No. 624,215. Patented May 2, 1899.

J. JACOBS.

ENDLESS BELT CONCENTRATOR.

(Application filed Dec. 2, 1898.)

(No Model.)

Fig. 3.

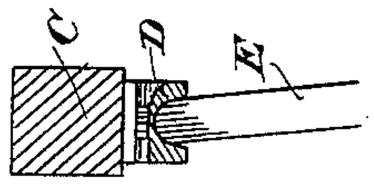


Fig. 6.

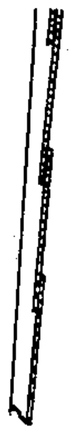


Fig. 5.

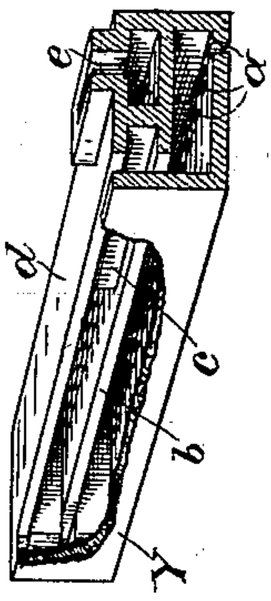


Fig. 9.

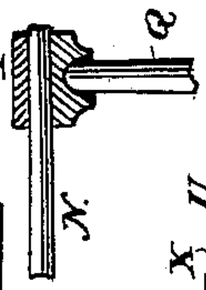


Fig. 4.

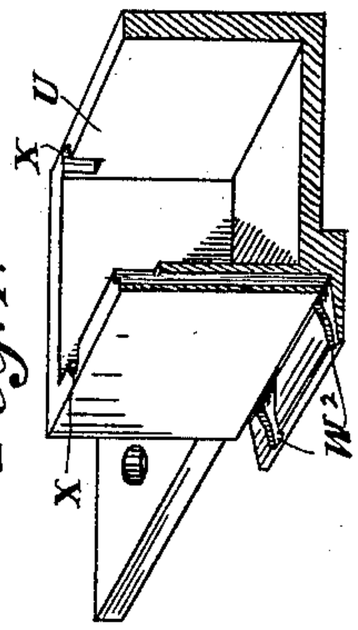


Fig. 10.

Fig. 1.

