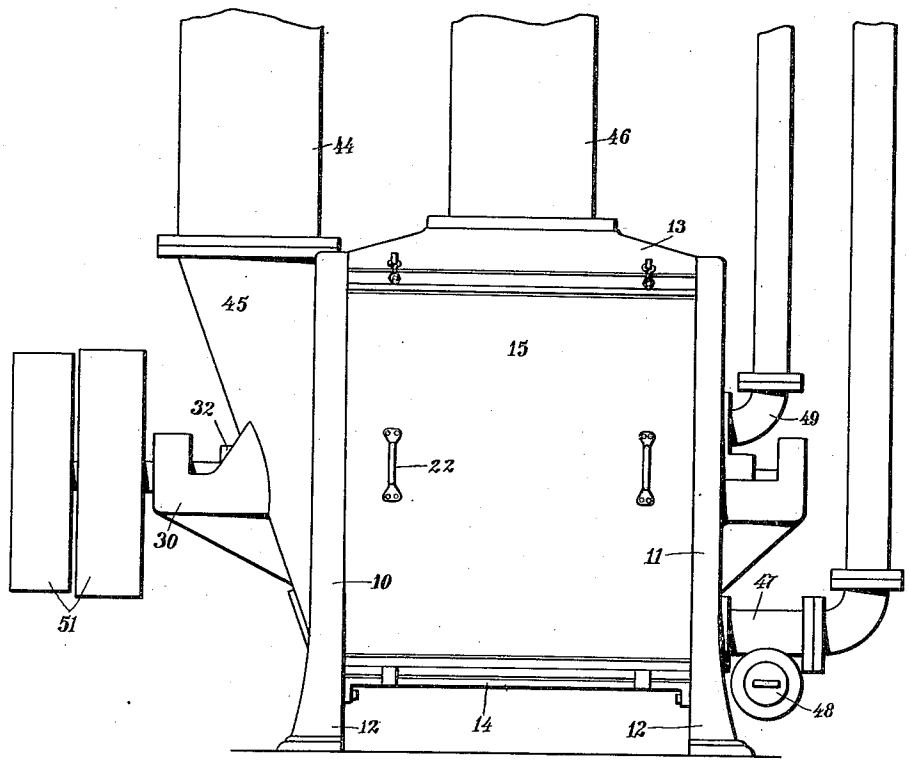
July 30, 1929. H. D. WELLS 1,722,874

PULP SCREEN

Filed Jan. 13, 1928 2 Sheets-Sheet 1

Fig. 1.



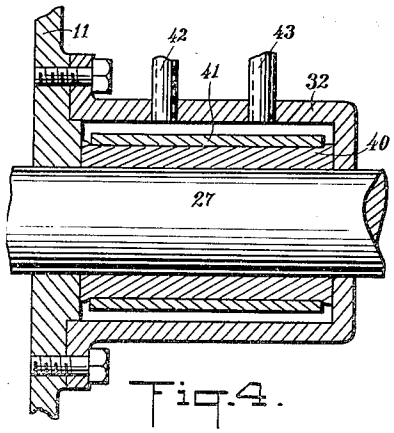


Fig. 4.

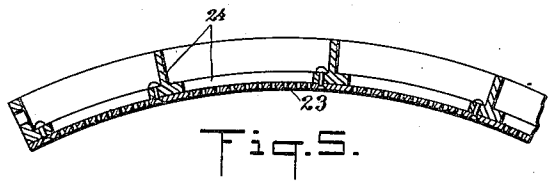


Fig. 5.

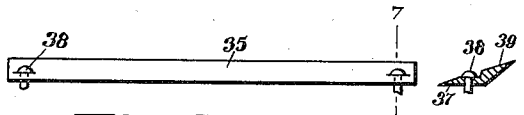


Fig. 6. Fig. 7.

