

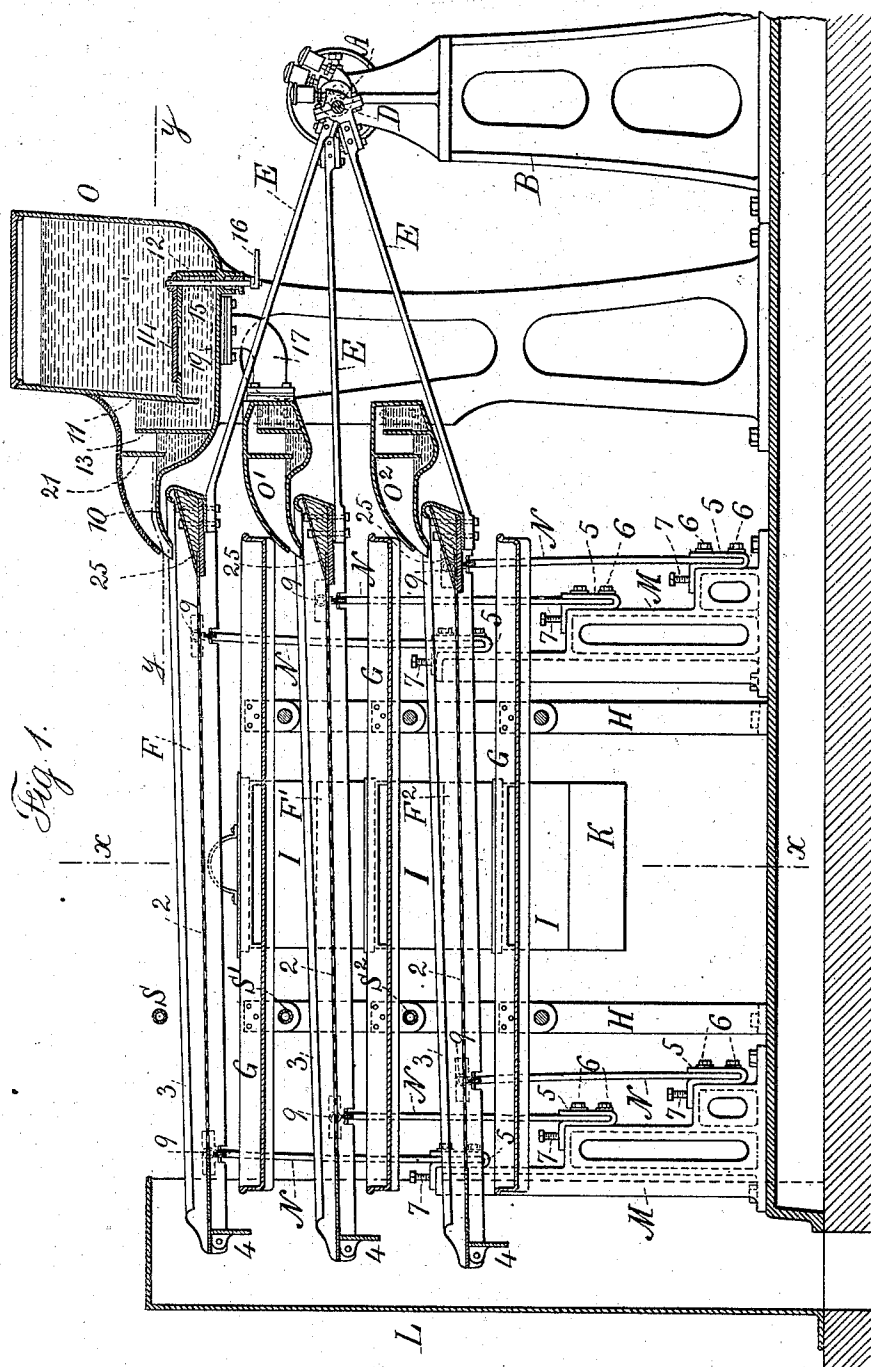
(No Model.)

2 Sheets—Sheet 1.

W. CURTIS.
PAPER PULP SCREENING MACHINE.

No. 552,749.

Patented Jan. 7, 1896.