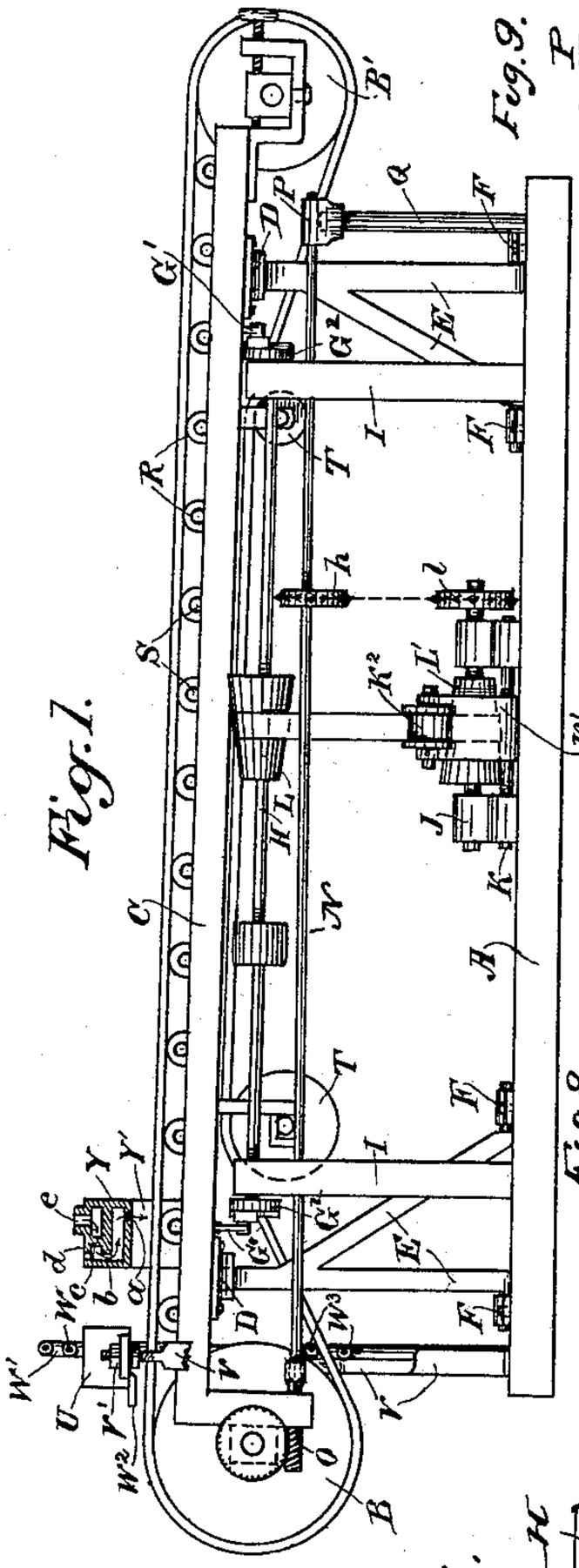


Fig. 8

Fig. 7.

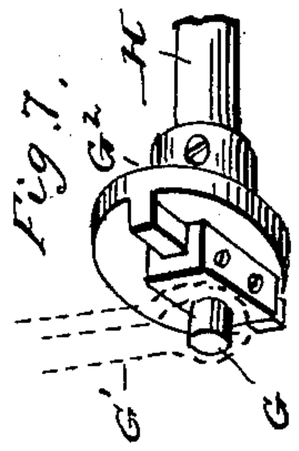
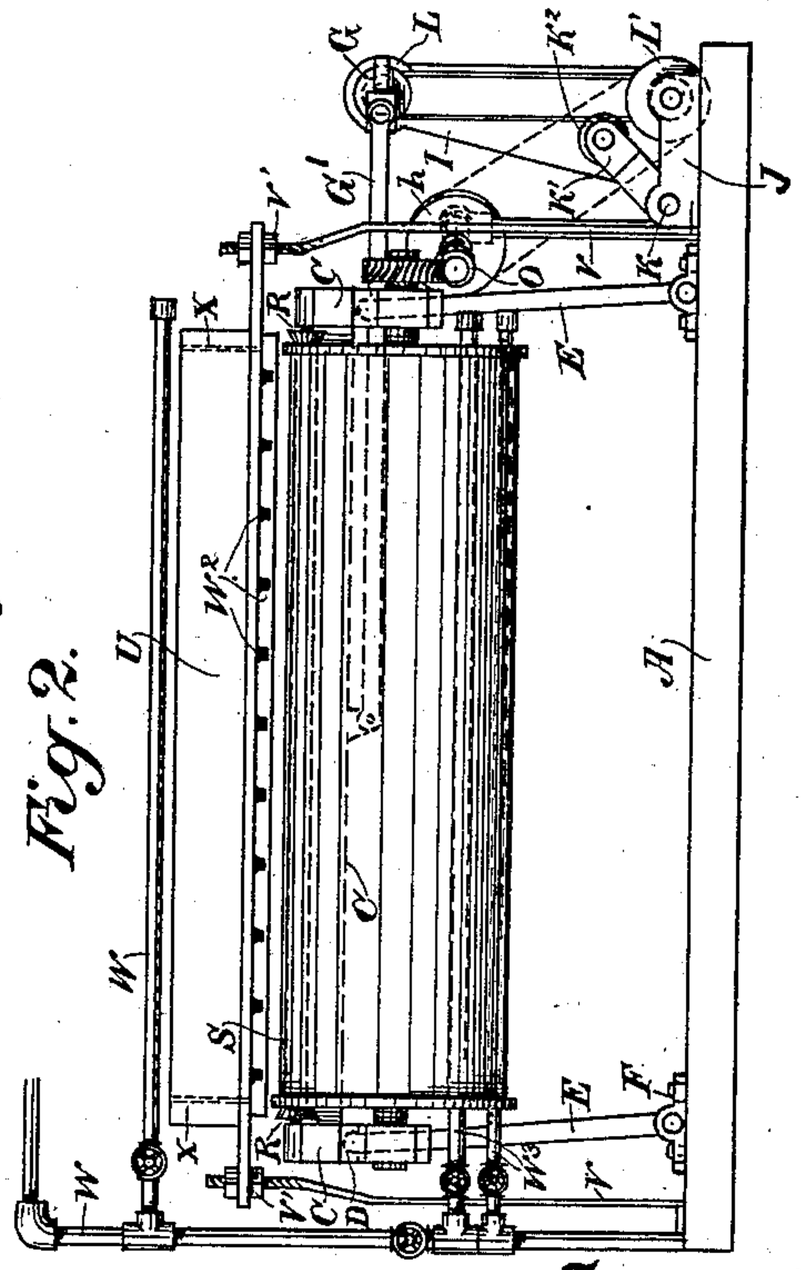