WITNESSES

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PULP SCREEN

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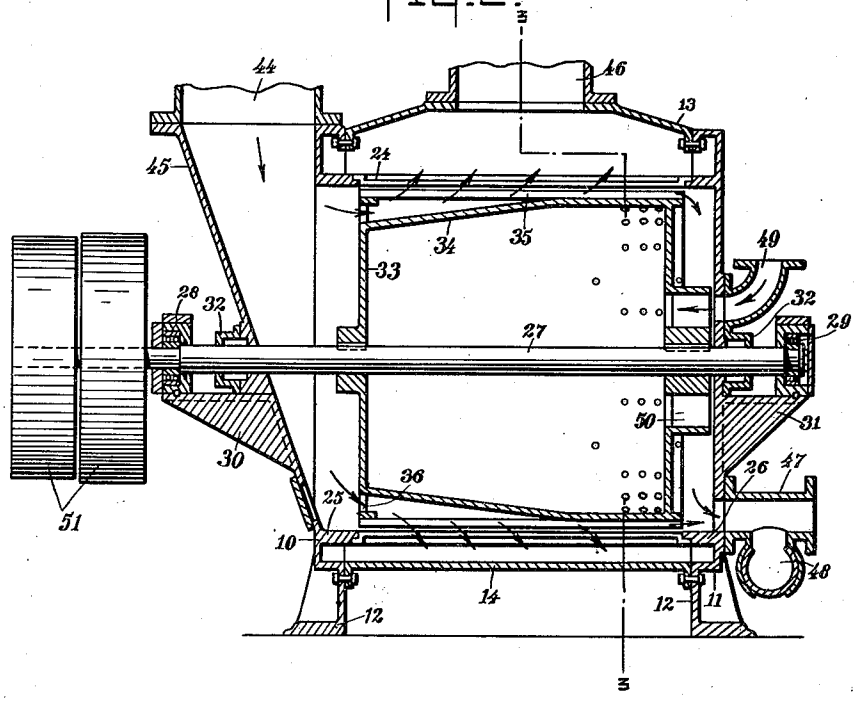
Fig. 2.



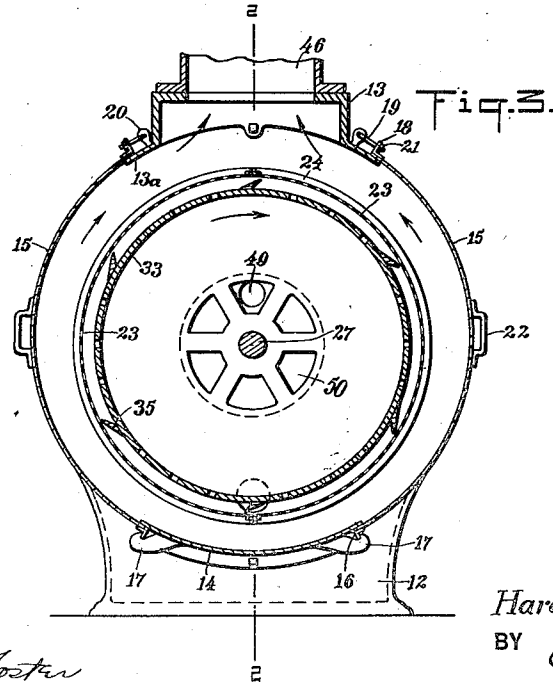


Fig. 3.

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UNITED STATES PATENT OFFICE.

HAROLD D. WELLS, OF GLENS FALLS, NEW YORK.

PULP SCREEN.

Application filed January 13, 1928. Serial No. 246,539.

The present invention is concerned with the provision of a pulp screen adapted for handling a wide variety of pulp, such for instance as ground wood pulp, sulphide pulp, soda pulp, sulphate pulp, paper stock, defibered waste paper, and the like.

The present screen is primarily designed to obtain the best quality of paper-making fibre. This is accomplished by using a screen in which a gentle pressure is used to force only the paper-making fibre therethrough, while at the same time subjecting the stock to a thorough washing action so that all of the paper making fibre is removed from the stock and none of it left in the tailings which are rejected from the machine.

An object of the invention is to provide a screen of this character which passes only the best quality paper-making fibre and thoroughly cleans the stock. Other objects are to provide a completely enclosed screening apparatus so that dirt cannot get into the stock, and there in no danger of spilling during the screening operation.