Witnesses:
J Stair
Chas N Smith

Inventor:
Warren Curtis
per Lemuel W. Perrell Atty

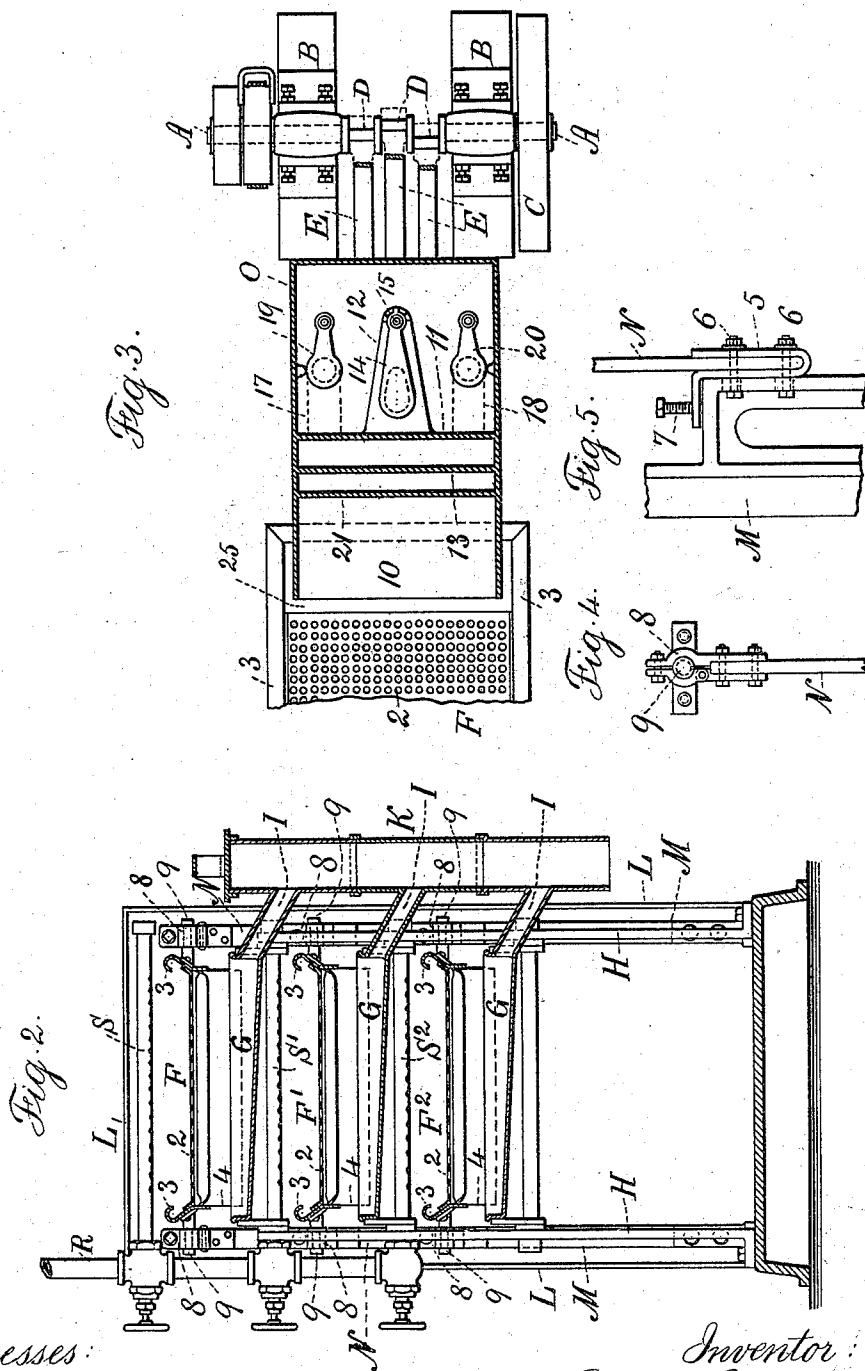
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2 Sheets—Sheet 2.

W. CURTIS.
PAPER PULP SCREENING MACHINE.

No. 552,749.

Patented Jan. 7, 1896.



Witnesses:
J. Staib
J. Chornomaz

Inventor:
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UNITED STATES PATENT OFFICE.

WARREN CURTIS, OF PALMER, NEW YORK.

PAPER-PULP-SCREENING MACHINE.

SPECIFICATION forming part of Letters Patent No. 552,749, dated January 7, 1896.

Application filed December 17, 1894. Serial No. 532,052. (No model.)

To all whom it may concern:

Be it known that I, WARREN CURTIS, a citizen of the United States, residing at Palmer, in the county of Saratoga and State of New York, have invented an Improvement in Paper-Pulp-Screening Machines, of which the following is a specification.

In screening paper-pulp the pulp has heretofore been supplied to a feed-box and run from the same in a thin sheet or layer upon a reciprocating screen, the coarser materials remaining upon the surface of the screen, and the finer materials passing through upon screens with successively finer meshes, so as to assort the paper-pulp into different grades of fineness, and the screens have been reciprocated by an eccentric upon a shaft with connecting-rods to the screens, and the screens have been supported upon springs that allow of their vibration.

The present invention relates to a paper-pulp-screening machine of the general character aforesaid, but adapted to screens with the same sizes of meshes and to which the pulp is supplied by secondary feed-boxes fed from the main feed-box, and the screened material passes to a common delivery, while the coarser materials that do not pass through the screens go off the ends of such screens to a common receptacle to be reconveyed to the pulping-engine.

