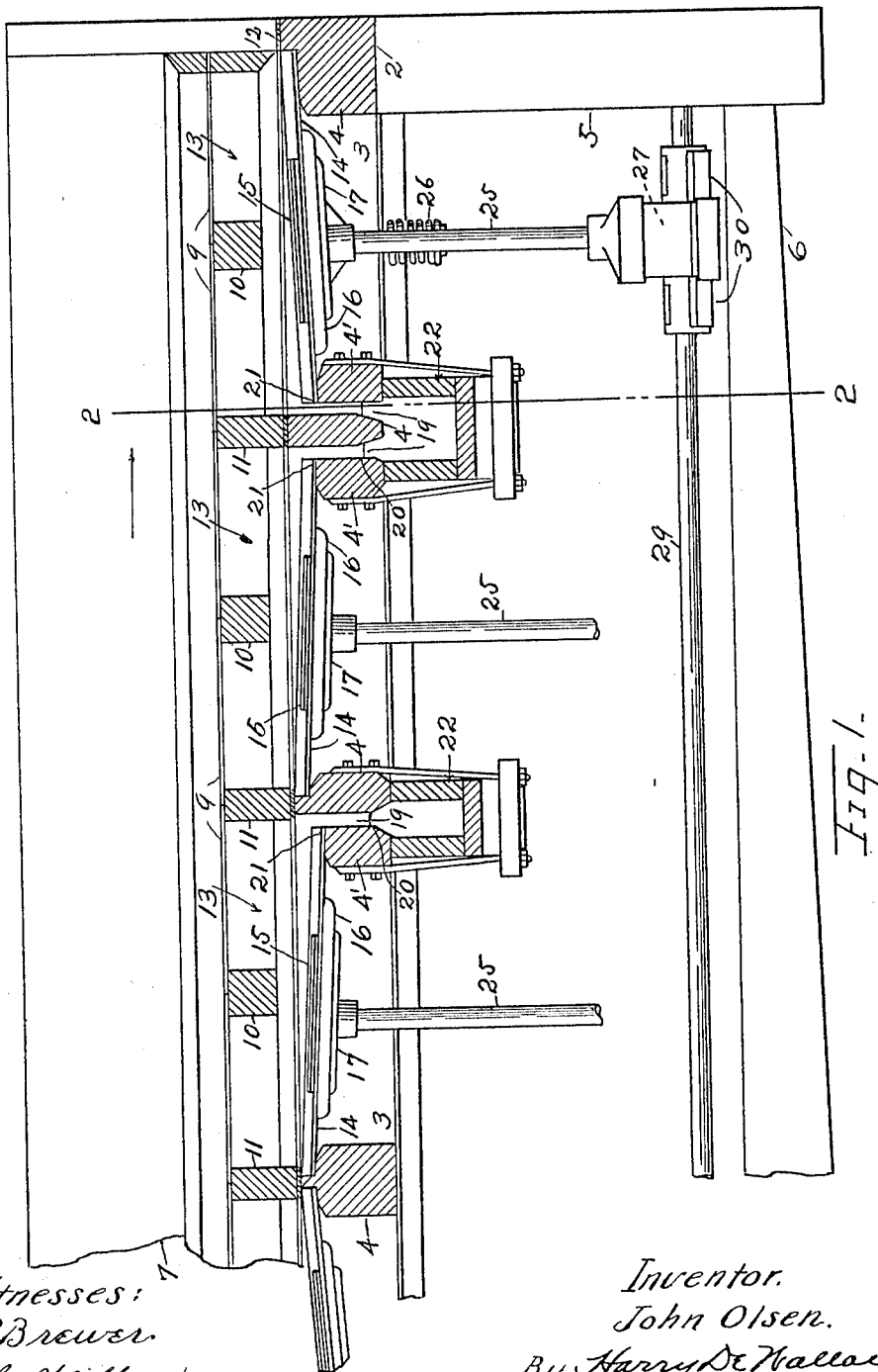


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J. OLSEN.
PULP SCREEN.
APPLICATION FILED SEPT. 9, 1909.

Patented Oct. 8, 1912.
2 SHEETS—SHEET 1.



Witnesses:
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2 SHEETS-SHEET 2.

