

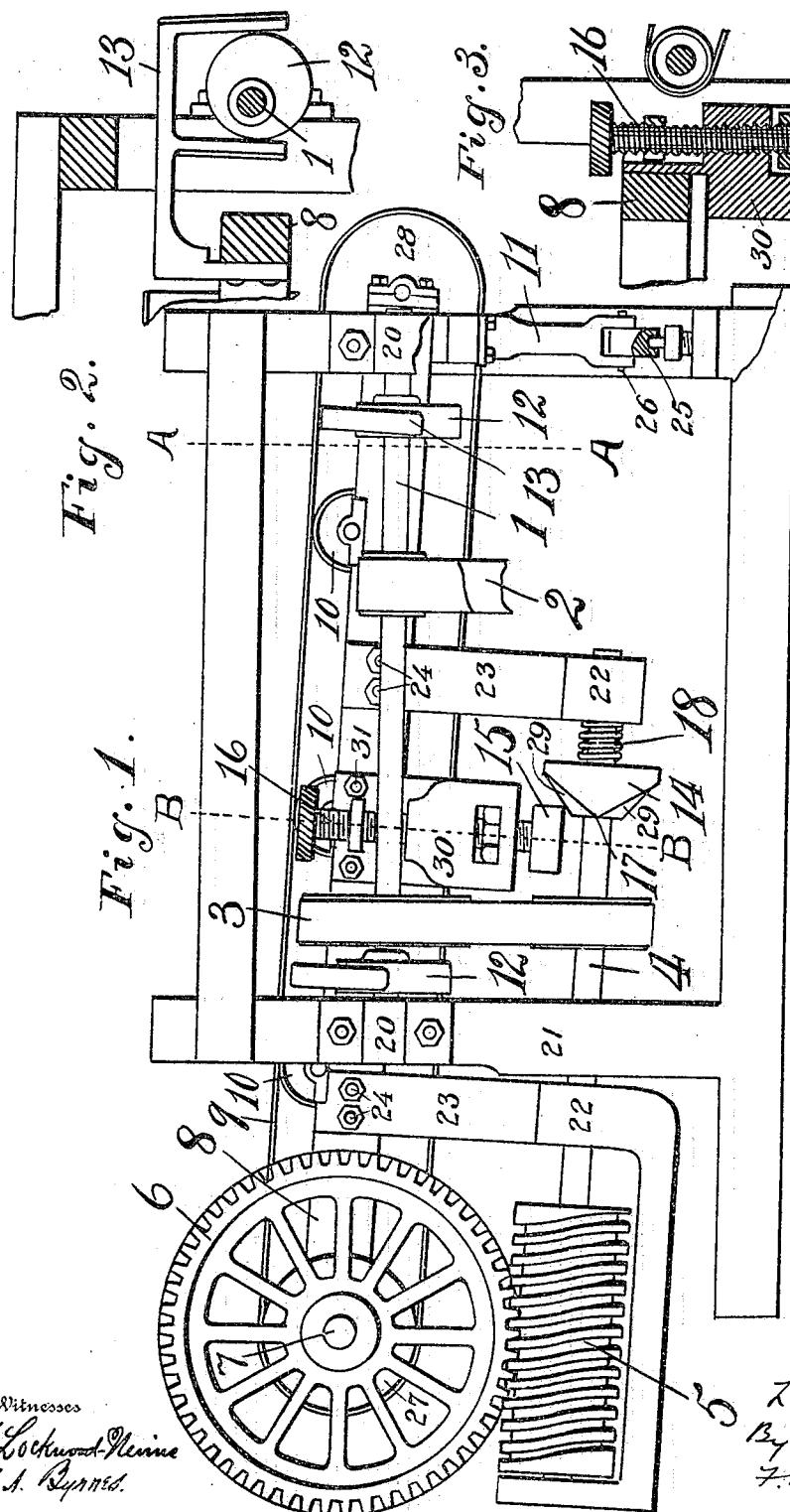
No. 809,648.

PATENTED JAN. 9, 1906.

L. R. TULLOCH.

FRUE CONCENTRATOR.

APPLICATION FILED FEB. 5, 1904.



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# UNITED STATES PATENT OFFICE.

LOUIS R. TULLOCH, OF ANGELS CAMP, CALIFORNIA.

## FRUE CONCENTRATOR.

No. 809,648.

Specification of Letters Patent.

Patented Jan. 9, 1906

Application filed February 5, 1904. Serial No. 192,249.

To all whom it may concern:

Be it known that I, LOUIS R. TULLOCH, a citizen of the United States, residing at Angels Camp, in the county of Calaveras and State 5 of California, have invented certain new and useful Improvements in Frue Concentrators, of which the following is a specification.

My invention relates to improvements in concentrators, and especially to that class 10 commonly known as the "Frue" concentrator.

The object of my invention is to provide 15 simple mechanism for imparting to concentrators of this class a reciprocating longitudinal movement in addition to the general longitudinal advance of the belt and in addition to the transverse reciprocating movement.

My invention therefore resides in the novel 20 construction, combination, and arrangement 25 of parts for the above ends, hereinafter fully specified, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is 25 a side elevation of the apparatus. Fig. 2 is a transverse section of a portion of the apparatus on the line A A of Fig. 1. Fig. 3 is a similar view on the line B B of Fig. 1.

