

No. 625,237.

Patented May 16, 1899.

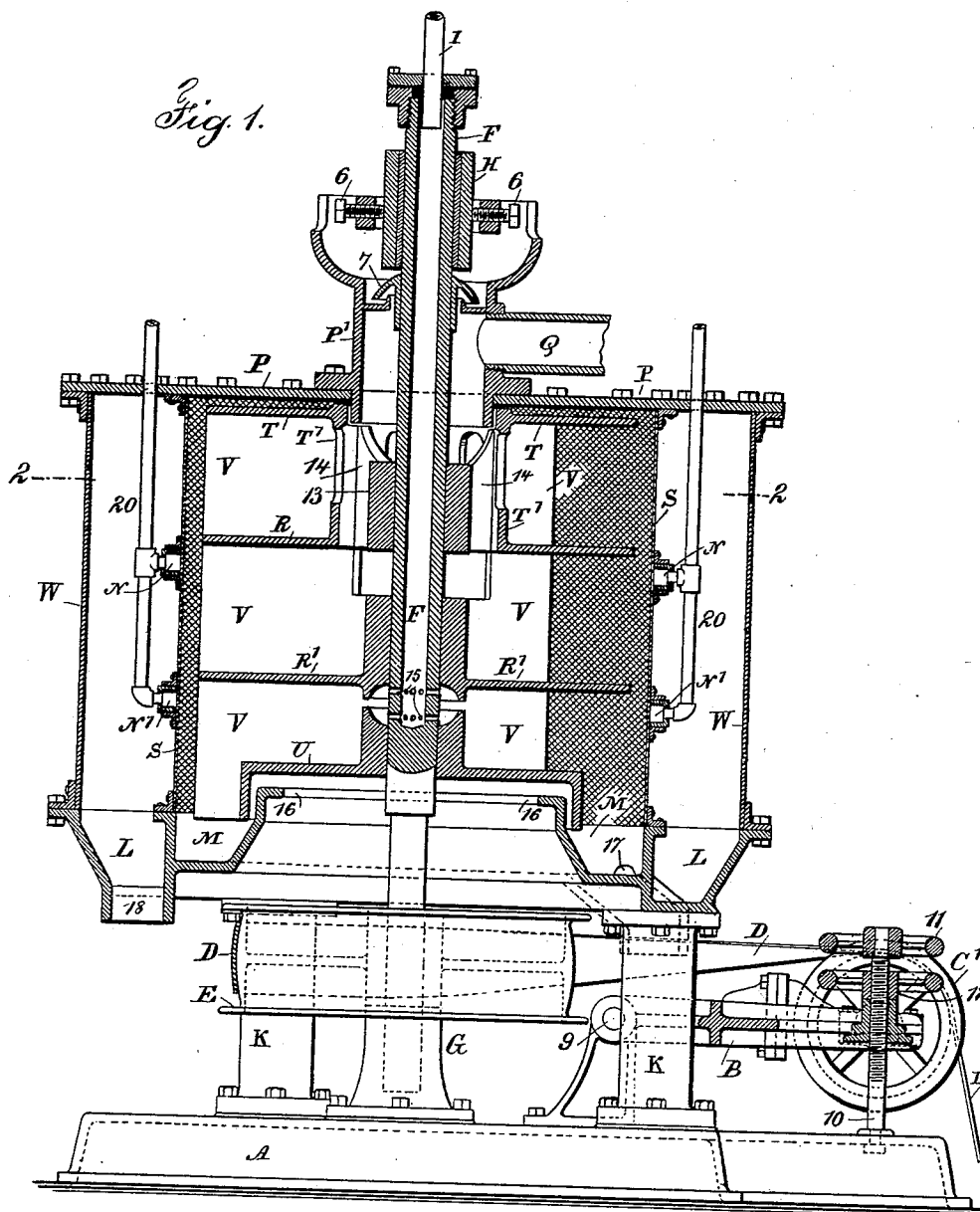
J. H. BAKER, G. F. SHEVLIN & F. H. BAKER.

PULP SCREEN.

(Application filed Apr. 15, 1898.)

(No Model.)

