

No. 645,061.

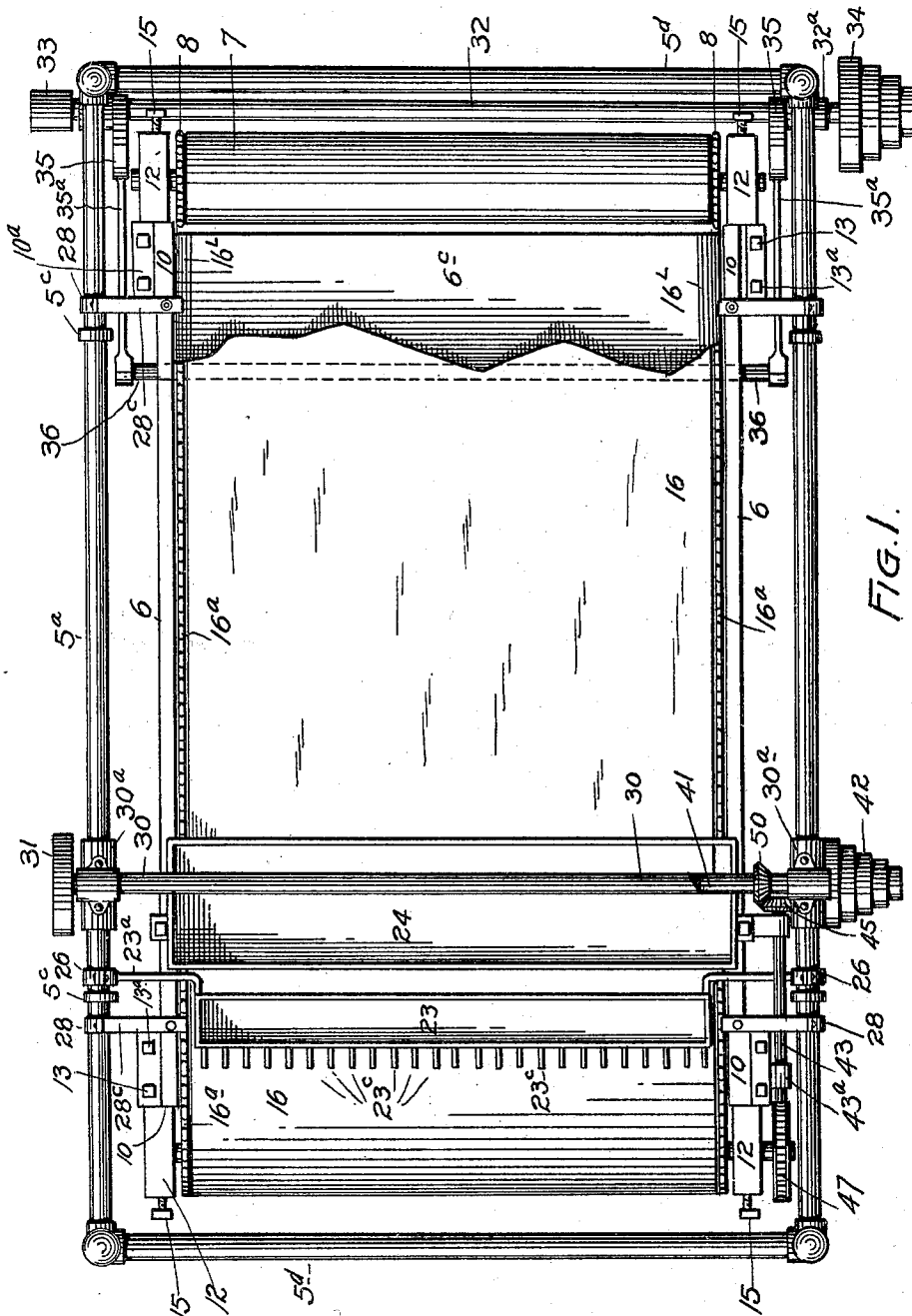
Patented Mar. 13, 1900.

H. T. BENSON.
VANNER.

(Application filed Apr. 3, 1899.)

(No Model.)

