare the following, when taken in connection with accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a vertical central sectional side view of a pulp beating and refining machine; Fig. 2, a face view of the stationary disk detached; Fig. 3, a face view of the revolving disk detached; Fig. 4, a diagram illustrating the operation of the disks; Fig. 5, a perspective view of one segment of the ribs detached; Fig. 6, a partial section cutting circumferentially through a groove in the disk in which the ribs are set and illustrating the means for removably securing the ribs to the disk.

This invention relates to an improvement in that class of machines which are designed to receive the material from the engine and beat and refine it into the required condition for the manufacture of paper, the object being a simple construction of machine which will completely disintegrate the material coming from the engine and bring it to the proper pulp condition; and it consists in a stationary disk carrying on its face a series of substantially concentric ribs or cutters, combined with a revolving disk having its face substantially parallel to the face of the stationary disk, said revolving disk having upon its face a series of concentric ribs projecting toward and similar to the ribs on the face of the stationary disk, the concentric ribs on one disk being eccentric to the ribs of the other disk, whereby the ribs of the revolving disk in each revolution work across the ribs of the stationary disk with a shearing cutting action, as more fully hereinafter described.

A represents the case within which the stationary disk B is arranged; C, the driving-shaft supported in suitable bearings D, and to the shaft revolution is imparted by means of a pulley on the shaft or otherwise. In the illustration I show a tight pulley E and a

loose pulley F—a well-known mechanical expedient for imparting revolution to shafts of this character. The shaft extends into the case through a stuffing-box G in the usual manner for this class of machines. Within the case the shaft carries a disk H, which revolves with the shaft. The disk B, as shown in Fig. 2, has upon its face a series or several ribs *a*, the several ribs being concentric to each other, and, as represented in Figs. 1 and 2, are concentric with the disk B and with the shaft C. The ribs *a* project from the face of the stationary disk B, as clearly seen in Fig. 1. The disk H, as illustrated, is eccentric to the shaft C, but so as to revolve with the shaft, the axis of revolution being concentric with the axis of the stationary disk and the ribs thereon.

The disk H is provided on its face with a series of several ribs *b*, preferably in number and relative location the same as the ribs *a* of the stationary disk. The ribs *b* of the revolving disk are arranged eccentric to the axis of the shaft or axis around which the disk revolves. The ribs *b* project from the face of the revolving disk toward the stationary disk and so that the ribs on the two disks may work as close together as they conveniently may do and run free.

The case is constructed so as to permit the partially disintegrated or prepared pulp to be introduced therein. As here represented, this is done through a passage I, which leads centrally through the stationary disk, a conductor J leading the material to be operated upon into the passage I, whence it flows into the case between the disks, and at some convenient point the case is provided with an outlet J', by which the completely beaten or refined pulp may escape.

The operation of the machine is illustrated in Fig. 4, in which the solid circle *a* indicates one of the ribs of the stationary disk. *b* represents in broken lines the corresponding revolving rib at its extreme right-hand throw. As the rib *b* revolves in the direction indicated by the arrow, it works across the rib *a*, as at *d d*, and this cross-working continues throughout the revolution, as when at the opposite point, as indicated by the broken circle *b'*, the crossing action will have reached the points *e e*. This cross action of the ec-

centric ribs upon the concentric ribs produces a shear-like cut between the two, which continues throughout the revolution, the same shear-like action being produced by all the ribs, and the operation of this shear or cutting action is to completely beat and disintegrate the material which passes between the two disks.

While I have represented the eccentric ribs as being upon the revolving disk, it will be evident the same result will be attained by making the stationary ribs eccentric to the axis of the shaft and the ribs of the revolving disk concentric with the axis of the shaft, thus reversing the operation, and this may be illustrated by supposing the disk shown in Fig. 3 to be the stationary disk with the ribs eccentric to the axis, while that of Fig. 2 will represent the revolving disk with the ribs concentric with the axis of revolution. In either case the ribs on each disk should be concentric with each other. The ribs should be made from a durable material, as steel, and to conveniently construct them, as well as to adapt them for removal or repair, they are best made in segments, K, Fig. 5, representing one of such segments detached. The disks are constructed with corresponding circular and concentric grooves L, (see Fig. 6,) the depth of the ribs being as much greater than the projection required as the depth of the grooves. The grooves locate the ribs circumferentially. To interlock the ribs, they are constructed at their ends with lateral grooves or undercuts M, and the ribs are in their combined length less than the circumference of the complete circle and so as to leave spaces between the adjacent ends of the segments. Into these spaces bars N are introduced, the bars being constructed with lips O or a shape corresponding to the irregular shape of the ends of the segments and so as to interlock therewith. The segments being set in place, the bars are introduced radially, the bars preferably being of a length so that a single bar may lock all the ribs, and when the bar is in place it is secured to the disk by suitable bolts, as P, and so as to se-

curely clamp the ribs upon the disks; but this particular means for securing the ribs upon the disks is not to be understood as essential to the invention, as it is immaterial to the invention how the ribs are secured.

I claim—

1. In a pulp beating and refining machine, a case, a shaft entering said case and carrying a disk within the case so as to revolve with the shaft, combined with a stationary disk arranged within the case, the faces of the two disks substantially parallel with each other, the disks each having upon their faces a series of circular ribs, those of each disk substantially concentric with all the others on the disk, the ribs of one disk arranged eccentric to the axis or the ribs of the other disk, the said ribs of the revolving disk adapted to work across the ribs of the other disk, and the case constructed with an inlet for the material to be operated upon with an outlet for the escape of such material when operated upon, substantially as described.

2. A pulp beating and refining machine consisting of a stationary disk and a revolving disk arranged within a working case, the case constructed for the admission of material to be operated upon between the two disks and with an outlet for the escape of material after operation thereon, circular ribs on the adjacent faces of the two disks, the disks being constructed with circular grooves corresponding to said circular ribs, and the ribs constructed in segments and adapted to set into said grooves, the ends of the ribs being of irregular shape, and radial bars between the ends of the said ribs, the sides of the said bars corresponding in shape and so as to interlock with the adjacent ends of the said segments and the bars secured to the disks, substantially as described.

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

SHARON D. BEACH.

Witnesses:

FRED C. EARLE,

LILLIAN D. KELSEY.