Aug. 19, 1924. 1,505,835

J. A. WHITE

ROTARY SCREEN

Filed Jan. 17, 1921 4 Sheets-Sheet 1

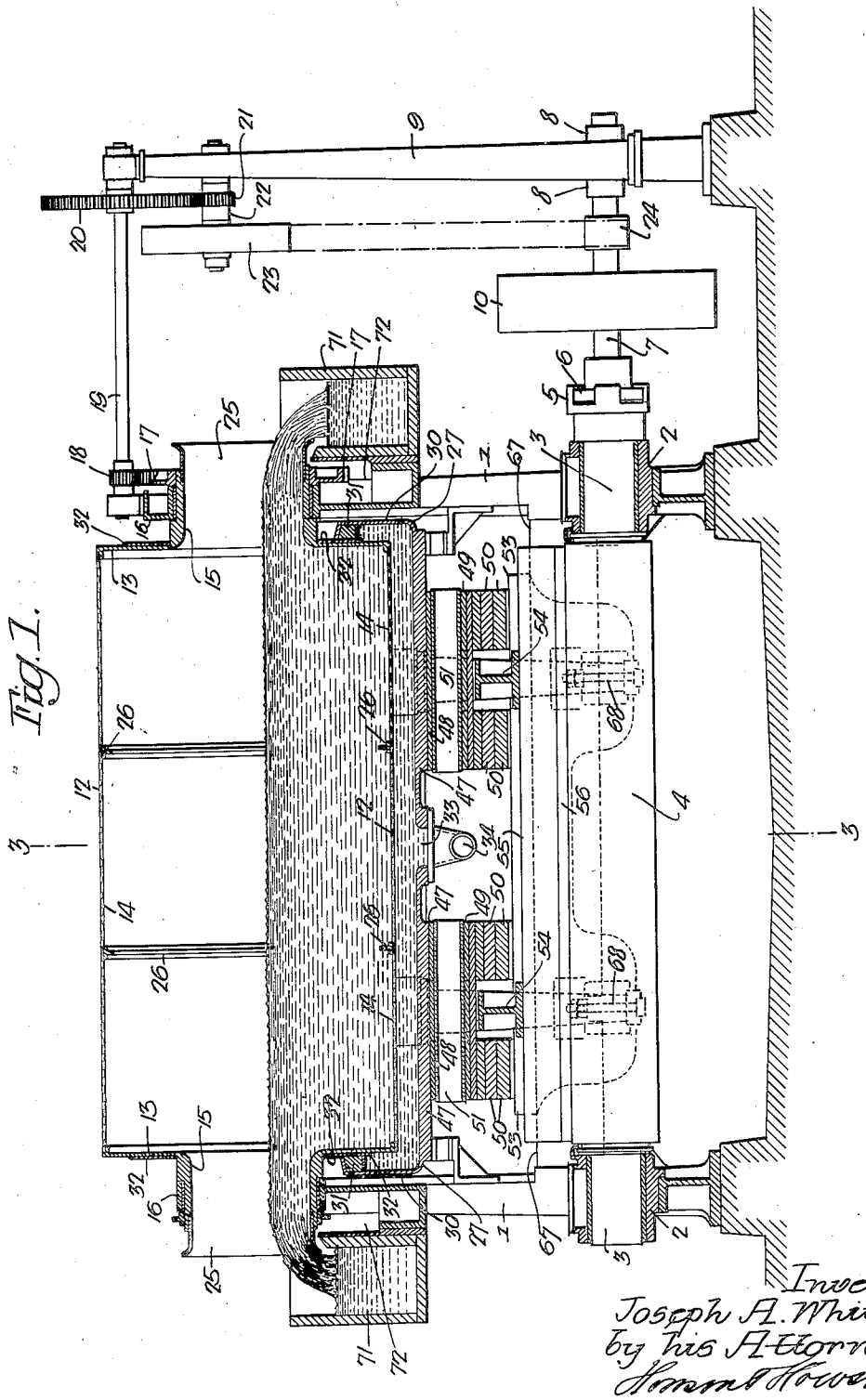


Fig. 1.