4 Sheets—Sheet 1.



Witnesses
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By his Attorney *Watson E. Coleman.*

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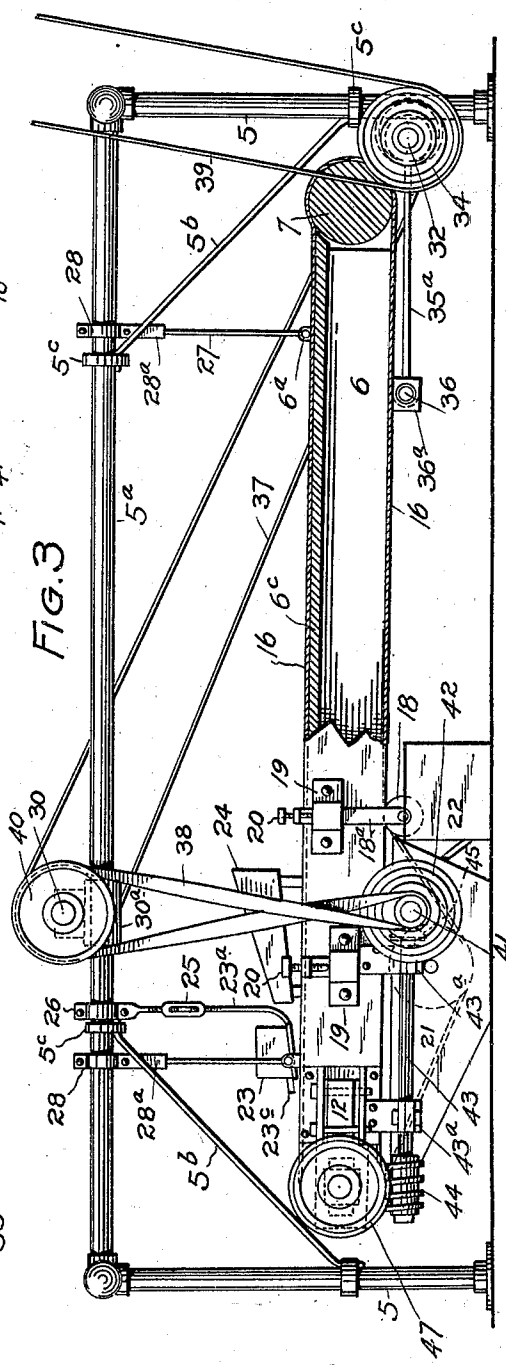
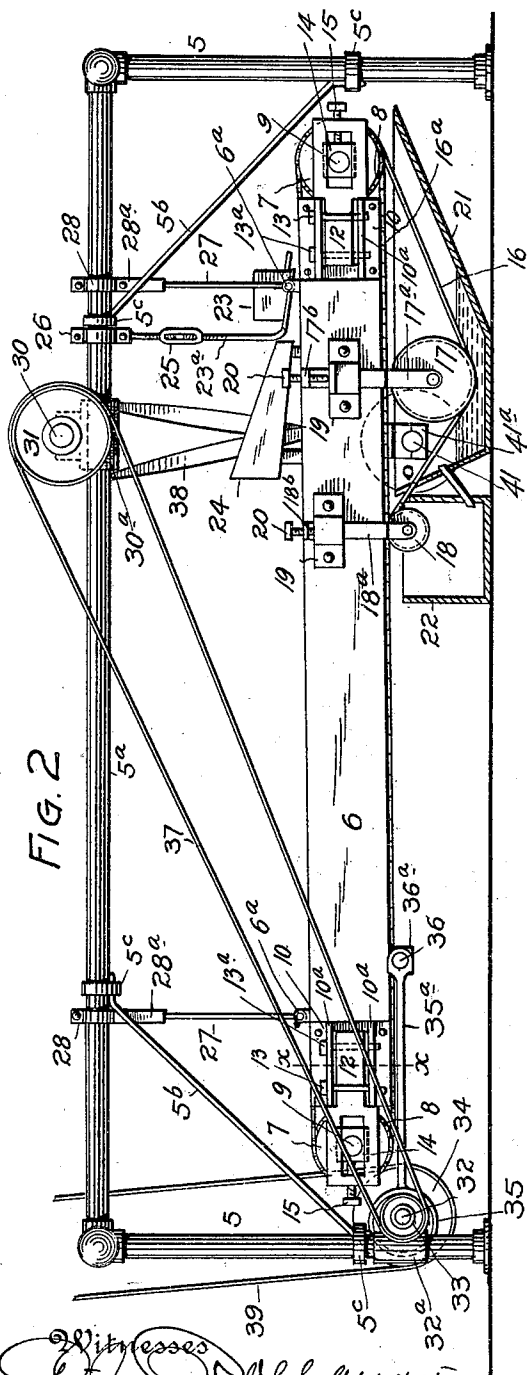
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4 Sheets—Sheet 2.