2 Sheets—Sheet 1.



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George F. Shevlin and
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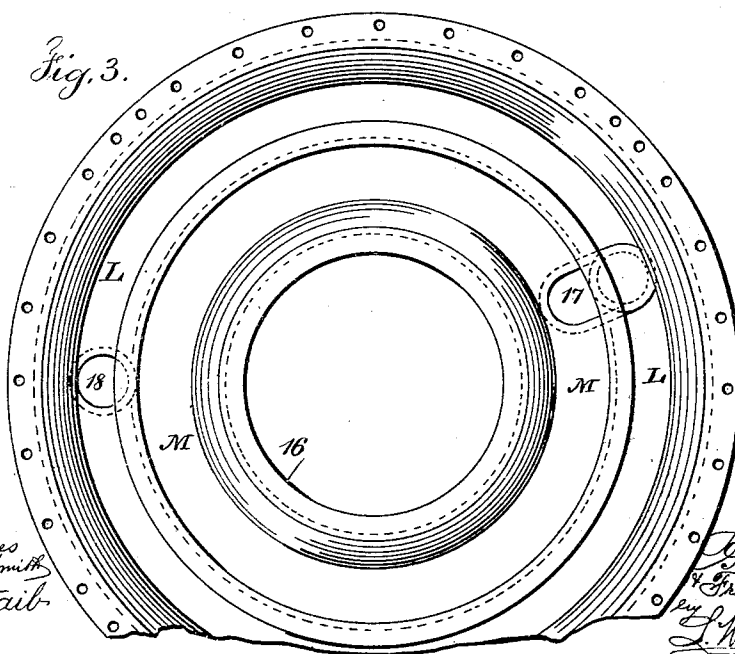
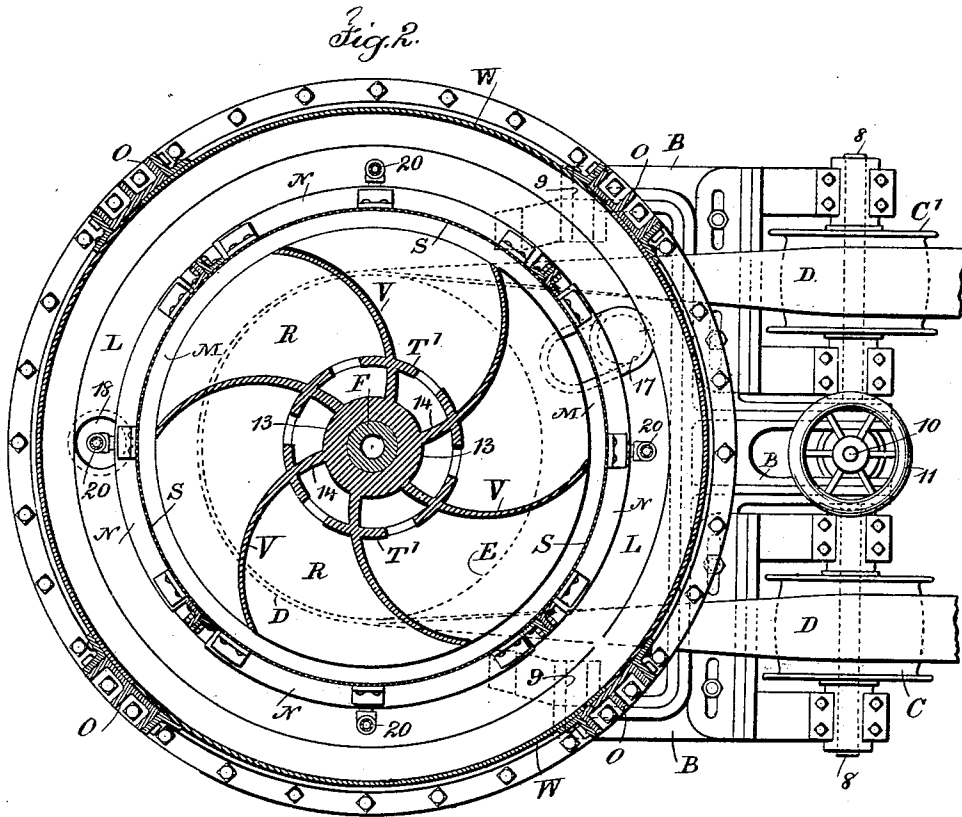
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UNITED STATES PATENT OFFICE.

JAMES H. BAKER, GEORGE F. SHEVLIN, AND FREDERICK H. BAKER, OF
SARATOGA SPRINGS, NEW YORK.

PULP-SCREEN.

SPECIFICATION forming part of Letters Patent No. 625,237, dated May 16, 1899.

Application filed April 15, 1898. Serial No. 677,659. (No model.)