Fig. 2.



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UNITED STATES PATENT OFFICE.

JEHU JACOBS, OF HENLEY, CALIFORNIA.

ENDLESS-BELT CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 624,215, dated May 2, 1899.

Application filed December 2, 1898. Serial No. 698,093. (No model.)

To all whom it may concern:

Be it known that I, JEHU JACOBS, a citizen of the United States, residing at Henley, county of Siskiyou, State of California, have invented an Improvement in Endless-Belt Concentrators; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to improvements in concentrators of that class in which an endless belt is caused to travel over drums or rollers supported in a frame which stands at a slight inclination, so that pulp and water deposited upon the upper end of the belt will move slowly toward the lower end while the belt itself travels in the direction of the upper end, and by this operation the lighter worthless particles are carried to the lower end of the belt and discharged, while the heavier valuable portions adhere to the belt and are carried by its movement over the upper end and are washed off into a proper receptacle.

My present invention is an improvement in a similar apparatus for which patent was issued to me July 13, 1897, No. 586,311.

It consists in the parts and the constructions and combinations of parts hereinafter described and claimed.

Figure 1 is a side elevation of the apparatus. Fig. 2 is a front end view of the same. Fig. 3 is a detail of the device for supporting the shaking frame. Fig. 4 is a view of the water-box. Fig. 5 is a view of the pulp-box. Fig. 6 is a longitudinal section of the belt. Fig. 7 is a detail of the eccentrics and connections for shaking the frame. Fig. 8 is a detail of a portion of the shaft N and showing the socket for the end thereof. Fig. 9 is a detail in section of the standard Q and box P. Fig. 10 is a section of one of the boxes F.

A is the main frame or base upon which the structure is carried. This frame is made of sufficiently-heavy timbers of the proper proportions, and I avoid the necessity of vertical posts or supports by a novel means of attaching the supporting shaking frame C, in the ends of which the belt-carrying rollers B B′ are journaled. In order to support this frame, I have shown semicircular or concaved brackets D, fixed to the lower side of the shaking frame near the ends, and the oscillating A-shaped standards E have their upper ends made convex or semicircular, so as to fit into these boxes. The lower diverging ends of these A-shaped standards have journals upon them which turn in boxes F, fixed upon the main frame or base A. By this construction the shaking belt-carrying frame and its appurtenances are entirely supported upon these journaled A-standards, and no permanent posts or other supports are necessary. It will be seen, however, that without connections from the sides the supporting-standards would easily fall down to one side or the other, carrying with them the belt-frame; but this is prevented by the connection of the eccentric-rods G′ with the shaking frame C at one end and at the other end with the eccentrics G, mounted upon the main driving-shaft H. This shaft is journaled upon the permanent posts I, which are the only fixed posts upon the frame, and when this shaft is rotated and the eccentrics moving the belt-carrying frame C will be oscillated from side to side upon the journaled standards before described, the boxes upon which the frame rests allowing a free easy motion of the parts. The boxes in which the journals at the lower ends of these A-shaped standards fit are mounted upon the main frame or base A by suitable bolts 10, and the boxes are slotted at 12, as shown in Fig. 10, so as to be movable transversely with relation to the frame and the travel of the belt. This enables the operator to move the boxes to one side or the other, thus changing the position of the lower ends of the standards with relation to the boxes in which the upper ends are turnable, and by this change the position of the shaking frame transversely may be altered to suit conditions, to prevent the pulp piling up to one side or the other of the belt during the operation, and to so set the standards with relation to each other that a transverse oscillating or tilting motion may be given to the shaking frame.