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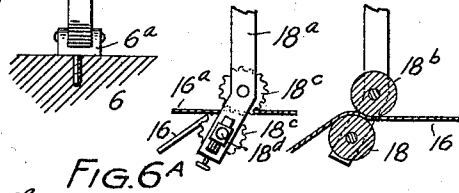
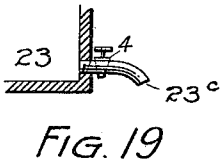
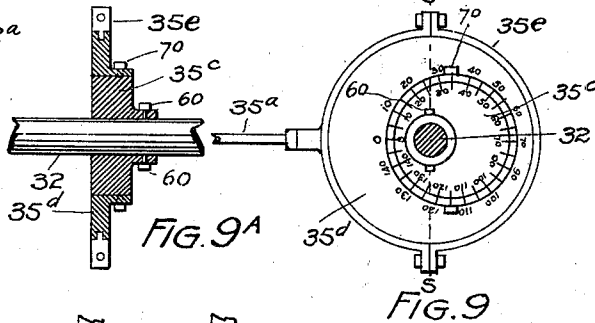
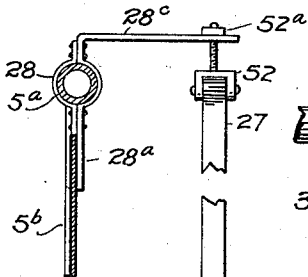
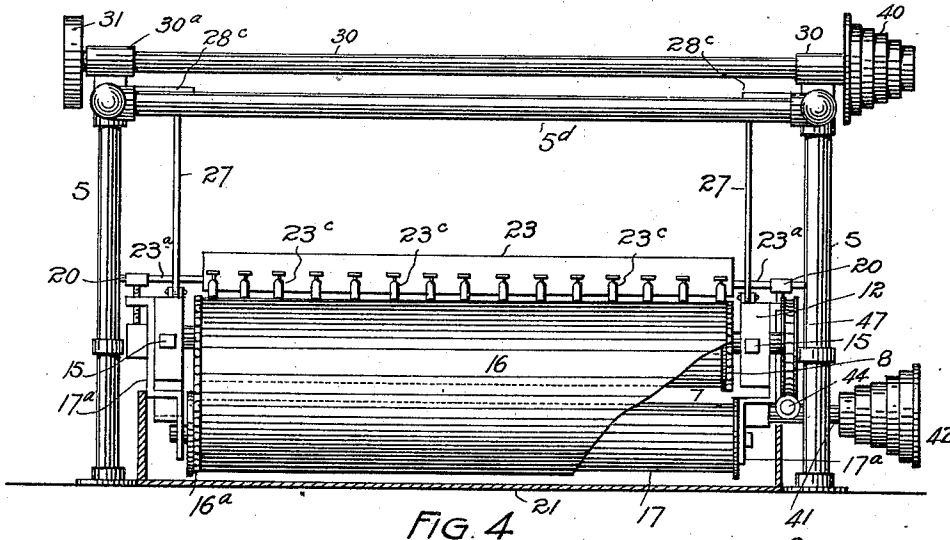


FIG. 6.

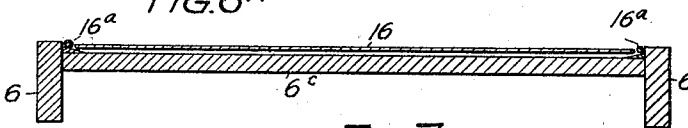


FIG. 7

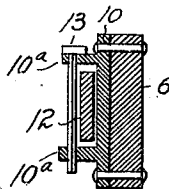


FIG. 8.