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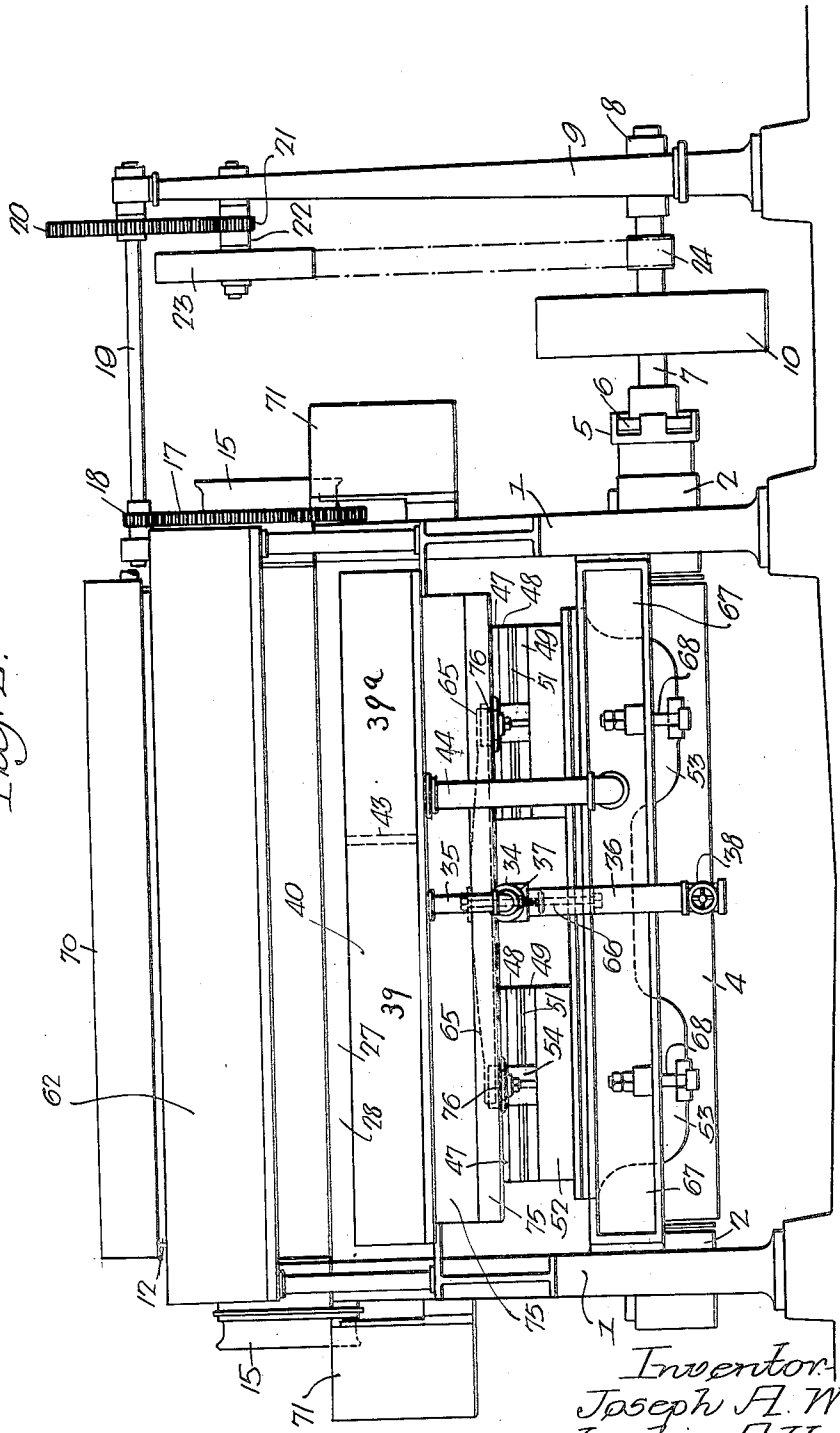


Fig. 2.

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Fig. 3.

