R. C. MABRY.

CENTRIFUGAL PULP DRYING MACHINE.

APPLICATION FILED APR. 28, 1921.

1,415,939.

Patented May 16, 1922.

2 SHEETS—SHEET 1.

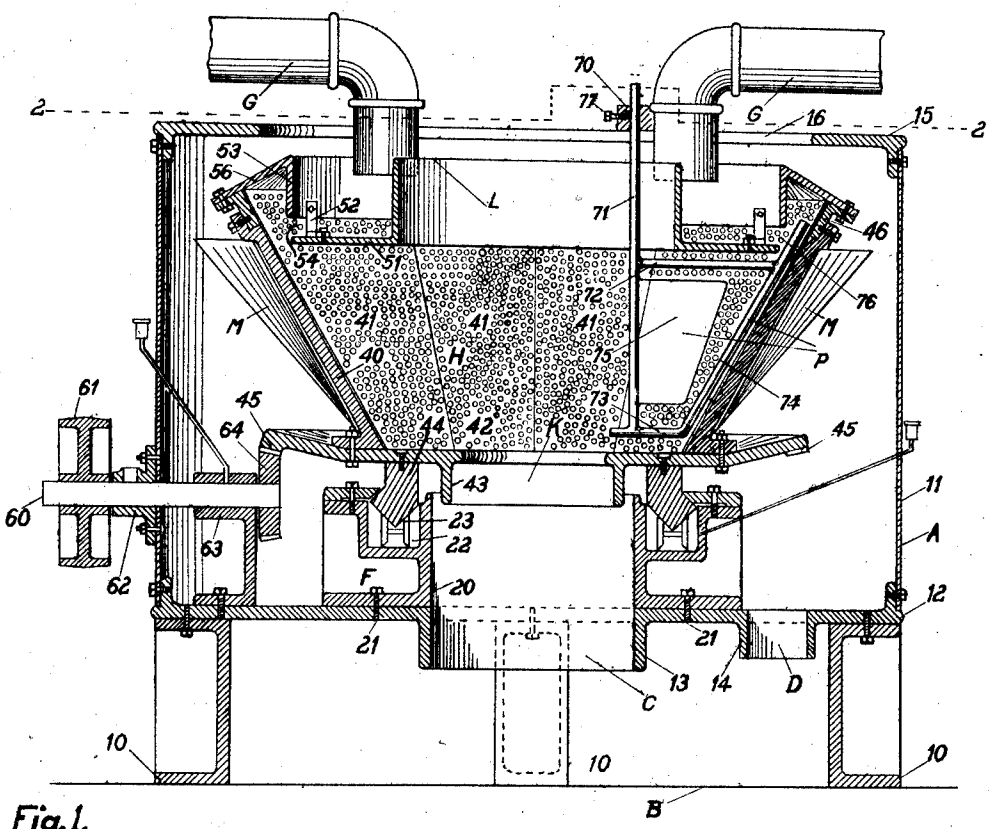


Fig. 1.

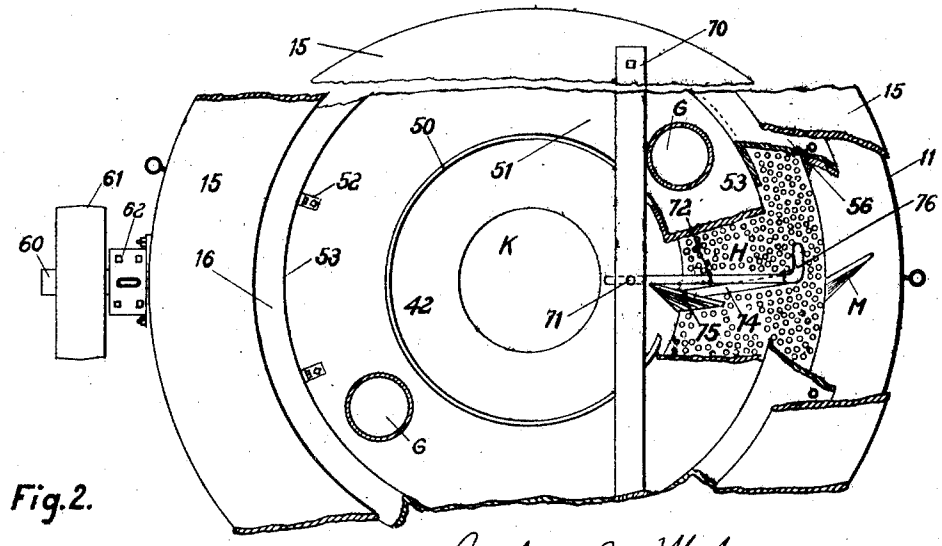


Fig. 2.