From the main driving-shaft H power is transmitted to a counter-shaft by means of cone-pulleys L L′, the pulley L′ being mounted upon a supplemental frame J, fixed to the base A. At the opposite end of this frame is journaled a shaft K, upon which is a swinging frame K′. The opposite end of this frame

K′ carries a flanged pulley K^2, which fits and rests against the belt extending between the two cones L L′. This pulley retains the belt at any point desired with relation to the pulleys, and the pulley-frame is slidable or adjustable upon or with its shaft, so that the belt may be moved toward one end or the other of the cone-pulleys, thus increasing or decreasing the speed of the pulley L′ from the constant speed of the pulley L. Upon the end of the shaft of the pulley L′ is a sprocket-wheel, and a chain from this sprocket-wheel *l* passes around a similar sprocket-wheel *h* upon the shaft N. This shaft serves, as in my former patent, to transmit motion to a worm-gear O, mounted upon the shaking belt-frame and transmitting motion to rotate the belt-carrying drums or rollers. As in the former case, the connection is now made with the worm-gear by means of an angular end upon the shaft fitting a corresponding socket in the end of the worm, which is suitably journaled upon its frame. The opposite end of the worm-driving shaft is journaled in a box or cap P, and this cap has a hole bored in the lower end, which fits upon a stationary post or standard Q, fixed upon the frame A. This box or cap P is thus turnable about its vertical axis and allows the shaft N to move sufficiently to accommodate itself to the oscillations of the belt-frame, while the end adjacent to the box P, and to which the chain sprocket-wheel is fixed, has so slight a motion as not to interfere with the transmission of power to it through the chain.

The movement of the shaking frame is regulated and adjusted by increasing or decreasing the throw of the eccentrics G, which are mounted upon the shaft H. In the present case I have shown hubs G^2 fixed upon the shaft H and having tongues, while the eccentrics G have corresponding guides slidable transversely on the tongues, so that by moving them they may be brought directly into line with the center of the shaft, where they will have no eccentricity, or they may be moved out until any desired degree of eccentricity and throw is obtained. The hubs are keyed or fixed to the shaft by set-screws, and the eccentrics may be locked at any position of adjustment by corresponding set or binding screws.

The carrying-belt travels over the drums B and the supporting-rollers S, with the independent cones R at the ends in the same manner as shown in my former patent; but the lower part of the belt passes over and is supported by two drums T instead of one. The belt itself consists of overlapping layers of canvas or duck put together with rubber, so that the overlapping edges form transverse riffles, substantially as shown in my former patent, No. 586,311, dated July 13, 1897. The lower side of the belt is made entirely of rubber. The clear-water box U is supported above the upper end of the belt by standards V, the lower ends of which are fixed in the base A, and the upper ends are screw-threaded and have nuts or plates V′ turnable upon them. The ends of the standards pass through holes in the projecting ends of the bottom of the box, and the box may be secured by means of other nuts and washers clamping this bottom to the standards. Any adjustment to level or change the pitch of the box transversely may be made by raising or lowering the nuts at one end or the other until the box is in the proper position. Water is admitted into the box by a pipe W from a main or stand-pipe W′ and is discharged from the box and distributed over the belt by overflow-passages made vertically in the side of the box, the upper ends opening into the box at a proper height to receive the water and the lower ends delivering into converging channels W^2, made in the projecting lip or bottom board of the box, as shown. Waterways X extend down through the back of the box, so as to discharge upon each edge of the belt and keep it clean. Perforated pipes W^3 extend from the stand-pipe both above and below the belt when it leaves the drum at the bottom, the perforations facing the belt, so that a jet of water admitted to the pipe by a suitable cock or faucet will serve to wash the belt clean of any adhering sulfurets or other material.