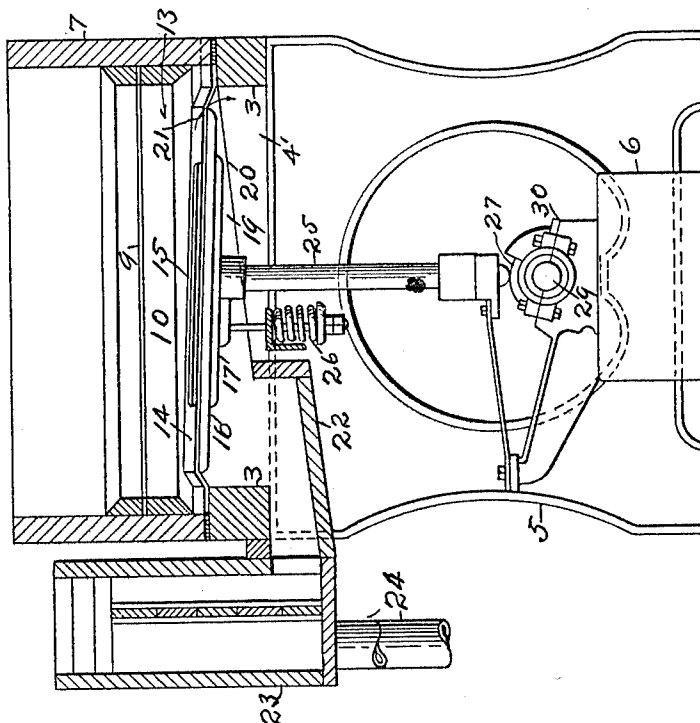


Fig. 2

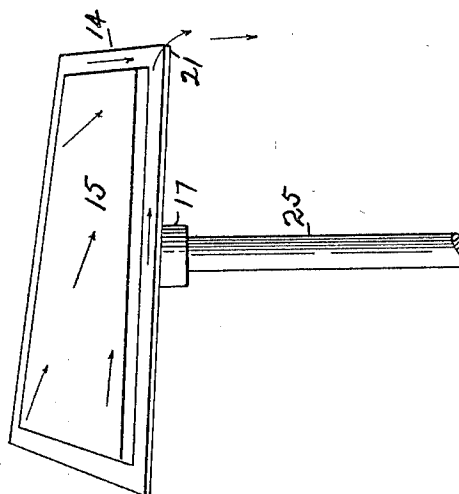


Fig. 3

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UNITED STATES PATENT OFFICE.

JOHN OLSEN, OF WATERTOWN, NEW YORK.

PULP-SCREEN.

1,040,743.

Specification of Letters Patent.

Patented Oct. 8, 1912.

Application filed September 9, 1909. Serial No. 516,856.

To all whom it may concern:

Be it known that I, JOHN OLSEN, a citizen of the United States, residing at Watertown, in the county of Jefferson and State of New York, have invented certain new and useful Improvements in Pulp-Screens, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a longitudinal section of a flat pulp screen showing the principal parts embodied in my improvement. Fig. 2 is a vertical cross-section substantially on the line 2—2 of Fig. 1. Fig. 3 is a perspective view of one of the diagonally inclined diaphragms.

This invention relates to an improvement in the well-known Gotham pulp screens, and it is also applicable to various other makes of flat pulp screens.

Heretofore, pulp screens having flat screen plates and correspondingly arranged diaphragms, have given mill operators a great deal of trouble and annoyance, by reason of the accumulations of pulp and fine heavy grit, which settled in, and clogged up the vacuum chambers, necessitating frequent shut-downs for clearing these chambers and cleaning off the diaphragms. The flat screens referred to, have invariably been arranged with one outlet for the discharge of the screened pulp from each vacuum chamber, and the said outlets have usually been placed at one of the long sides of the diaphragms. The diaphragms in this class of screens are also arranged in level order parallel to the screen plates, and for this reason, there is little chance for the stock to drain off, so as to leave the diaphragms free and clear, for a longer period than a few hours at a time.

All pulp machines are operated at a high rate of speed, and are designed to screen several tons of stock a day. Owing to the rapid working of the machines, and the great volume of stock which is handled, the accumulations of pulp and grit referred to gather very rapidly and in a short space of time fill up the vacuum chambers to such an extent, that the diaphragms gradually become inflexible and are therefore rendered incapable of performing their work. To overcome this difficulty, the machines must be frequently stopped, and the solid settlings removed by hand. This entails many long delays and considerable expense, and be-

sides it greatly reduces the out-put of the mill. Owing to the flat arrangement of the screens and the fact that the mass of stock held within the chambers is subjected to little or no agitation, the heavy particles of pulp and grit readily settle into the corners and other portions of the chambers remote from the outlet passages, and remain there until the machine is stopped and the settlings are removed. To correct this common defect and to obviate the serious trouble, annoyance and expense referred to, I have devised a simple remedy which effectually prevents the settling of the pulp in the chambers.