The present invention relates to the peculiarities of construction of the combinations of devices hereinafter set forth and claimed.

In the drawings, Figure 1 is a longitudinal vertical section, and Fig. 2 is a cross-section at the line X X. Fig. 3 is a horizontal section at the line Y Y. Figs. 1, 4 and 5 are details of the ends of the spring-bars.

The driving-shaft A is supported upon a suitable frame B and it is advantageously provided with a fly-wheel C, fast and loose pulleys and a belt-shifter, and upon this driving-shaft are cranks corresponding in number with the number of vibrating screens. I have represented three such screens and three cranks D, which are advantageously one hundred and twenty degrees apart, and the crank-rods E extend to the screen-frames F, F', and F², in which are placed screens 2, which are preferably of sheet metal and perforated with round holes; but these may be

varied according to the character of the paper-stock to be treated, and the crank-rods E are advantageously made as flat springs fastened at one end to the screen-frames and at the other end to the crank.

The screen-frames F, F', and F² are similar and are provided with a cross-piece at one end sufficiently strong for receiving the connections for the ends of the rods, and the sides of these frames are advantageously of sheet metal inclined outwardly and bent at the top as hollow ribs 3, in order that the edges of the sheet metal may hang downwardly and the hollow ribs prevent the paper-stock splashing over the edges of the screen-frames, and at the delivery end of the screen-frames there are drip-bars 4, and the sheet metal of the screen is without perforations for a sufficient distance adjacent to the drip-bars to prevent the paper-stock that passes through the screens falling outside the pans that are provided beneath such screens.

The pans G are stationary and they are supported by cross-bars from the vertical standards H, and these pans G are wider than the screen-frames and longer than the perforated portions of the screen bottoms within the frames F, F', and F², so that the paper-stock running through the screens is received into the pans without liability of loss, and the pans G have inclined bottoms, so that the paper-stock runs toward the inclined discharge-chutes I that pass off from the sides of the pans near the middle part and open into the vertical discharge-trunk K, leading to a suitable receptacle.

At the delivery end of the screen-frames a suitable trunk or inclosure is provided, as illustrated at L, the same being open at one side for the delivery ends of the screen-frames to pass into in order that the coarser materials passing away from the upper surfaces of the screens may fall into such delivery-trunk L from the ends of the screen-bottoms and from the drip-bars 4.

I find it important to support the screen-frames in such a manner that the inertia will not render the machine unsteady or cause undue vibration to the frame of the machine or to the floor, so that the screen-frames and screens may be vibrated with great rapidity and with but little power and without noise

or vibration to the building. To accomplish this object I provide four step-frames M, suitably attached to the bed of the machine, and the steps in the upper parts of these frames are approximately at corresponding distances apart to the distance between the screen-frames, and the screens themselves are supported by spring-bars, preferably of wood, received at their lower ends into adjustable clips and connected at their upper ends to the respective screen-frames by pivot-studs. These spring-bars are shown at N. Each spring-bar is received at the bottom into a clip 5, through which bolts 6 pass, by which the spring-bar and clip are connected and the clip fastened to the step-frame, and such step-frame is slotted for the bolts to pass through, in order that the clips and the spring-bars carried by them may be adjusted vertically by the screws 7 passing through brackets upon the clips and resting upon the top ledges of the step-frames, the object of this construction being to provide for the accurate adjustment of the screen-frames so that the screens may be level crosswise and at the proper inclination from the receiving to the delivery ends.

At the top end of each spring-bar is an eye-clip 8, and upon the sides of the screen-frames are pivot-studs 9, the ends of the studs passing through the eyes of the clips, so that there is a turning motion of the eye-clips upon the pivot-studs as the screen-frames are vibrated longitudinally; and it will now be understood that the parts are so placed and adjusted that when the crank of either screen-frame is at half-stroke the spring-bars of that screen-frame are not bent, and that the strength of the spring-bars is sufficient to overcome the inertia of the screen-frame as it is vibrated, and by the time the limit of vibration is reached, so that there will not be any concussion between the crank and the connecting-rod at the ends of the vibration either way of the screen-frame and screen. Hence the screen-frames are similar to inverted pendulums and it is only necessary for the cranks to maintain the vibration, and hence but little power is expended.

In supplying the paper-stock I employ the feed-box O into which the paper-stock is run from the pulp-engine in any desired manner. This feed-box has a broad dam or spout 10 curved downwardly and in the direction of the flow of the paper-stock, so that such paper-stock and the water with which it is mixed flow in a uniformly thick stream over such spout upon the top screen in the frame F, and in order to employ the same feed-box for all three screens I provide a partition 11 and a lateral trunk 12 upon the bottom of the feed-box opening through this partition, and it is also advantageous to provide a dam 13 over which the paper-stock and water flow in a uniform layer before passing under the plate 21 and upon the spout 10, and in the trunk 12 there is an opening provided with a valve

or cover 14 upon a vertical stem 15, passing through a stuffing box or gland at the under side of the feed-box and provided with a handle 16, by which the stem can be partially revolved to turn the cover and regulate the opening into the lateral trunk, and hence the quantity of paper-stock fed through the opening to the top screen in the range of screens.