Further objects are to provide an apparatus in which no air is mixed with the stock in the screen, and in which there is no foaming and on lumps formed.

Still further objects are to provide a screen in which no concrete platform is required and the device may be set directly on the main floor and discharged at any desired height above the machine proper.

The invention further contemplates the use of a screen in which the motion is entirely rotary; no reciprocating parts are used, no fresh water is needed, there are no shower pipes to clog, the operation is continuous, no revolving plates are employed, and a machine of extremely simple, practical construction, which will be rugged and efficient in use, and well suited to the requirements of economical operation, convenient manipulation and ready accessibility for repair purposes.

With the above noted and other objects in view, the invention consists in certain novel features of construction and combinations and arrangements of parts as will be more fully set forth and pointed out in the claims. The invention may be more fully understood from the following description in connection with the accompanying drawings, wherein—

Fig. 1 is a view in side elevation showing a screening apparatus embodying the present invention.

Fig. 2 is a longitudinal sectional view therethrough taken approximately on the line 2—2 of Fig. 3.

Fig. 3 is a transverse sectional view on the staggered line 3—3 of Fig. 2.

Fig. 4 is an enlarged sectional detail through one of the packings of the rotor shaft.

Fig. 5 is an enlarged sectional detail showing the operation of one of the screens in its carrier frame.

Fig. 6 is an elevational view of one of the rotor blades.

Fig. 7 is a transverse sectional view therethrough on the line 7—7 of Fig. 6.

Referring with particularity to the drawing I have used the reference numerals 10 and 11 to designate the two end castings of the casing of the machine. These castings rest upon integral feet 12 and are connected at the top and bottom by a top casting 13 and bottom casting 14 respectively. Cooperating with the end castings and the top and bottom castings to form a casing of generally circular cross sectional shape, are a pair of movable arcuate side plates 15. These plates at their lower edges carry angle irons 16 engaged with hooks 17 of the bottom castings 14. At their upper edges the plates 15 carry angle irons 18 adapted to receive the threaded ends of I-bolts 19 pivoted to lugs 20 on the outwardly and downwardly flaring flanges 13ª of the upper casting 13. The bolts 20 pass through openings in the angle irons 18 and are secured by nuts 21. By virture of the above described construction and the use of handles 22 on the removable side plates 15, these members may be readily removed from the machine in order to provide access to the cylindrical screen 23 which is mounted therein.

The screen 23 may be formed of any suitable number of sections and is carried by a skeleton cylindrical frame 24 supported at its ends by inwardly projecting flanges 25 and 26 integral with the castings 10 and 11 respectively. It is to be understood that the screen and its supporting frame are stationary members.

A horizontal rotor shaft 27 has suitable bearings at 28 and 29 and bearing brackets 30, 31 projecting outwardly from the end castings 10 and 11 and preferably integral therewith. The shaft 27 also passes through specially designed stuffing boxes or packings enclosed within cup-shaped mem-

bers 32 secured to the outer faces of the end castings of the machine.

Keyed to the shaft 27 is a rotor 33 in the nature of a hollow apertured drum which tapers toward one end as indicated at 34. Extending longitudinally of the drum and in parallelism with each other, are blades 35 bolted or otherwise secured to the exterior surface of the rotor. These blades lie directly against the rotor at the larger end of the latter and are supported on a spider 36 at the smaller end of the rotor. Details of the blades are indicated in Figs. 6 and 7, wherein it will be noted that they are provided with flat sides 37 lying against the rotor and secured as by bolts 38, and with inclined forward faces 39, tending when the machine is filled with stock, to force the pulpy mass gently toward and through the cylindrical screen 23 which surrounds the rotor and is disposed immediately adjacent the blades.

In Fig. 4 I have illustrated an enlarged detail of one of the stuffing boxes in which a soft rubber sleeve 40 encircles the shaft 27 when in the cup 32; this sleeve being held in place by a metallic collar 41 and a free flow of water being maintained through the cup by water inlet and outlet pipes 42 and 43 entering and leaving the top of the cup-like member 32.