To this end my invention consists of inclining the several diaphragms both laterally and longitudinally, in other words, tipping the diaphragms diagonally, in a manner to cause the liquid pulp to drain off the diaphragms, and to flow readily from every part of the vacuum chambers, and discharge into the outlets from the lowest corner of each diaphragm. The diaphragms being rectangular in shape, the longest inclines extend from one side of the frame to the other, while the shortest inclines extend in the direction of the length of the screen or toward the outlet passages, where the screened stock is discharged into the flow-spouts. Under this construction and arrangement, every portion of the surface of the diaphragm is disposed on an incline sufficient to render this part self-cleaning, by reason of the gravitating wash of the stock as it flows toward the outlet.

Referring to the drawings, 2 represents the bellows frame which is composed of the longitudinal timbers 3 and the cross timbers 4 and 4'. The bellows frame is supported by standards or legs 5 which are located at the opposite ends of the machine, and are tied together by a central girder 6.

7 represents the screen vat which is mounted upon the bellows frame, the bottom or floor of which consists of a series of slotted screen plates 9, which are disposed transversely in the vat and are mounted upon cross girts 10 and 11, the said girts alternating in the manner illustrated in Fig. 1.

The sides and ends of the vat and also the girts 11 are constructed and arranged to meet the corresponding parts of the bellows frame, and when set in position upon the frame, with a suitable packing 12 interven-

ing they form, together with the frame, a series of vacuum chambers 13, each chamber comprising the space directly beneath two adjacent screen plates. The bottom of each vacuum chamber is formed by a diaphragm which is located between the cross timbers 4 of the frame, and which consists of a flexible sheet of rubber 14, which passes between wooden plates 15 and 16, all of which are mounted upon and supported by a metallic base 17. The side edges of the diaphragms 14 are secured to the cross timbers 4 and 4', and end edges of the diaphragms are secured to the longitudinal timbers 3, and the upper sides of these timbers are inclined to correspond to the inclination of the diaphragms.

The pulp which is screened through the plates, and received into the vacuum chambers, discharge from the latter through narrow outlet passages 19, which are formed by the spacing of the cross timbers 4 and 4' of the bellows frame, as shown in Fig. 1.

In order to render the diaphragms self-cleaning, or in other words, to prevent the settling or accumulation of the solid particles of the pulp upon the diaphragms, and the clogging or filling up of the suction chambers, as described, the diaphragms are all disposed at an angle or inclination, in the manner shown in the drawings. In arranging the diaphragms on the incline, for carrying out the purposes and objects of the invention, each diaphragm is inclined toward the outlet, and also toward one side of the machine, preferably toward the front side of the machine. The outlet passage 19 is provided with an inclined bottom 20 which extends about two-thirds the distance across the machine. The bottom of the outlet passage 19 is inclined for the express purpose of facilitating the cleaning of said passage by the continual wash of the liquid which flows with considerable speed down the said incline. The inclination of the bottom of the outlet also serves the useful purpose of facilitating the cleaning of the machine, when it is desired to change from pulp of one color to that of another color. Under this arrangement the lowest corners 21 of the diaphragms discharges the screened pulp

into the outlet passages, at their highest ends. The pulp then flows down the inclined bottoms of the outlets, and drops off into flow-spouts 22, which carry the stock into a flow-box 23, from which it is carried away through conducting pipes 24. The flow-box 23 is located at the rear side, and preferably extends substantially the full length of the machine. But one flow-box is employed for each screen, and there is one flow-spout for each single and each double outlet.

The diaphragms are each vibrated by a piston rod 25 and a coil spring 26, the plungers connecting by contact with a series of cams 27 carried by a driving shaft 29, which runs longitudinally through the machine, and is supported in bearings 30 mounted on the girder 6.

The improvement herein shown and described is extremely simple. Pulp machines equipped with the diagonally inclined diaphragms operate more perfectly and the machines may be kept in continuous operation for long periods of time without requiring stopping for the purpose of cleaning out the vacuum chambers.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is—

In a pulp screen, the combination with a bellows-frame, and a series of vacuum chambers arranged in said frame, of a flexible diaphragm extending lengthwise across and supported by said frame and forming the bottom of each vacuum chamber, the said diaphragms inclining in a manner to effect the flow of pulp liquor toward one corner, means for vibrating said diaphragms, an outlet for screened pulp for each diaphragm, the said outlets having bottoms extending part way in their length and arranged to decline in the direction of the length of the diaphragms, and a separate flow-spout for each diaphragm and outlet.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN OLSEN.

Witnesses:

GEO. W. TUPP,

ERNST G. MARTIN.