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FIG. 14

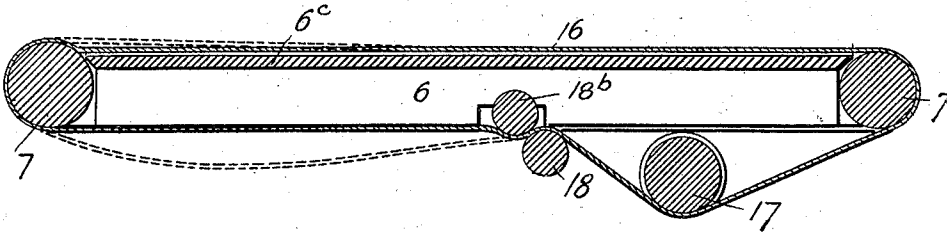


FIG. 15

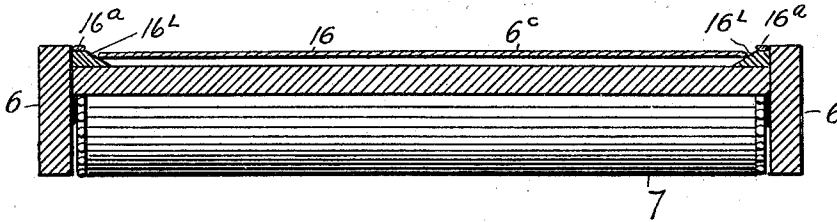


FIG. 16

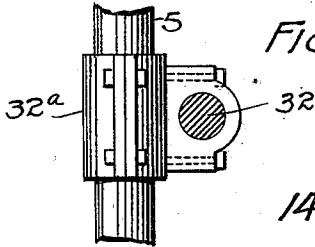


FIG. 10^a

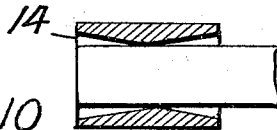


FIG. 17

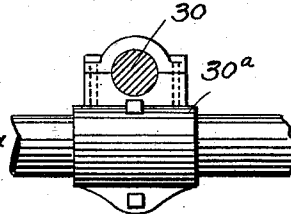


FIG. 10

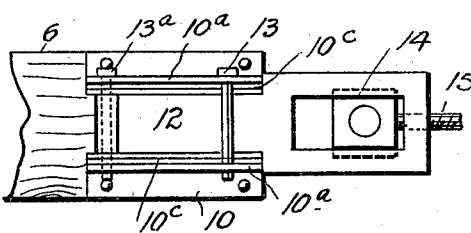


FIG. 12

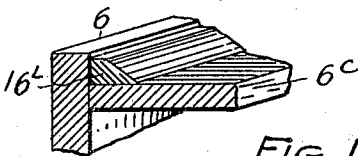
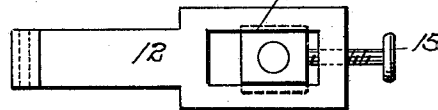


FIG. 18.

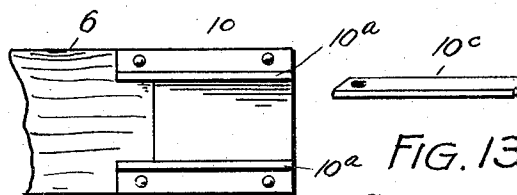


FIG. 13

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FIG. 11
By his Attorney Harrison P. Benson
Watson C. Coleman

UNITED STATES PATENT OFFICE.

HARRISON T. BENSON, OF DENVER, COLORADO.

VANNER.

SPECIFICATION forming part of Letters Patent No. 645,061, dated March 13, 1900.

Application filed April 3, 1899. Serial No. 711,574. (No model.)

To all whom it may concern:

Be it known that I, HARRISON T. BENSON, a citizen of the United States, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Vanners; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improved vanner; and it consists of the features hereinafter described and claimed, all of which will be fully understood by reference to the accompanying drawings, in which is illustrated an embodiment thereof.

In the drawings, Figure 1 is a longitudinal top view of my improved vanner. Fig. 2 is an elevation of the left side of my device. Fig. 3 is an elevation, partly in section, of the right side. Fig. 4 is a front elevation, partly broken away. Fig. 5 is a detail view of the hangers and holders of the vanner-box. Fig. 6 is a vertical cross-section of rolls 18 and 18^b, showing apron 16 between them. Fig. 6^a is a view of the sprocket-wheels attached to rolls 18 and 18^b, showing sprocket-chain engaging said wheels. Fig. 7 is a vertical cross-section of vanner-box and apron on line A A, Fig. 1. Fig. 8 is a vertical cross-section of adjustable hinge-block on line B B, Fig. 10. Fig. 9 is a view of one of the adjustable eccentrics. Fig. 9^a is a vertical cross-section of adjustable eccentric on line s s, Fig. 9. Fig. 10 is a view of one of the adjustable hinge-blocks complete. Fig. 10^a is a view showing the reaming in the hinge-box 14. Fig. 11 is a view of the part to which hinge-block 12 is hinged. Fig. 12 is a side view of hinge-block 12 detached from plate 10. Fig. 13 shows one of the metal strips 10^a that lie between flanges 10^a and edges of hinge-block adjacent thereto. Fig. 14 is a longitudinal vertical section of the vanner-box and rolls, showing the position of the apron. Fig. 15 is a vertical cross-section of the vanner-box, showing part of roll 7. Fig. 16 is a view of adjustable clamp-box 32 on leg 5 of stationary frame. Fig. 17 is a view of adjustable clamp-box 30^a on top of the rail 5^a of stationary frame. Fig. 18 is a perspective view of beveled strips 16^b, side rail 6, and floor 6^c.