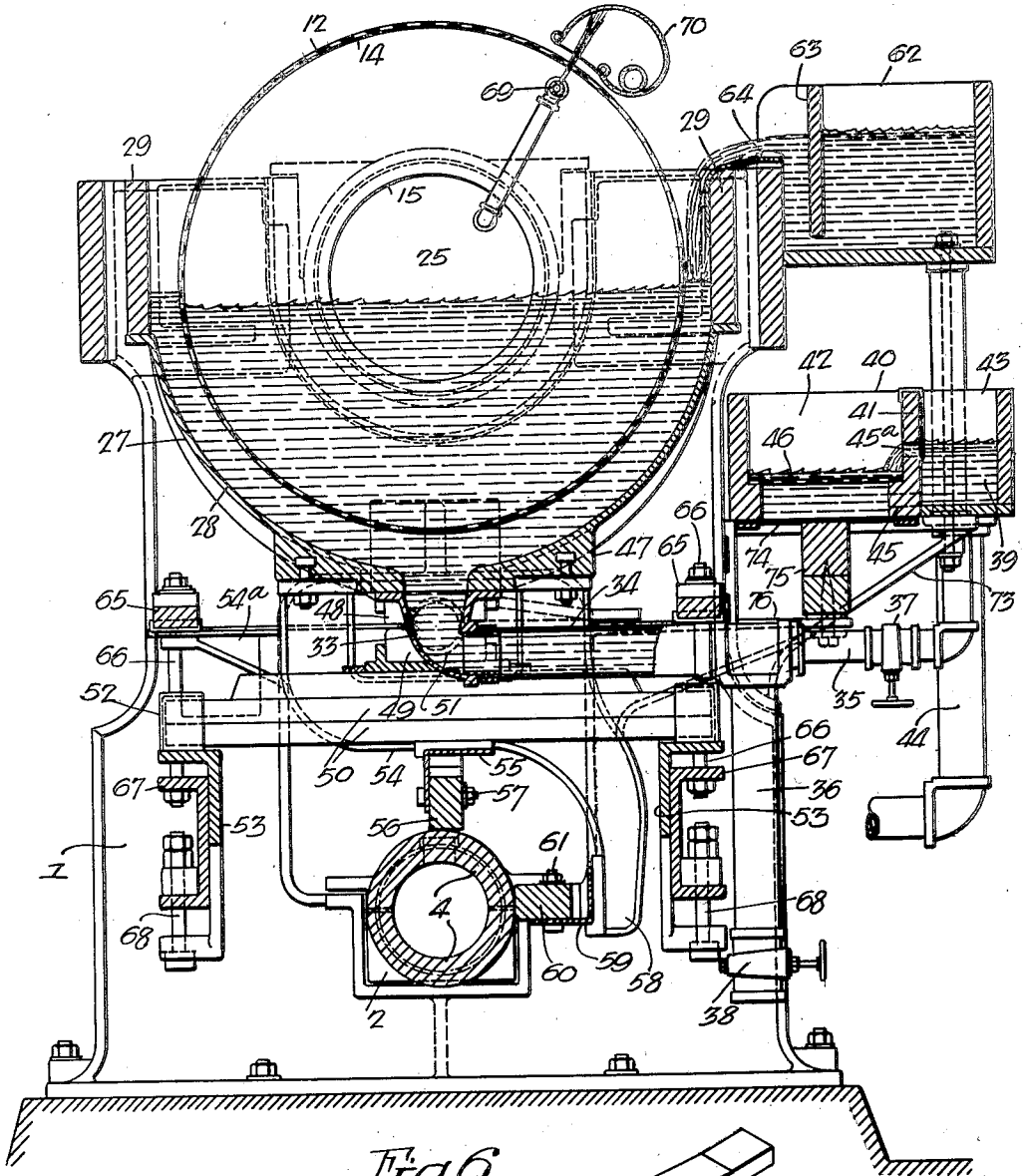
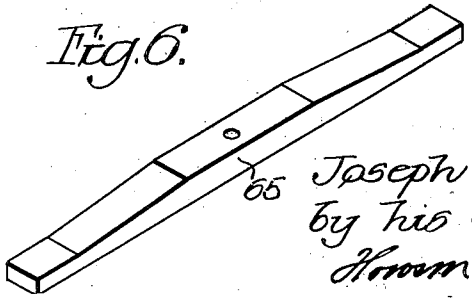


Fig. 6.



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Fig. 4.