The sand or pulp distributing box Y is supported by standards Y′ from the main frame. This box is adapted to receive the pulp or material to be concentrated and has its interior arranged so that the pulp will be evenly distributed over the surface of the belt and subjected to the action of the water from the clear-water box. The box extends across from side to side above the belt and has holes *a* made through the bottom along the rear side. Above the bottom is a horizontal diaphragm *b*, extending the full length of the interior of the box, but leaving a space along the front side or farthest from the holes *a*. Suitable cleats support this diaphragm and hold it in position above the bottom. A rib *c* is fixed longitudinally upon the top of this diaphragm to act as a distributer. Above this is another diaphragm or cover *d*, with an opening *e*, through which pulp is delivered into the box, so as to fall upon the rear portion of the diaphragm *b*, and from this point it flows around the ends of the rib *c* and falls over the front edge of the diaphragm upon the bottom of the box, passing thence to the holes *a* and to the belt, upon which it is thus properly distributed.

The shaking frame is secured together by cross-bolts and has braces so placed as to retain the frame square and firm and prevent its getting out of shape or twisting.

The rocking standards E at the tail end are a little shorter than those at the head to provide for a certain grade or inclination of the belt. Any change in this fixed grade is produced by raising or lowering the main base-frame A to suit requirements.

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

1. In an endless-traveling-belt concentrator, the main frame or base, a shaking frame having drums or rollers at opposite ends over which the endless belt passes, an eccentric-shaft journaled essentially parallel with the side of the shaking frame with eccentrics fixed thereon and connections between the eccentrics and the ends of the shaking frame, standards having their upper ends fitting in concaved boxes on the lower side of the shaking frame, the lower ends divergent and journaled longitudinally in boxes upon the main frame, said boxes having slotted bolt-holes and bolts by which they are secured and adjustable transversely upon the main frame and with relation to the upper ends of the standards.

2. In an endless-belt concentrator, a main frame, an endless-belt-carrying frame with drums about which the belt is movable, hinged supporting-standards therefor and mechanism by which the belt and frame are oscillated transversely to the line of travel of the belt, a worm-gear through which motion is transmitted to one of the drums about which the endless belt passes, a shaft having one end detachably connected with the gear and movable in unison with the transverse vibrations of the belt-frame and parts thereto, a post or standard upon which the opposite end of the shaft is journaled and turnable and connection by which it is allowed to turn on its vertical axis in unison with the vibrations of the opposite end.

3. In an endless-belt concentrator, a main frame, a shaking frame having drums journaled at opposite ends around which the endless belt passes, a worm-gear through which motion is transmitted to one of the drums to cause the belt to travel, loosely-journaled supporting-standards for the shaking frame, and mechanism by which a transverse oscillation only of the frame may be produced, a main and a counter shaft having oppositely-placed conical pulleys with driving-belt passing between the two, a flanged wheel and yoke in which it is journaled, a shaft to which the opposite end of the yoke is fixed and upon which it is adjustable longitudinally of the shaft so as to change the speed transmitted from the driving to the driven cone, a shaft having one end connecting with the worm which transmits motion to the endless concentrator-belt and the other journaled in a box turnable upon a vertical axis to coincide with the movements of the opposite end of the shaft, sprockets upon the said shaft and upon the cone counter-shaft and chains passing around said sprockets whereby motion is transmitted from the main shaft and to the worm driving-shaft as described.

4. In an endless concentrator of the character described, a pulp-distributing box positioned between the water-box and the lower end of the belt, said box having holes in the bottom at one side, a horizontal diaphragm above said bottom and extending the full length of the interior of the box, with an open slot in the side opposite to the holes, and a vertically-disposed distributing-rib fixed parallel thereto upon its upper surface, and a removable cover with a supply-opening leading to the side of the rib opposite to the slots in the diaphragm.

In witness whereof I have hereunto set my hand.

JEHU JACOBS.

Witnesses:
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J. A. STROBECK.