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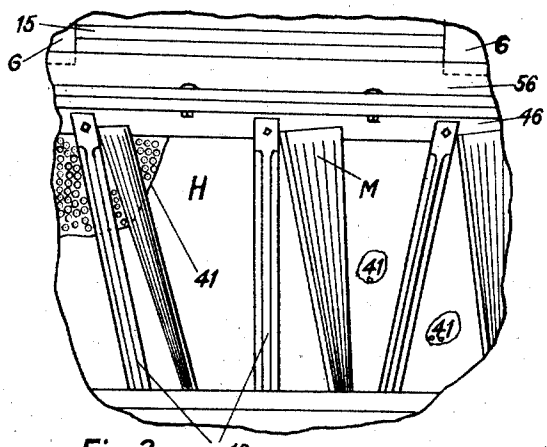


Fig. 3.

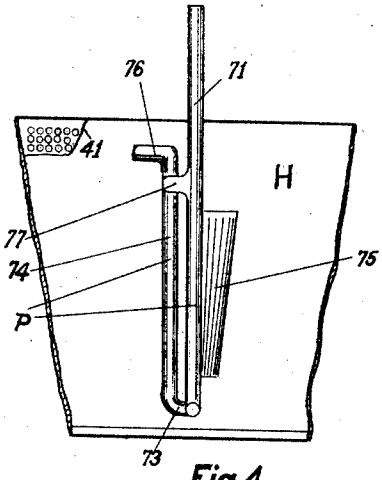


Fig. 4.

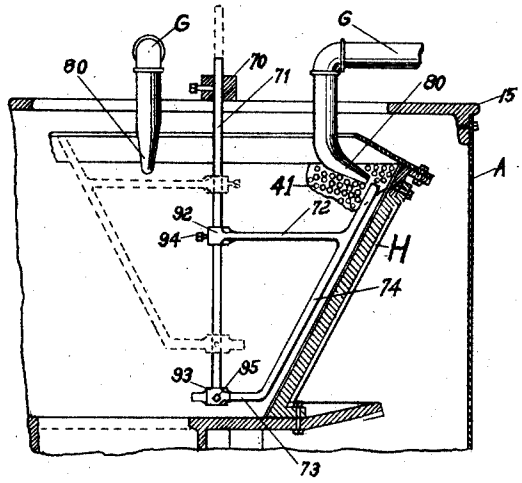


Fig. 5.

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UNITED STATES PATENT OFFICE.

REXFORD C. MABRY, OF NASHUA, NEW HAMPSHIRE.

CENTRIFUGAL PULP-DRYING MACHINE.

1,415,939. Specification of Letters Patent. Patented May 16, 1922.

Application filed April 28, 1921. Serial No. 465,192.

To all whom it may concern:

Be it known that I, REXFORD C. MABRY, a citizen of the United States, residing at Nashua, in the county of Hillsborough and State of New Hampshire, have invented certain new and useful Improvements in Centrifugal Pulp-Drying Machines, of which the following is a specification.

My invention relates to centrifugal drying or separating machines, and is particularly adapted for use in removing the water from wood pulp.

It can also be used for removing water from other materials of a similar consistency.

For the purpose of storing and bleaching and for thickening for other purposes, it is desirable to reduce the amount of water or increase the percentage of solids from about one-tenth of one per cent to five per cent or more. Up to about five per cent of solids the material flows like a liquid, but when the percentage of solids increases to fifteen or more per cent, the material becomes about the consistency of oatmeal and is more troublesome to handle.

My machine is intended to remove the water, or reduce the pulp as it is called, and will operate up to ten or eighteen per cent.

The water which comes from my machine is also clearer, indicating that less of the solids have escaped, and my operation is a relatively gentle filtering and squeezing which does not injure the pulp, while at the same time it is not necessary to run my machine at as high speed as necessary with various other machines for a similar purpose.

In the drawings, Fig. 1 is a sectional elevation of my preferred form of machine.

Fig. 2 is a section of Fig. 1 on the line 2—2 looking from above, parts being broken away to show the interior and reduce the size of the drawing.

Fig. 3 is an elevation showing details of the outside of the screen.

Fig. 4 is an elevation showing in detail the construction of the cleaning rod.

Fig. 5 is a vertical section showing an alternative form of machine.

In the drawings, A represents a tank or water receiver, preferably of cylindrical form, with a base 12 shown as supported by legs 10 on a floor B.

At the center of base plate 12 is a pulp outlet C around which is a depending flange 13, and at D is shown a water outlet around which is a depending flange 14.

11 is a cylindrical outer shell of the water receiver A, and at the top is shown an annular inwardly projecting flange 15 which leaves a relatively large opening 16 at the top.

F represents a hollow annular hub through which is a passage 20 which registers with and forms part of the pulp outlet C. Hub F is fastened to base 12 by means of bolts 21 and is shown as provided with an annular exterior pocket 22 in which are carried the bearings 23 which support annular flanges 44 of screen H.

This screen H is of cone shape with its large end at the top and its outlet K which registers with outlet C at the bottom. It comprises a base 42 having a depending flange 43 which extends down inside the part 20 of hub F and has in it outlet K. Base 42 extends outwardly, and under its outer rim has teeth 45 which engage a gear 64 carried by shaft 60, supported in bearings 62 and 63, which carries the drive pulley 61, altogether forming the means for rotating screen H indicated generally by O.