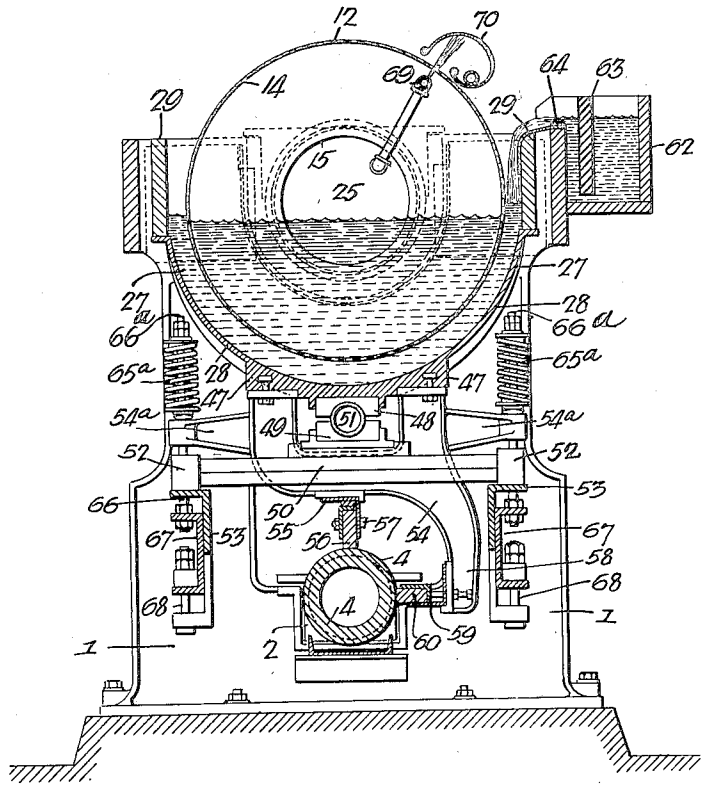
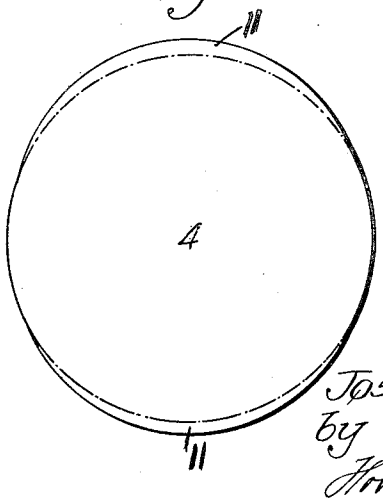


Fig. 5.



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Patented Aug. 19, 1924. 1,505,835

UNITED STATES PATENT OFFICE.

JOSEPH A. WHITE, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO MOORE & WHITE COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

ROTARY SCREEN.

Application filed January 17, 1921. Serial No. 437,741.

To all whom it may concern:

Be it known that I, JOSEPH A. WHITE, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Rotary Screens, of which the following is a specification.

My invention relates to certain improvements in rotary screens for screening paper stock.

One object of my invention is to provide a screen in which the stock will be thoroughly screened and in which the cylinder will be cleaned at each movement of the vat.

A further object of the invention is to provide a compact device for screening paper stock in which a large quantity of stock can pass through the apparatus, and a still further object of the invention is to provide means for giving the vat a vertical motion or both a vertical motion and a rocking motion. And a further object of the invention is to so arrange the agitating mechanism that it will cause substantially no vibration to the floor of the building in which the screen is located.

The invention also relates to certain improvements in the bearings so that lubricant will not stain the stock.

In the accompanying drawing:

Fig. 1 is a longitudinal section view of my improved rotary screen;

Fig. 2 is a side view;

Fig. 3 is a sectional view on the line 3—3, Fig. 1;

Fig. 4 is a view illustrating a modification;

Fig. 5 is a diagrammatic view of the cam; and

Fig. 6 is a perspective view of one of the wooden beams.

1, 1 are the ends of the frames of the machine connected by side frames 67. These end frames are firmly mounted on the floor as shown. 2 are bearings of any suitable construction for the trunnions 3 of the elongated cam 4, which preferably extends the full distance between the bearings on the frames 1, as shown in Fig. 1. In the present instance on one of the trunnions 3 of the cam is a coupling 5 which is engaged by coupling 6 on a power driven shaft 7 mounted in bearings 8 on a pedestal 9. On the shaft 7 is a belt wheel 10. The cam is preferably hollow, as shown in Fig. 3, and in the present instance has two cam surfaces 11, as illustrated in a large diagrammatic view, Fig. 5.

12 is a rotary screen having, in the present instance, cast metal heads 13, flanged to receive the perforated screen plates 14. The perforations are of such size as to allow a certain grade of stock to pass through the screen. On each head is a neck 15 adapted to bearings 16 in the upper end of each end frame 1.

On one neck is a gear wheel 17 which meshes with the pinion 18 on a shaft 19, and on this shaft is a gear wheel 20 which meshes with the pinion 21 on a sleeve 22 carried by a stud on the standard 9, and on this sleeve is a belt pulley 23, around which passes a belt, shown by dotted lines, to a belt pulley 24 on the shaft 7. By this means the slow rotary motion is given to the screen 12. In each neck of the screen is an opening 25 for the passage of the screened stock; and while I have shown an opening in each end, one end may be provided with an opening and the other end may be closed. In wide screens, such as illustrated in Fig. 1, I provide supporting rings 26 at intervals to which the screen is secured. The number of these rings will depend upon the length of the screen.