The stationary frame, which may be of any suitable dimensions, is constructed with fittings and supported by braces 5^b, attached to leg 5 with clamp 5^a and attached to top rail 5^a with clamp 5^c. Legs 5 of stationary frame are threaded on lower ends and screwed to footpieces fastened to floor of mill with lag-screws. I prefer to make this frame of piping three to four inches in diameter.

The vanner-box, which is longitudinally inclined, is supported by metal straps 27, attached by forked bolts 52 to holders 28^c, (see Fig. 5,) fastened to rail 5^a with clamp-straps 28 and 28^a. 6^a is a fork-bolt which is screwed into side rail 6. An eye is formed in each fork and also through the lower part of metal strap 27. The two parts are connected with a bolt, as shown in Fig. 5. The upper end of strap 27 is connected in like manner to forked bolt 52. The upper extremities of bolts 52 are threaded and provided with adjusting-nut 52^a for regulating the inclination of the vanner-box. (See Fig. 5.) The vanner-box consists of the side rails 6 and the floor 6^c, over which the apron 16 passes. Located at each extremity of the vanner is roll 7 and 7^a, journaled in the framework of the vanner-box. At rear of vanner the roll 7 is so adjusted that it stands one inch above the floor 6^c, thus forming the end of vanner-box, as shown in Fig. 14. Under sprocket-chain 16^a are strips 16^b the full length of floor 6^c one and one-quarter inches thick and three and one-half inches wide or any other suitable dimensions beveled toward the inside, (see Figs. 15 and 18,) thus carrying both edges of apron 16 high on both sides, forming thereby the sides, while roll 7 forms the end of the vanner-box. I prefer to set roll 7 about one-quarter of an inch below the top of side strips 16^b. The rolls 7 and 7^a are made adjustable and detachable in the following manner: Shaft 9 passes through a combination hinge-box 14, the hole in which is reamed out on both sides, tapering to the center. This obviates any bind of shaft in box. Box 14 is operated back and forth in a recess in hinge-block 12 with set-screw 15, as shown in Fig. 12. 10 is the plate, with flanges 10^a, to which the rear end of hinge-block 12 is hinged.

13^a is the hinge-bolt, passing down through the eye in the rear end of 12 and the eye of

metal strips 10^c, which lie between flanges 10^a and the edges of hinge-block 12.

13 is a wedge-bolt passing down through flanges 10^a on the outside of metal strips 10^c and hinge-block 12, clamping hinge-block 12 and metal strips 10^c tight back against plate 10. Thus it will be seen by removing wedge-bolt 13 hinge-block 12 will swing out like a hinge and be released from shaft 9, and by removing hinge-bolt 13^a hinge-block 12 is released from back plate 10, (see Figs. 11 and 12,) which is attached to end of side rail.

In Fig. 8, 6 is the end of side rail, showing the back plate 10 fastened thereto. The tenoned part of hinge-block 12 is considerably narrower than the space between the flanges 10^a. This space is filled with metal strips of different thicknesses, with suitable holes through one end of each strip through which hinge-pin 13^a passes (see Fig. 13) when strips are laid in place between flanges 10^a and hinge-block 12. Thus it will be seen that by changing strips from top to bottom or bottom to top of hinge-block 12 the rolls 7 and 7^a will be raised or lowered, as desired. In removing any apron or roll it is only necessary to remove wedge-bolt 13 and swing hinge-block 12 out of engagement with shaft 9. Roll 7 is thus released and apron 16 can be put on or taken off at will. This forms a perfect adjustable hinge-block box in every particular, answering all the purposes for which it was designed.

The adjustable eccentrics 35 are suitably journaled on shaft 32. (See Fig. 1.)