Screen H is built up of the ribs 40 which support the screen sections 41 made of any foraminous material with holes or meshes of a size suitable for use with the material to be operated on.

At the top, ribs 40 are connected together by means of an annular plate 56 which is preferably bent downward at 53 to help form part of the outlet of the feed hopper L.

This feed hopper L is preferably of annular form and includes an annular upwardly extending cylinder 50 from which extends outwardly the annular flange 51 to a point slightly below the bottom of 53, thus forming an annular outlet 54. 51 is attached to 53 by means of suitable brackets 52.

G, G represent one, or preferably two or more suitable feed inlets which deliver the stock into the annular hopper L preferably at different points. This stock is therefore delivered by hopper L through its annular outlet 54 proximate the top rim of screen H.

As screen H and hopper L revolve at a high rate of speed, the tendency of centrifugal force is to hold the stock near the top screen while the tendency of gravity is to carry it downward.

My device will work without the use of the

clearing member which I will now describe, but I find it works to better advantage and reduces the stock to greater thickness by its use.

The bar 70 extends across the top 15 of shell A and is fixed in position, and from this depends a supporting rod 71 for the stationary member P.

From the bottom of rod 71 extends horizontally an arm 73, and from this, upwardly proximate the conoidal inner surface of the screen, extends the cleaning rod 74. This is preferably such a distance from the surface of the screen that as the stock is carried around it will be picked up and rolled over the rod. This rod is supported at the top by an arm 72 and preferably extends upward at the top and over towards the direction from which the stock comes at 76.

As a part of the stationary member, I prefer also to use a compression guide plate 75 which extends outwardly from support 71 proximate cleaning rod 74 and serves to hold back the stock and thereby to compress it, and to direct it downward so that it will flow out from the outlet K through C to the point of delivery. This plate 75 may be set vertically or at a slight angle as desired.

Preferably, extending outwardly at a reverse angle, I also use the wings M, each attached to a rib 40 whereby there is a tendency to create a vacuum outside the screen as it revolves, thus helping to force the stock through the screen sections 41.

As shown in Fig. 5, instead of a feed hopper revoluble with the screen and having an annular outlet, I can use one or more pipes G, G provided with nozzles 80, 80 arranged to direct the stock against the upper inner part of the screen K.

I can also omit the wings M and the plate 75.

I may also adjust the stationary member P up or down or to the right or left by loosening set screw 77, as shown by the dotted lines, and I may make the arms 72 and 73 adjustable on rod 71 by means of collars 92 and 93 by which they are attached to 71 adjustably by set screws 94, 95.

It is obvious that I can lift and turn stationary member P so that it will be practically out of action, or that I may remove it entirely. In such case, particularly if the nozzles 80, 80 are used, the speed of the machine should be so adjusted that gravity will overbalance centrifigal force and the stock will move gradually from the top to the bottom of the revolving cone.

I claim:

1. In a centrifugal machine for extracting liquid from paper pulp, the combination of a cone shaped screen with its large end at the top and its outlet at the bottom; and means for rotating said screen; with an annular feed hopper revoluble therewith having an annular outlet proximate the top rim of the screen; and a stationary member including a cleaning rod which extends proximate the conoidal inner surface of the screen and a compression guide plate proximate said rod and so set as to direct the thickened stock towards the outlet; together with wings extending outwardly and at an angle from the screen; and a water receiver which extends outside the screen and wings.

2. In a centrifugal machine for extracting liquid from paper pulp, the combination of of a cone shaped screen with its large end at the top and its outlet at the bottom; and means for rotating said screen; with an annular feed hopper revoluble therewith having an annular outlet proximate the top rim of the screen; and a stationary member including a cleaning rod which extends proximate the conoidal inner surface of the screen and a compression guide plate proximate said rod and so set as to direct the thickened stock towards the outlet.

3. In a centrifugal machine for extracting liquid from paper pulp, the combination of a cone shaped screen with its large end at the top and its outlet at the bottom; and means for rotating the said screen; with a feed hopper arranged to deliver stock proximate the top rim of the screen; and a stationary member including a cleaning rod which extends proximate the conoidal inner surface of the screen.

4. In a centrifugal machine for extracting liquid from paper pulp, the combination of a cone shaped screen with its large end at the top and its outlet at the bottom; and means for rotating the said screen; with feeding means arranged to deliver stock proximate the top rim of the screen; and a stationary member including a cleaning rod which extends proximate the conoidal inner surface of the screen.

5. In a centrifugal machine for extracting liquid from paper pulp and the like, the combination of a cone shaped screen with its large end at the top and its outlet at the bottom; and means for rotating said screen; with feeding means arranged to deliver stock proximate the top rim of the screen; and an adjustable stationary member including a cleaning rod which extends proximate the conoidal inner surface of the screen.

REXFORD C. MABRY.