Stock is delivered into the casing through a pipe 44 connected to the top of an inclined sheet 45 integral with the end casting 10. The paper-making fibre which passes through the screen 23 leaves the machine through a vertical up-flow pipe 46 connected to the top casting 13. All of the fibre which passes through the screen enters the annular chamber defined by the screen and the casing, and is forced or sucked upwardly through the pipe 46. Tailings or rejections pass out of the machine through a pipe 47 secured near the lower end of the casting 11. This pipe may be provided with any suitable number of traps such as 48 for the heavier tailings; these traps being in the nature of rotary dumping troughs.

Water is delivered into the interior of the rotary perforated drum 34 through a water inlet pipe 49 maintained in continuous alignment with one of a series of openings 50 which encircle one hub of the drum.

In operation, the stock passing gravitationally or under pressure down the flue 45, is moved between the rotor and the screen; the rotor blades serving to gently force the paper making fibres through the screen and into the annular chamber between the screen and casing, from whence they pass upwardly through the pipe 46. A strong stream of water constantly entering the rotor drum discharges in a series of radial jets, aiding not only to force fibrous stock through the screen, but to effectively wash the fibres from the tailings and slivers, which latter pass to rejection through the pipe 47.

It will be noted that the tapered arrangement of the drum also serves to gradually compress the stock as it moves from one end of the casing to the other; this compression in addition to the action of the water jets and distributing blades tending to force all of the fibrous portion of the stock through the screen. The blades 35 serve the additional important function of evenly distributing the stock over the whole surface of the drum and screen. Any suitable means of driving the rotor, such for instance as the pulleys 51 may be utilized.

Obviously, various changes and alterations might be made in the general form and arrangement of the parts described without departing from the invention. Hence I do not wish to limit myself to the details set forth, but shall consider myself at liberty to make such changes and alterations as fairly fall within the spirit and scope of the appended claims.

I claim:

1. A pulp screen including a casing of generally cylindrical cross sectional shape, a cylindrical screen mounted within the casing and defining therewith an annular chamber into which fibre passes through the screen, an apertured rotary drum mounted within and spaced from the screen, means for delivering stock into the screen, means for carrying off screened fibre, means for delivering water to the interior of the drum, and means for carrying off tailings, the drum at one end having a circular series of openings therein successively registering with the water supply means, the latter comprising a pipe delivering into one end of the casing.

2. A pulp screen including a casing of generally cylindrical cross sectional shape, a cylindrical screen mounted within the casing and defining therewith an annular chamber into which fibre passes through the screen, an apertured rotary drum mounted within and spaced from the screen, means for delivering stock into the screen, means for carrying off screened fibre, means for delivering water to the interior of the drum, and means for carrying off tailings, the means for delivering stock comprising a chute formed in one end of the casing, the means for carrying off screened fibres comprising a vertical conduit opening into the top of the casing.

3. A casing for pulp screens including pairs of end castings rigidly connected together, removable side plates cooperating with said end plates, and connecting means to form a generally cylindrical screening chamber.

4. A casing for pulp screens including pairs of end castings rigidly connected to-

gether, removable side plates cooperating with said end plates and connecting means to form a generally cylindrical screening chamber, said connecting means comprising top and bottom castings.

5. A casing for pulp screens including pairs of end castings rigidly connected together, removable side plates cooperating with said end plates and connecting means to form a generally cylindrical screening chamber, said connecting means comprising top and bottom castings, the latter having an opening therein through which screened fibres are adapted to pass.

6. A casing for pulp screens including pairs of end castings rigidly connected together, removable side plates cooperating with said end plates, and connecting means to form a generally cylindrical screening chamber, one of said end castings being formed with an integral entry chute for pulp stock.

7. A casing for pulp screens including pairs of end castings rigidly connected together, removable side plates cooperating with said end plates, and connecting means to form a generally cylindrical screening chamber, said end castings including brackets mounting bearings for a drum shaft extending through the chamber.

Signed at Glens Falls, in the county of Warren and State of New York, this 11th day of January, 1928.

HAROLD D. WELLS.