60 are set-screws passing through the collar of the inside block 35^c and when tightened hold said block securely to shaft 32. (See Figs. 9 and 9^a.) Set-screws 70 pass through the collar of outside block 35^d and securely hold block 35^d to block 35^c. Band 35^e is made in two pieces and clamped together with bolts at their central points. This band is provided on its inside with a tongue or guide adapted to engage a groove in the periphery of outside block 35^d. By loosening set-screws 60 and 70 the inside blocks 35^c may be turned to the right or left to any desired point to increase the throw from nothing to an inch or more, thus providing the proper oscillation for the vanner-box. In Fig. 9 the eccentric is set out at zero and would give no throw if shaft 32 were in motion.

35^a are eccentric-rods attached by boxing 36^a to shaft 36.

36 is a shaft suitably attached to the under side of rails 6 by boxing 36^a.

Shaft 32 is attached to legs 5 of the stationary frame by clamps 32^a, which are adapted to be moved up or down legs 5, as may be required by grade of vanner-box. (See Fig. 16.)

Apron 16 is made of heavy ducking thoroughly saturated with asphalt varnish. This makes the apron 16 water-tight, adds materially to its durability, smooths down the

fibers, and leaves the millions of little recesses in the apron 16, which are very essential in holding the mineral while separating it from the waste.

33 is a pulley suitably attached to driving-shaft 32 and is connected by belt 37 with pulley 31, which is attached to counter-shaft 30. Counter-shaft 30, mounted in journal-boxes, is suitably attached to top side rails of stationary frame with adjustable clamps 30^a, fastened by set-screws. By loosening the set-screws, as shown in Fig. 17, the clamp, with its journal-box and counter-shaft 30, can be moved either way on the rail until shaft 30 is plumb over shaft 41. (See Fig. 3.) Cone-pulley 40, which is suitably attached to counter-shaft 30, is connected by belt 38 to cone-pulley 42. Cone-pulley 42 is attached to shaft 41, which is attached with boxes to the under side of side rail 6 of vanner-box. Beveled cog-wheel 50, which is suitably attached to shaft 41, meshes with beveled cog-wheel 45, attached to shaft 43, as shown in Fig. 1. Shaft 43, which is attached to side rail 6 with boxes 43^a, has worm 44 attached to it, which meshes with worm-wheel 47. (Illustrated in Fig. 3.) Worm-wheel 47 is suitably attached to shaft 9, to which is secured roll 7. Sprocket-wheels 8 are attached to shaft 9 tight up against the guides on roll 7.

I prefer to wrap rolls 18 and 18^b in heavy canvas for the purpose of forming a more spongy surface. As shown in Fig. 6, set-screws are provided for rolls 18 and 18^b, enabling roll 18 to be adjusted tight up against apron 16 and roll 18^b. Thus by friction apron 16 is drawn taut from front down under roll 17 and up between rolls 18 and 18^b. Here the slack of apron 16 is dropped behind, as shown by dotted lines of Fig. 14.

17^a and 18^a are hangers projecting downward, attached to side rails 6 by clamps 19. Set-screws 20 pass through nut 17^b and are suitably arranged to adjust roll 17 and rolls 18 and 18^b in order to regulate the tension of apron 16, thus providing the amount of slack required in apron to form vanner-box.

23 is a water-box, and 23^c are stop-cocks. 23^a are adjustable hangers for water-box, said hangers being attached to rail 5^a by clamps 26. 25 is a screw-buckle to adjust water-box 23 to a perfect level. Thus it will be seen that the water-box is suspended clear on hangers 23^a across and above vanner-box in such manner that the oscillating of the vanner-box would not in the least disturb the water in box 23.

24 is a suitable feed-box extending across the top of vanner-box and attached to side rails 6 thereof.

The operation of the device, as will be readily understood, is as follows: The shaft 32 is rotated by power applied thereto from any suitable source through the belt 39 and cone-pulley 34 on the end of said shaft. From said shaft the power is transmitted to the frame 6 through the eccentrics and rods