To all whom it may concern:

Be it known that we, JAMES H. BAKER, GEORGE F. SHEVLIN, and FREDERICK H. BAKER, citizens of the United States, residing at Saratoga Springs, in the county of Saratoga and State of New York, have invented an Improvement in Pulp-Screens, of which the following is a specification.

In screening paper and similar pulp a centrifugal device has been made use of to project the fiber and the water with which it is mixed against a stationary screen, the finer fibers passing through the screen with the water and the coarser materials remaining within the screen. We find it important that the coarser materials should be washed down the screen and also projected inwardly, so that a second screening operation is performed by the centrifugal action for carrying off any fiber that may be sufficiently fine for passing through the screen. In our present improvement the water and pulp are received at the center of the centrifugal device and projected outward, so that the water and fine pulp pass through the surrounding screen, and a supply of water free from pulp is provided in the centrifugal device, so that the water washes down any fibers that may adhere to the interior of the screen and carries off with it such fine materials as will pass through the screen. In addition to the foregoing we surround the circular screen with one or more waterways, the screen forming one side of such waterway, so that the water issuing through the screen carries with it any coarse pulp, so that it is subjected to a second screening operation by the centrifugal device, which projects the water and pulp against the interior of the screen.

In the drawings, Figure 1 is a vertical section of the entire apparatus. Fig. 2 is a sectional plan view at the line 2 2, and Fig. 3 is a plan of the annular troughs at the bottom of the apparatus.

The base A is of suitable size and shape, and upon it are the standards K, by which the annular troughs L and M are supported; and outside of the apparatus is an inclosing case W, formed of segmental plates between vertical columns or frames O, which support

the top plate P, in which there is a central opening, and a cylinder P', that is bolted to the top plate and extends upward and supports the bearing H for the vertical shaft F; and there are screws 6, by which the bearing H may be adjusted, and a deflector 7 upon the vertical shaft and below the bearing, whereby any lubricating material upon the bearing and shaft is prevented from passing down such shaft to the centrifugal portion of the apparatus, and there is a lateral inlet-pipe Q, opening into the cylinder P' and through which pipe the pulp and water are to be supplied to the centrifugal apparatus hereinafter described.

The bottom of the shaft F is supported in a step or bearing G, which may be of any desired character, and around the shaft F and connected therewith is a pulley E, that receives the driving-belt D, which passes off horizontally, or nearly so, over the pulleys C C' and descends through an opening in the floor to a driving-shaft and pulley. (Not shown in the drawings.) The pulleys C and C' are supported upon a yoke-frame B, that carries the cross-shafts 8 for the pulleys, and the yoke-frame is pivoted at 9, and there is a screw 10 passing through the yoke-frame B or the cross-shaft thereof and provided with a hand-wheel 11, by which the yoke-frame and its pulleys can be raised or lowered, and in so doing the driving-belt will be either tightened or slackened. If the latter, the driven shaft and its pulley will rotate without turning the pulley E and vertical shaft F, and by tightening the driving-belt by the action of the screw 10 the centrifugal apparatus will be revolved at the desired speed, and a lock-nut 12 holds the screw 10 from turning accidentally.

The cylindrical screen S extends from the partition between the troughs L and M up to the under side of the top plate P, and it is secured in position by flanged rings and rivets or bolts, and the meshes in the cylindrical screen are to be of the proper size for acting upon the pulp, and in consequence of the screen being substantially continuous there is little risk of it becoming injured by the force of the materials as they pass against the

same by the centrifugal action of the revolving device within the screen.