27 is a vat in which the screen is located. This vat has a segmental bottom portion 28 and vertically arranged side members 29 which are connected to the end portions 30 recessed to accommodate the necks of the screen as shown clearly on Fig. 3. Carried by the ends of the vat are segmental packing sections 31 which rest against the plates 32 at each end of the screen, but this joint may be modified without departing from the main features of the invention.

At the center of the vat is an outlet opening 33 having a pipe 34 which communicates with two pipes 35 and 36. The pipe 35 has a valve 37, and the pipe 36, which is the washout pipe, has a valve 38. The pipe 35 is coupled to the bottom of a compartment 39 in a screen box 40. A partition 41 divides this compartment 39 from the screen compartment 42, while another partition 43 divides the compartment 39 from a compartment 39^a and an outlet pipe 44 for the white water communicates with this latter compartment, and in the partition 41 are openings 45 and 45^a which allow the water to flow into and out of the screen compartment 42.

46 is a screen of any suitable mesh, and the screen box is agitated by the same mechanism as the vat, this agitating mechanism I will now proceed to describe.

On the segmental bottom 28 of the vat 27 are the two portions 47 spaced apart to allow for the passage of the pipe 34, and each portion is recessed to receive an elongated bearing block 48 which is opposite an elongated bearing block 49 on a flexible support 50, and between the two blocks is a cylindrical pivot 51 in the form of a tube. The supports 50 consist in the present instance, of two timbers extending from side to side of the machine resting in pockets 52 on the vertically adjustable beams 53, in the present instance of metal. Under each bearing are two of these supports 50 spaced apart for the passage of a frame 54, which is rigidly attached by bolts to the bottom section of the vat, and through which motion is imparted to the vat. In some instances the flexible support 50 may be of metal in place of wood if found desirable.

Secured to the two frames 54 is an angle plate 55, to which a wooden beam 56 is attached, and this beam rests directly on the upper surface of the cam roll 4 and is detachably secured to the angle bar by bolts 57. Each frame 54 has an extension 58 to which is secured an angle bar 59, and the wooden beam 60 is secured to this angle bar by bolts 61. This beam 60 rests against the side of the cam roll 4, so that when the cam roll is rotating the cams give the vat a vertical movement through the beam 56 and a rocking movement through the beam 60. This movement is very rapid, so that the vat is agitated constantly and it is this agitation of the vat that is imparted to the stock that causes the stock to pass through the screen as it rotates. The movement towards the screen pushes that portion of the stock through the screen which is fine enough to pass through, and that portion of the stock which adheres to the surface of the screen is drawn away from the screen by the suction as the vat is moved away from the screen, so that there is a constant screening of the material and cleaning of the surface of the screen; and as the screen is not blocked by adhering material, the screening process is very rapid and thorough.

In order to hold the vat 28 centrally on its pivots, I form arms 54ª on the frames 54, and on these arms rest beams 65, preferably of wood, Fig. 6, the beams in the present instance being thicker at the center than at the ends. A bolt 66 passes through the center of each beam 65 and into the side frames 67 and the beams can be adjusted by turning the nuts on the bolts. The beams 65 are of such a thickness that they will yield to allow the cam roll 4 to move the vat sufficiently to agitate the material in the vat.

Mounted at the upper end of the frame of the machine is a feed trough 62, having a partition 63 which terminates near the bottom of the trough and a wier 64 over which the stock flows from the feed trough into the vat.

In Fig. 4 I have illustrated a modification in which the beams 65 are dispensed with and springs 65ª are used which accomplish the same purpose, and these springs can be adjusted to any degree desired by nuts on the bolts 66ª which pass through the springs.

In order to vertically adjust the support 50 I mount the pockets 52 on the beams 53 as before stated, and these beams bear against the side beams 67 and bolts 68 extend through the flanges of the members 53 and the side frames 67 and are provided with nuts by which the members 53 can be vertically adjusted.

69 is a steam or water pipe which projects a jet of steam or water into the openings in the screen as it rotates, the water accumulating in the trough 70, and this water is carried off to one side of the machine.

The operation is as follows: The material to be screened flows from the feed trough into the vat, and when the machine is set in motion the cam is rotated and a vertical and rocking movement is imparted to the vat through the beams 56 and 60. The material which passes through the screen flows through the openings 25, into the troughs 71 and these troughs are separated from the ends of the machine by spaces 72 so that lubricating oil or grease will not gain access to the troughs and discolor the pulp.

