March 11, 1924. 1,486,827

E. A. BARNES

DRIVING MECHANISM FOR ORE CONCENTRATORS

Original Filed Feb. 12, 1919

Fig. 1.

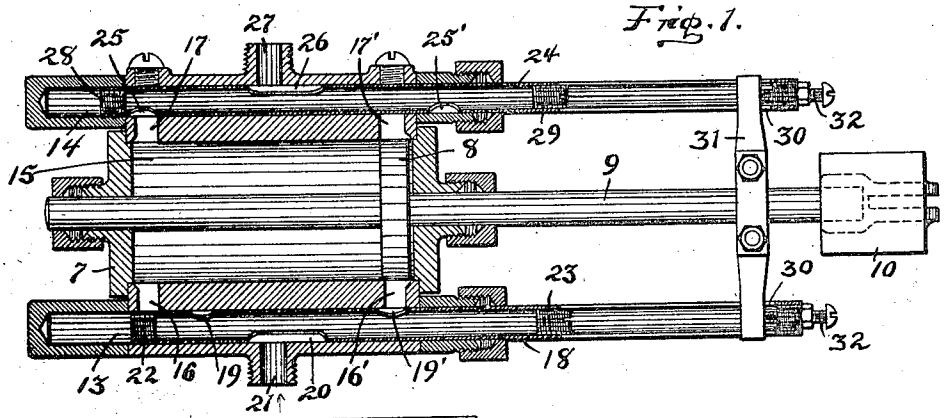


Fig. 2.

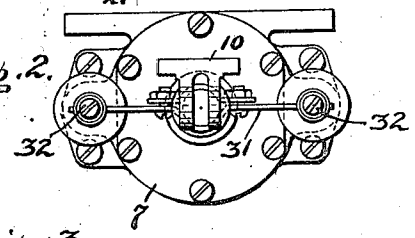
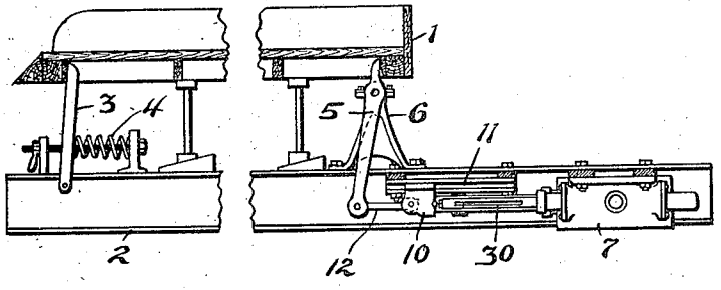


Fig. 3.



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UNITED STATES PATENT OFFICE.

EDWARD A. BARNES, OF FORT WAYNE, INDIANA, ASSIGNOR TO THE DEISTER CONCENTRATOR COMPANY, A CORPORATION OF INDIANA.

DRIVING MECHANISM FOR ORE CONCENTRATORS.

Application filed February 12, 1919, Serial No. 276,513. Renewed July 30, 1923.

To all whom it may concern:

Be it known that I, EDWARD A. BARNES, citizen of the United States of America, and resident of Fort Wayne, in the county of Allen and State of Indiana, have invented certain new and useful Improvements in Driving Mechanism for Ore Concentrators, of which the following is a specification.

This invention relates to improvements in driving mechanism for ore concentrators and is especially designed to be actuated by fluid under pressure, and the object thereof is to provide a construction suited to the use of fluid pressure as the propelling agent and which will admit of adjustments that will alter the differential character of its reciprocating action.

The object of the invention is accomplished by the construction illustrated in the accompanying drawings in which:—

Fig. 1 is a plan view of the driving head partly in horizontal section through its center;

Fig. 2 is an end elevation of the same; and

Fig. 3 is a side elevation showing a concentrating table, a portion of which is broken away, with the invention arranged in operating connection therewith, the view being partly in vertical section.

Similar characters of reference indicate corresponding parts throughout the several views and referring now to the same:

1 is a concentrating table, of the usual type, mounted upon a base 2 in the ordinary manner so as to admit of reciprocating movement. An arm 3 is pivoted at its lower end to the base 2 and its upper end bears forwardly against a part of the table, there being a spring 4 arranged adjustably to exert pressure against the arm. At the opposite end of the table is arranged a rocking lever 5 which is pivotally mounted upon brackets 6 on the base, the upper end of the lever being arranged to bear rearwardly against a part of the table and impart movement to the table oppositely to that applied by the spring-pressed arm 3.