Where three screens are made use of I provide a second feed-box O' and a third feed-box O², and these feed-boxes are provided with dams and delivery-spouts similar to the spout 10 and dam 13, and there are openings through the bottom of the feed-box O, with a pipe 17 leading to the second feed-box O' and a pipe 18 leading to the third feed-box O², and there is a valve 19 to the pipe 17 and a valve 20 to the pipe 18, such valves being provided with stems passing through glands or packing-boxes and handles, by which such stems are moved to turn the valves 19 and 20 and regulate the flow of paper-stock from the bottom of the feed-box O to the respective feed-boxes O' and O², so that by these means the paper-stock fed to the screens in the frames F' and F² can be regulated and the entire pulp-screening machine brought to its greatest capacity, according to the character of the paper-stock that is being treated, it being understood that the action of each screen-frame and screen is the same, and while it is generally advantageous to run the entire machine upon one grade or quality of paper-stock it is to be understood that if the screens have meshes of different sizes different qualities of paper-stock might be assorted, there being separate delivery-chutes from the respective pans; and it will be observed that the spring-bars and connections between the step-frames and the screen-frames may be made use of in any screen-machine, regardless of the character of the pans made use of and of the sizes of the perforations in the screen-plates.

It is often necessary to supply additional water upon the screens to wash off the accumulated paper-stock near the delivery ends of the screens, and with this object in view a supply-pipe R is provided for water, and lateral branches S, S', and S² with cocks, and each branch is perforated for the jets of water to pass off in the proper direction for washing the paper-stock toward the delivery ends of the screens.

If the spout that supplies the paper-stock delivered the same directly upon the perforations of the screens, the impact of the stock would tend to drive the fibers into such perforations and thus either clog them or cause an imperfect separation. To avoid this difficulty the receiving end of the screen is formed with or connected to an imperforate metal plate that is inclined or curved upwardly, as shown at 25, so that the paper-stock receives a nearly horizontal flowing movement before passing over the perforations.

I claim as my invention—

1. The combination with the screen frame and screens in a paper pulp screening machine, of spring bars pivot studs upon the screen frame and eye clips upon the upper ends of the spring bars for connecting the spring bars and screen frame and for allowing the eye clips to turn upon the pivot studs, clips for the lower ends of the spring bars, supporting frames and bolts passing through slots for connecting the clips and the frames, and screws passing through brackets upon the clips for adjusting the spring bars and screen frame and means for vibrating the screen, substantially as set forth.

2. The combination in a paper pulp screening machine, of two or more screen frames and screens, spring-bars, eye-clips and pivot-studs for connecting the spring bars and the screen frames, step frames, clips and bolts passing through slots for connecting the lower ends of the spring bars to the step frames and screws for adjusting the spring bars and screen frames vertically, substantially as set forth.

3. The combination in a paper pulp screening machine, of two or more screen frames and screens, spring bars, eye clips and pivot studs for connecting the spring bars and the screen frames, step frames, clips and bolts passing through slots for connecting the lower ends of the spring bars to the step frames and screws for adjusting the spring bars and screen frames vertically, pans beneath the respective screen frames and screens with inclined bottoms and lateral trunks for delivering the screened pulp, substantially as set forth.

4. The combination in a paper pulp screening machine, of two or more screen frames and

screens and means for supporting and vibrating such screen frames and screens, and a feed box having a delivery spout for the upper screen, a partition and lateral trunk with an opening and a valve for regulating the supply of paper stock to the upper screen, a second feed box and spout for the lower screen, a pipe connecting the main feed box and the second feed box, and a valve for regulating the flow of paper stock to the second screen, substantially as set forth.

5. The combination with the screen frame and screens in a paper pulp machine and mechanism for vibrating the same of a feed box having an opening and valve for regulating the flow of the paper pulp, a dam over which the pulp passes, a hanging plate for the pulp to pass under and a curved delivery spout extending over the upper end of the screens, substantially as set forth.

6. The combination in a paper pulp screening machine, of a series of screen frames and screens one over the other and means for supporting and vibrating such screen frames and screens, a feed box and delivery spout for the upper screen and a secondary feed box and a supply pipe and valve from the upper feed box for each of the lower screens, and a pan below each screen having an inclined bottom and lateral discharge chute, substantially as set forth.

Signed by me this 13th day of December, 1894.

WARREN CURTIS.

Witnesses:

GEO. T. PINCKNEY,
S. G. HAVILAND.