Referring to the drawings, 1 represents the main power-shaft having bearings 20 in the 30 stationary frame 21. To said shaft 1 power is applied by a belt 2 from any suitable source of power. A belt 3 communicates motion from said shaft 1 to a counter-shaft 4, having bearings 22 in hangers 23, secured by bolts 35 24 to a frame 8, said frame being supported upon standards 11, pivoted upon beams 25, as shown at 25, so as to permit of transverse oscillations of said standards and of transverse reciprocations of the frame. This 40 transverse reciprocating movement is produced by eccentrics 12 on the shaft 1, revolving in yokes 13, attached to the frame 8, as is common in the art.

The shaft 4 carries at its end a worm 5, 45 meshing with a worm-wheel 6 on a transverse shaft 7 at the upper end of the frame 8, said shaft also carrying the upper drum 27, around which and also around the lower drum 28 travels the endless concentrator-belt 9, upon 50 which the values are deposited, said belt passing over rollers 10 on the frame 8. The revolution of the shaft 4 thus produces a slow advance of the belt 9; but in addition to this slow longitudinal advance there is also imparted to the belt 9 a rapid longitudinal reciprocation by means as follows: Upon the

counter-shaft 4 is secured a cam 14, having a flat central surface 19 and a ridge 17, extending outward in the plane of said central surface. (See Fig. 1.) The cam-surface then 60 slopes downward or inward on either side of said ridge 17, as shown at 29. This cam is pressed by a spring 18 against a roller 15, mounted on the lower end of a screw 16, screwed through a block 30, secured by bolts 65 31 to the frame 8. Thus said roller and cam both reciprocate in contact with each other transversely with the frame 8. It is evident that with this construction the revolution of the shaft 4 produces a rapid reciprocation 70 of said shaft relative to the frame 8, and therefore a reciprocation of the worm 5, carried by the shaft 4, relative to the wheel 6, carried by the frame 8. This necessarily produces a rapid oscillation of the wheel 6 in 75 addition to its slow rotary motion, and therefore also produces a rapid longitudinal reciprocation of the belt 9 in addition to its slow longitudinal advance. The frame 8, however, does not partake of this longitudinal reciprocation.

The cam 14 is made conical in shape instead of cylindrical, so as to permit of variation of the amplitude of longitudinal reciprocation. By screwing the screw 16 up or 85 down said amplitude may be increased or diminished. When the roller is moved down so far as to contact with the flat central surface 19, no reciprocation whatever results from the revolution of the shaft 14. 90

I claim—

1. In a concentrator, the combination of a shaft, means for revolving said shaft, a worm thereon, a frame, drums on said frame, an endless concentrating-belt around said drums, a worm-wheel meshing with said worm and operatively connected with one of said drums to revolve the same, and positive means independent of the connection with the worm-wheel for imparting a longitudinal reciprocation to said shaft, whereby is produced a comparatively rapid oscillation of the worm-wheel and a corresponding longitudinal reciprocation of the belt in addition to its slow advance, substantially as described. 100

2. In a concentrator, the combination of a shaft, means for revolving said shaft, a worm thereon, a frame, drums on said frame, an endless concentrating-belt around said drums, a worm-wheel meshing with said worm and operatively connected with one of said drums to revolve the same, and means for imparting 110

a longitudinal reciprocation to said shaft, said means comprising a cam on said shaft, and a device engaging said cam, whereby is produced a comparatively rapid oscillation 5 of the worm-wheel and a corresponding longitudinal reciprocation of the belt in addition to its slow advance, substantially as described.

3. In a concentrator, the combination of a shaft, means for revolving said shaft, a worm thereon, a frame, drums on said frame, an endless concentrating-belt around said drums, a worm-wheel meshing with said worm and operatively connected with one of said drums 10 to revolve the same, and means for imparting a longitudinal reciprocation to said shaft, said means comprising a conical cam on said shaft, a roller engaging said cam, and means for adjusting said roller to and from the axis 15 of the cam, whereby is produced a comparatively rapid oscillation of the worm-wheel and a corresponding longitudinal reciprocation of the belt in addition to its slow advance, substantially as described.

4. In a concentrator, the combination of a shaft, means for revolving said shaft, a worm thereon, a frame, drums on said frame, an endless concentrating-belt around said drums, a worm-wheel meshing with said worm and operatively connected with one of said drums 20 to revolve the same, and means for imparting 25

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a longitudinal reciprocation to said shaft, said means comprising a conical cam on said shaft having a flattened central surface, a roller engaging said cam, and means for adjusting said roller to and from the axis of the cam, whereby is produced a comparatively rapid oscillation of the worm-wheel and a corresponding longitudinal reciprocation of the belt in addition to its slow advance, substantially as described. 35

5. The combination of a frame, a shaft mounted therein, a worm-wheel on said shaft, a worm engaging said worm-wheel, a shaft for the worm, bearings therefor secured to said frame, said shaft being slidable in said bearings, means for turning the shaft in said bearings and positive means independent of the connection with the worm-wheel for reciprocating the shaft therein, whereby, in addition to the slow rotary movement of the worm-wheel shaft a comparatively rapid oscillating movement is imparted thereto, substantially as described. 40

In witness whereof I have hereunto set my 45 hand in the presence of two subscribing witnesses.

LOUIS R. TULLOCH.

Witnesses:

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