The pulp that is too heavy to go through the screen is conveyed into the supplemental screen box 40, this box 40 being located on the side of the machine. The material will flow into the box by gravity, and onto the screen 46. The box is mounted on brackets 73, rigidly secured to the end frames of the machine, and the suction diaphragm 74 of the screen box is carried by blocks 75 secured to a bracket 76 projected from the frame 54, so that the diaphragm 74 is given the same motion as the vat. The cam roll being long and the bearing beams being of wood, there is practically no wear to the cam roll and the wooden beams can be readily replaced when worn.

I claim:

1. The combination of a rotary screen; bearings therefor; end frames carrying the bearings; a vat in which the screen is mounted; yielding supports for the vat; pivots located between the vat and the supports; a cam for imparting a vertical and rocking movement to the vat to cause the material to be forced through the screen; and means for allowing the material to be discharged from the screen.

2. The combination of end frames; bearings thereon; a screen having necks mounted in the bearings; means for rotating the screen; a vat located between the end frames and in which the screen is mounted; means for feeding material to the vat; openings in the ends of the screen for the discharge of screened material; yielding supports for the vat; a frame attached to the vat; a bar mounted on the frame; and a rotating cam for imparting a movement to the vat through the bar and frame.

3. The combination of two end frames; bearings thereon; a screen having necks mounted in the bearings; openings in the necks for the flow of material from the interior of the screen; means for rotating the screen; an elongated cam roll mounted in bearings in the end frames; means for rotating said roll; a vat located between the end frames in which the lower portion of the screen is mounted; pivots on which the vat is mounted; yielding beams for supporting the pivots; two frames attached to the vat, each frame having an extension; and two bars extending longitudinally, one above the cam roll and the other at the side thereof, both bars being connected to the frames which are secured to the vat, so that when the cam roll is rotated the vat will have a vertical and a rocking movement.

4. The combination of a frame; a rotary screen mounted on the frame; means for rotating the screen; a vat into which the screen extends; means for yieldingly supporting the vat; and pivots located between the supporting means and the vat; a cam; means for rotating the cam; means actuated by the cam for imparting a movement to the vat; and a supplemental screenbox communicating with the bottom of the vat and actuated by the mechanism that actuates the vat.

5. The combination of end frames; bearings thereon; a rotary screen mounted in the bearings; a vat into which the screen extends; means extending between the vat and the main frame for yieldingly supporting the vat; frames attached to the vat; a cam for imparting movement to the vat through the frames; and means, at each side of the apparatus, for yieldingly holding the vat in a central position.

6. The combination of end frames having bearings; a rotary screen mounted in the bearings; a vat located between the frames in which the lower portion of the screen is mounted; yielding transverse supports for the vat; cylindrical pivots between the vat and its supports; frames secured to the vat, each frame having an extension; a cam; means for rotating the cam; beams secured to the frame and to the extension, one being located above the cam and the other at the side thereof, so that the vat will be given a vertical movement as well as a rocking movement; arms projecting from each frame; wooden beams extending from one arm to the other; and tie bolts extending through the center of the beams and adjustably mounted in the fixed portions of the apparatus.

7. The combination of a cylindrical screen; frames in which the screen is mounted; means for rotating the screen; a vat; means for imparting a movement to the vat; a supplemental screen at one side of the vat and communicating therewith; and supports on the frames for said supplemental screen, said screen being actuated by the mechanism that actuates the vat.

8. The combination of end frames; a vat located between said frames; yielding supports for the vat; a screen mounted in the end frames and located in the vat; means for supplying material to the vat; a frame attached to the vat; a cam for actuating the vat through the frame; a supplemental screen supported on the end frames at one side of the vat; a pipe forming a communication between the lower portion of the vat and the supplemental screen; a diaphragm in said screen; and a bracket on the vat frame attached to said diaphragm.

9. The combination of a cylindrical screen; a vat in which the screen is located; means for imparting a movement to the vat; and a supplemental screen box communicating with the vat and actuated by the mechanism that actuates the vat.

10. The combination of end frames; a cylindrical screen mounted in bearings on the frames, said screen having an open neck at each end; a trough at each end to receive material flowing from the screen; a vat into which the screen extends, said vat having ends; packing between the ends of the vat and the ends of the screen; means for yieldingly supporting the vat; and means for imparting a movement to the vat to cause material in the vat to be projected through the screen.

JOSEPH A. WHITE.