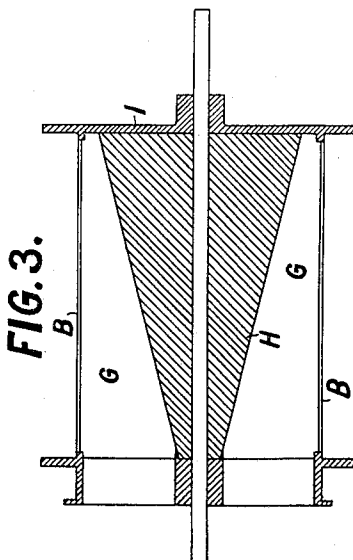
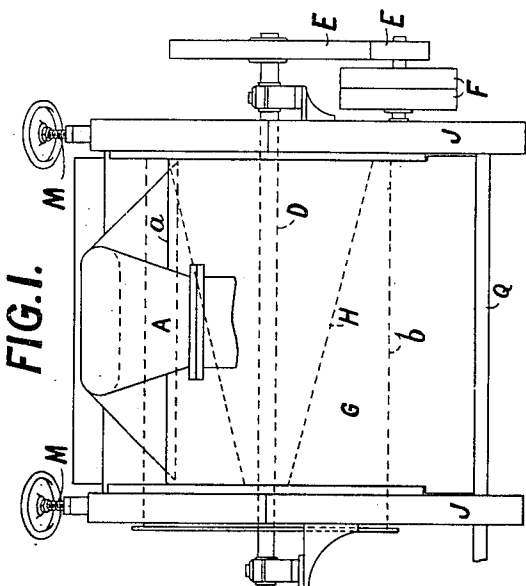
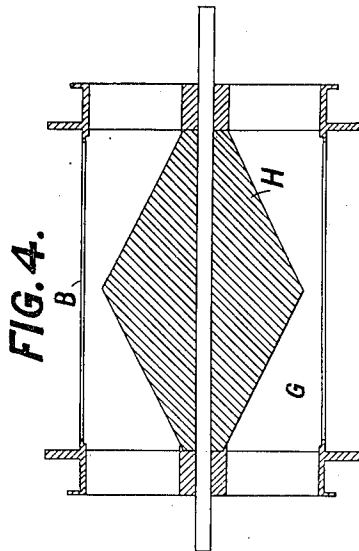
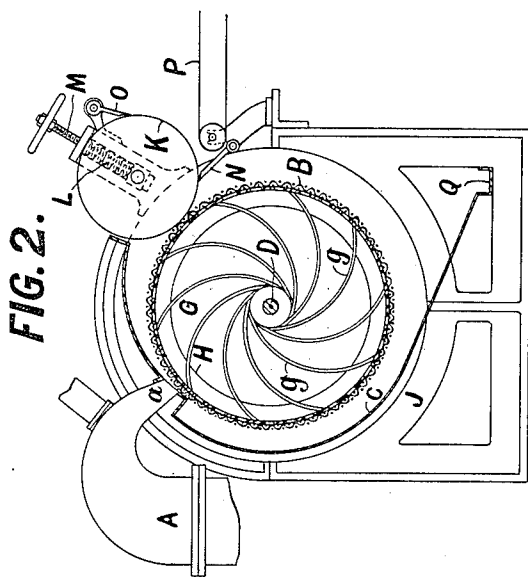


No. 819,004.

PATENTED APR. 24, 1906.

P. COUPER.
PAPER MAKING APPARATUS.
APPLICATION FILED JAN. 2, 1906.



Witnesses

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UNITED STATES PATENT OFFICE.

PETER COUPER, OF FLINT, ENGLAND.

PAPER-MAKING APPARATUS.

No. 819,004.

Specification of Letters Patent.

Patented April 24, 1906.

Application filed January 2, 1906. Serial No. 294,279.

To all whom it may concern:

Be it known that I, PETER COUPER, paper-maker's engineer, a subject of the King of Great Britain, residing in Flint, in the county of Flint, England, have invented certain new and useful Improvements in or in Connection with Paper-Making Apparatus, (for which application has been made in Great Britain, No. 2,774, dated February 10, 1905,) of which the following is a specification.

This invention has reference to paper-making apparatus, and is designed more especially to provide certain improvements in concentrating the pulp and extracting the liquid both before and after the bleaching liquor is added.

It has been a long-felt want among paper-makers to devise some means of handling fiber by mechanical power from the green plant right onto the beaters without the use of a half-stuff machine; but the extraction of the chlorin has always been a stumbling-block. The present invention meets this want, and I claim that my apparatus, with the aid of a centrifugal pump, will do all that is required and render a "press-pate" superfluous.

My apparatus takes the green pulp just as it leaves the straining plant and concentrates it before the bleach is added. This concentrated pulp is then delivered by the machine to a suitable vessel where the desired quantity of bleach is run among the fibers. The pulp is allowed to remain in the bleach liquid for some time until the degree of whiteness is obtained. Then it is conveyed by a centrifugal or other pump through a pipe A to my apparatus, where the strong bleach liquor is extracted from the pulp, the concentrated fiber being delivered to a vessel where it is washed in clean water until no trace of chlorin remains. The washed pulp, perfectly free from chlorin, is again delivered to my apparatus and concentrated to a very close consistency and dried as if the pulp has been passed over a press-pate. In mills where they wash esparto and potch in the same engine my apparatus will take the place of a press-pate after the fibers have passed through the ordinary strainers.