Rocking movement is imparted to the lever by the driving head which constitutes the present invention. This driving head is comprised of a cylinder 7 having therein a piston 8 fixed upon a piston-rod 9 that extends entirely through the cylinder. To one end of the piston-rod is fixed a cross-head 10 that is arranged to slide in guides 11 which are supported by the base. The cross-head and the lower end of the rocking-lever 5 are coupled by a connecting-rod 12 so that as the piston reciprocates within the cylinder the lever becomes actuated accordingly.

The cylinder has opposite valve chambers 13 and 14 respectively, each of which has communication with the piston-chamber 15 at both ends thereof through corresponding ports 16 and 16′, and 17 and 17′. Within the chamber 13 is a sliding tubular feed-valve 18 that snugly fits the bore of the chamber and is longitudinally movable therein. In one side of the tubular valve are made two valve openings 19 and 19′ respectively so located and spaced apart as to alternately register with the corresponding ports 16 and 16′ when the valve is reciprocated. The valve has also an elongated opening 20 so proportioned as to maintain constant communication with the feed opening 21 during the movement of the valve. A plug 22 closes the rear end of the valve, and another plug 23 is arranged in the valve to close its forward portion.

Within the chamber 14 is the exhaust-valve 24 which is similar in character and operation to the feed-valve except that its exhaust openings 25 and 25′ are spaced farther apart than their related ports 17 and 17′. This valve also has an elongated opening 26 which communicates constantly with the exhaust outlet 27. The rear end of the valve is closed by a plug 28 and a plug 29 closes the forward portion thereof. The forwardly extending portion of each valve is slotted as indicated by 30, and receives the corresponding end of the valve actuating-bar 31 which is fixed upon the piston-rod so as to move therewith. The bar 31 has longitudinal movement in the slotted ends of the valves to an extent limited rearwardly by the plugs 23 and 29, each of which plugs are adjustable, and forwardly by adjustable stops 32 that are mounted in the front ends of the valves. Thus, the valves become moved by the action of the piston at each end of their stroke in the corresponding direction through the medium of the actuating bar 31. By adjustment of the plugs 23 and 29 and the stops 32, the movements of the respective valves become altered as to the period in the cycle

of action of the driving-head. The intention is to make such adjustments of the valves that the reciprocating movement of the table will become of unequal velocity in opposite directions to such an extent as will effect progression of settled ore matter thereon toward its discharge end, and this is accomplished by causing the feed-valve to communicate with the cylinder chamber at an earlier or later period of the stroke of the piston in one direction than in its opposite stroke so that the spring 4 is compressed more or less accordingly. The differential action imparted to the table by the driving-head is augmented by the spring 4 which exerts force that is applied to the table in one direction only. Thus, the driving-head is aided by the spring in effecting movement of the table in one direction and is resisted thereby in the opposite direction.

In the operation of the invention fluid under pressure is applied to the cylinder through its inlet opening, thereby causing the piston to become reciprocated and the valves accordingly actuated, with the result that the table is repeatedly drawn rearwardly against the action of the spring, the movements of the table in opposite directions becoming more or less unequal in velocity accordingly as the plugs and stops of the valves are adjustably positioned.

By the use of this invention the customary belting, line shafting and countershafting is eliminated and the fluid pressure that is generally available in large quantities in ore mills is utilized.

What I claim is:—

1. In apparatus of the class described, a driving-head with piston rod a cylinder with a reciprocating piston therein and feed and exhaust valves through which fluid under pressure is applied to and exhausted from the cylinder; an actuating bar fixed on the piston rod and having independent driving relation respectively with said valves; and means of adjustment for each valve adapted to independently effect the regulation of the movements thereof in opposite directions.

2. In apparatus of the class described, a cylinder having therein a reciprocating piston with piston rod adapted to be actuated by fluid under pressure and having also feed and exhaust valves for regulating the ingress and egress of the fluid; means on the piston rod for actuating the valves; and adjusting means in connection with each valve for independently regulating the period of its action at each end of its stroke.

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

EDWARD A. BARNES.

Witnesses:

C. H. WATSON,

D. P. MCDONALD.