35^a, causing the oscillation of said frame. Power is also transmitted from said shaft 32 through the pulley 33 thereon, the belt 37, and the pulley 31 to the shaft 30 and from the latter shaft through the pulley 40, belt 38, and pulley 42 to shaft 41. The rotation of the shaft 41 causes, through the pinions 50 and 45, the rotation of the shaft 43, and as the latter is geared through the worms 44 and worm-wheel 47 with the shaft 9 the latter shaft, which carries the roll 7^a, is also rotated. The sprocket-wheels 8 are also mounted on the shaft 9, and through these wheels and the sprocket-chains 16^a the opposite roll 7 is rotated, as are also the sprocket-wheels 18^b. The rolls 7 and 7^a are thereby turned in the same direction and carry with them the apron 16, the same passing under the roll 17 and between the gripping-rolls 18 and 18^b, which are turned in opposite directions. It will thus be seen that four of the five rolls used are actuated by the sprocket-chains 16^a without the aid of the apron 16. The apron is run with sufficient amount of slack to be drawn up over roll 7 as roll 7^a is rotated by the chains 16^a. At the same time the pressure of the water and pulp forces the apron down on the floor 6^c, depressing the central portions thereof below the sides. If the apron were drawn sufficiently tight to drive the four rolls, it would present a plane surface on top, as shown in dotted lines in Fig. 14. The material to be treated being fed upon or delivered to the apron 16 and with a speed of from three hundred to five hundred oscillations per minute of the frame 6, the pulp and the water are thoroughly agitated and the precious metal to be recovered percolates through the mass and settles upon the apron. The waste passes over the rear roll 7, while the apron 16, traveling forward, carries the metal over the roll 7^a and down into the tank 21 filled with water. Any slimes rising to the top of the water in the tank 21 will pass off into tank 22.

By means of the cone-pulleys 40 and 42 and the gearing between them and the shaft 9, carrying the sprocket-wheels 8 and roll 7^a, the speed of the apron 16 may be readily controlled to adapt the machine for the treatment of any kind of ore.

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

1. In an ore-concentrator, an oscillating frame, comprising rolls at the ends thereof, and a traveling belt or apron passing around said rolls, bearing-blocks for said rolls, hinged supports for said blocks having elongated slots therein in which said blocks are adjustable, and means for locking said supports to maintain said blocks normally in operative position, substantially as set forth.

2. In an ore-concentrator, an oscillating frame, comprising rolls at the ends thereof, and a traveling belt or apron passing around

said rolls, bearing-blocks for said rolls, plates secured to said frame having flanges thereon, supports for said blocks lying between said flanges and pivoted thereto, and a locking-pin extending through said flanges and engaging the outer surfaces of said supports, substantially as set forth.

3. In an ore-concentrator, the combination with a stationary frame, of a suspended vanner thereon, means for oscillating said vanner, an apron made of heavy ducking thoroughly saturated with asphalt varnish and moved by friction of rolls 18 and 18^b, adjustable hangers for said vanner, adjustable hangers for the roll 17 and for the rolls 18 and 18^b, the said rolls 18 and 18^b being covered with canvas to form a yielding surface, and being turned in opposite directions by means of sprocket-chains passing between and engaging the sprocket-wheels on said rolls, the said sprocket-chains passing around the rear roll 7, engaging sprocket-wheels thereon, and engaging sprocket-wheels on front roll 7^a, and sprocket-wheels on the front roll 7^a rotated by worm-gear attached to shaft 9 of roll 7^a, substantially as set forth.

4. In an ore-concentrator, the combination with a frame, of an oscillatory vanner-box suspended therefrom, rolls located at the end of said vanner-box, a tank 21, a roll 17 therein, an apron surrounding the vanner-box and its end rolls and passing under roll 17, and rolls 18 and 18^b adapted to draw said apron between them by friction, said rolls being provided at their ends with sprocket-wheels 18^c, and adapted to be rotated in opposite directions by the sprocket-chains 16^a passing between and engaging said sprocket-wheels, substantially as set forth.

5. In an ore-concentrator, the combination with a frame of an oscillatory vanner-box suspended therefrom, rolls located at the ends of said vanner-box, the shafts of said rolls passing through bearing-blocks 14 which are adjustable back and forth in recesses in the supports 12 by set-screws 15, plates 10 provided with flanges 10^a to which the rear ends of the supports 12 are hinged by hinge-bolts 13^a passing through eyes in flanges 10^a and eyes in the rear ends of said supports, bolts 13 extending through eyes in the flanges 10^a adapted to hold the supports 12 against the side rails 6, strips 10^c adapted to lie between the flanges 10^a and the top and bottom edges of the supports 12 to adjust the height of said supports, a tank 21, a roll 17 therein, and a traveling apron surrounding the vanner-box and its end rolls and passing under roll 17, substantially as set forth.

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

HARRISON T. BENSON.

Witnesses:

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RICHARD L. SHAW.