The construction of my apparatus will be understood from the following description, reference being had to the accompanying drawings, in which—

Figure 1 is a front elevation; Fig. 2, a cross-

section; Figs. 3 and 4, a longitudinal section of the drums.

Referring to Figs. 1, 2, and 3, the apparatus comprises a rotary drum provided with a foraminous surface B, which detains the fiber of the pulp, but allows water to drain through its meshes or perforations. The drum, which is contained within a suitable outer casing C, is rotated by the shaft D by means of the gears E and pulleys F. In close proximity to the foraminous surface B of the drum is the mouthpiece *a* of the feed-pipe A, through which pulp is conveyed to the drum by a centrifugal or other suitable pump, so as to deliver the pulp with force against the foraminous surface B of the drum. The pulp is therefore driven and spread against the meshes of the drum, onto whose surface the pulp collects and is compacted. Inside the drum is made with a series of compartments G, running longitudinally from end to end of the drum all round it. The partitions *g*, forming these compartments, are inserted between the inside of the foraminous cylinder B and the cone-shaped center piece H. These compartments at their base therefore have a slope from one end of the drum toward the other, so that liquid forced through the gauze-cylinder at the top will flow by gravity through these compartments and be delivered at the open end of the drum through an opening in the end frames J into a channel or spout Q, the other end of the drum being closed at I. If preferred, however, I can arrange a double cone H, Fig. 4, (instead of a single one, as shown in Fig. 3,) so that the highest point of the compartments will be in the middle and slope from an apex toward opposite ends, which in this case are both open. If this liquid be bleaching liquor or water impregnated with bleaching liquor, it is returned again by a conducting-spout to the vessel where the pulp is being bleached, so that the liquor is not wasted. The pulp fed onto the foraminous cylinder is caused to distribute itself equally throughout its entire length by forming the pipe A with a flared mouthpiece. This mouthpiece gradually widens, as shown in Fig. 1. The drum rotating slowly all the time the pulp is being fed thereto, this mouthpiece *a* assists the pulp being spread evenly over the drum and aids the separation of liquid, which latter, however, is largely caused by the force with which the pulp is delivered

against the foraminous cylinder. Liquid is separated out, and the pulp is solidified or concentrated as the pulp is advanced by the drum. In another part of the drum is a rotary pressure-roller K, adapted to press against the foraminous surface B of the drum and regulate the thickness of the paper-pulp delivered by the drum, also to apply a pressure on the pulp to further concentrate it. The pressure of this roller is obtained by springs L, which can be regulated to a nicety by adjusting-screws M. The pulp on the periphery of the drum after passing between the drum B and roller K adheres to the latter. I provide, however, a lip or scraper N, pressing against the roller K and commonly called a "doctor," adapted to remove the concentrated pulp from the roller as it rotates. One of these can be so placed as to remove the pulp from the roller and deliver it to a vessel where the bleach is added, and another, O, can be placed to remove the pulp and deliver it by the conveyer felt or belt P to the pulp-washing vessel or to other apparatus. The operation of the manufacture will now be apparent. The machine first concentrates the green pulp, and the pressure with which the green pulp is delivered through the pipe against the foraminous surface B of the drum operates to compact the pulp and force the water and moisture out through the gauze, and the pulp is retained on the surface. The pulp is removed and delivered to a tank, where the strong bleach liquor is added, and when the bleaching operation is effected the pulp is again delivered to my machine to have the bleach removed, after which the pulp is washed and again fed to my machine to be finally concentrated and prepared for the beating department. By my concentrating apparatus a far greater volume of material can be prepared in a given time than by the usual process in vogue, and no felting of the fiber takes place. The apparatus is simple and effective and does not entail any costly upkeep, and it can be readily adopted and fixed to any existing potching or bleaching plant.

I declare that what I claim is—

1. The combination of an outer stationary

casing, a drum with foraminous surface rotating inside the said casing, a feed-pipe with a contracted mouthpiece in proximity to it but made the full width of the drum, and a device for delivering the wet pulp through the mouthpiece with force against the meshes and detain it thereon, but force the liquid to drain through.

2. The combination of an outer stationary casing, a drum with foraminous surface, rotating inside said casing, a feed-pipe whose mouthpiece is in proximity to said surface, a pump arranged to deliver the wet pulp with force against the meshes and detain it thereon, but force the liquid to drain through, and partitions or channels inside the drum to carry off the liquid that is separated from the pulp.

3. In apparatus for the purpose mentioned, a drum with foraminous surface through which the liquid from the wet pulp will drain, and a series of curved partitions and steep channels inside the said drum delivering the drainage to the outside at either end without falling on the lower part of the drum.

4. In apparatus for the purpose mentioned, a drum with foraminous surface through which the liquid from the wet pulp will drain, if the latter be delivered with force against the meshes so as to detain the solid matter thereon, of means outside the drum for further pressing the pulp and delivering it in uniform thickness.

5. In apparatus for the purpose mentioned, a drum with foraminous surface through which the liquid from the wet pulp driven against it, will drain, a cone-shaped center piece inside the drum, so arranged that the liquid will flow by gravity to either end, and compartments running longitudinally from one end of this cone-piece inside the drum to form channels for the liquid.

In witness whereof I have hereunto signed my name, this 27th day of November, 1905, in the presence of two subscribing witnesses.

PETER COUPER.

Witnesses:

G. C. DYMOND,
THOMAS S. SHILLINGTON.