The centrifugal device is composed of two or more substantially circular plates upon the vertical shaft F. We have represented the top plate T, a bottom plate U, and intermediate plates R and R', and these are suitably connected with the vertical shaft F, preferably by hubs formed integral with the respective plates or with arms extending from such plates and surrounding and keyed to the vertical shaft. The top plate T is made with a central opening and a slotted cylinder T', extending from the top plate T to the plate R, and there are arms 14 extending from the hub 13 to the cylinder T', and the circular plate R also has a central opening, so that the water and pulp entering by the supply-pipe Q pass into the cylinder P' and down into the slotted cylinder T', and a portion of such water and pulp passes through the slots of that cylinder and the rest of the water and pulp passes through the central opening in the plate R into the space between the plates R and R', and wings or beaters V are provided between the respective plates T, R, R', and U, which wings or beaters are advantageously curved, as shown in Fig. 2, so as to throw the paper-pulp and water outward against the interior of the cylindrical screen S; and it will be observed that the circular plate R forms a separation between the upper supply of pulp and water and the lower supply of such pulp and water, so that coarser stock, which may not pass through the upper portion of the screen S, will be subjected to the action of the pulp and water below the circular plate R, so as to act the second time upon such coarser paper-stock, and such coarser paper-stock will gradually pass down the interior surface of the cylindrical screen S, and we provide a water-supply below the plate R' for acting upon the coarser materials and washing the finer portions of the coarser materials through the screen before the coarser materials finally pass down into the annular trough M. For this additional supply of water a pipe I is connected with the upper end of the vertical shaft F by a coupling or packing-gland that allows the shaft to revolve while the water-pipe I remains stationary, and the shaft F is made tubular down to the lateral openings 15 between the hub of the bottom plate U and the circular plate R', and the water issuing with violence at this point and being projected by the wings against the interior of the cylindrical screen effects a final washing and separation of the finer fibers of the pulp from the coarse materials before they pass into the trough M.

We find it advantageous to construct the inner edge 16 of the trough M sufficiently high to extend up within the annular flange around the bottom plate U, thereby preventing material escaping from the inner edge of the trough M, and the bottom plate and the wings

or beaters V extending down and partially into the trough M insure the final delivery of the coarser materials by the downwardly-inclined pipe 17 leading the coarser material to a suitable receptacle, and at 18 is represented the delivery-pipe from the trough, through which the finer materials are ultimately delivered.

Around the cylindrical screen S are one or more annular waterways. We have represented two of these annular waterways N and N', and they are supplied with water by pipes 20 20, and each annular waterway is adapted to closely surround the screen, so as to strengthen the same against the centrifugal action or pressure, and the cylindrical screen forms one side of each annular waterway, so that the water as it is supplied by the pipe and runs through the waterways under pressure is projected through the screen itself and carries any coarse materials that may slide down or adhere to the inner surfaces of the screen inwardly to be again thrown out by the centrifugal action of the revolving device within the screen. In this way the construction is simplified, and any desired amount of water can be supplied at the required places, and the additional supply of clear water through the tubular shaft of the centrifugal device insures a very thorough washing and separating action, so that the materials that ultimately pass to the trough M may only be the coarse fiber that requires a reducing treatment.

It is advantageous to make the ends of the hubs concave adjacent to the lateral openings 15, so that the water may pass into the space thus formed and be distributed equally to the centrifugal arms or blades, and in so doing the coarser stock will be thinned, so that the water will carry off with it through the screen the finer and useful fibers.

The waterways around the screen are advantageously segmental, and when in the same plane compose the annular waterways; but such segmental waterways may be placed in any desired positions around the screen.

By providing a water-supply to the centrifugal device that is additional to the supply of water and paper-stock the centrifugal screening operation can be conducted without loss of fine fiber, because the thinning out of the materials retained by the screen insures the substantial separation of all the available fiber.

We claim as our invention—

1. In a pulp-strainer, a stationary pulp-screen, in combination with a hollow revolving central shaft having openings therein, plates surrounding the same and revolving therewith and forming a centrifugal device within the screen, means for supplying water and pulp to the upper plates and means for supplying water to the hollow shaft to pass out from openings therein to the lower portion of the centrifugal device upon one of the

plates so as to be directed against the lower portion of the screen, substantially as set forth.

2. In a pulp-strainer the centrifugal apparatus consisting of two or more circular plates, a slotted cylinder for a portion of the water and pulp to pass off above one of the circular plates and an opening through such circular plate for the other portion of the pulp and water to pass down, and a surrounding screen against which the water and pulp are projected, and annular troughs at the bottom of the screen, substantially as set forth.

3. In a pulp-strainer, the combination with a centrifugal device and means for supplying pulp and water to the same, of a surrounding stationary pulp-screen through which the fine pulp and water are projected by the centrifugal device and an annular waterway around

outside the pulp-screen and a water-supply pipe thereto whereby the water is projected through the perforations of the screen from the outside, substantially as set forth.

4. In a pulp-strainer, the combination with a centrifugal device and means for supplying pulp and water to the same, of a surrounding stationary pulp-screen through which the fine pulp and water are projected by the centrifugal action, and means for supplying water outside the screen so as to pass through the same inwardly, substantially as specified.

Signed by us this 25th day of March, 1898.

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