(No Model.)

G. JOHNSTON.

ORE CONCENTRATOR.

No. 490,850. Patented Jan. 31, 1893.

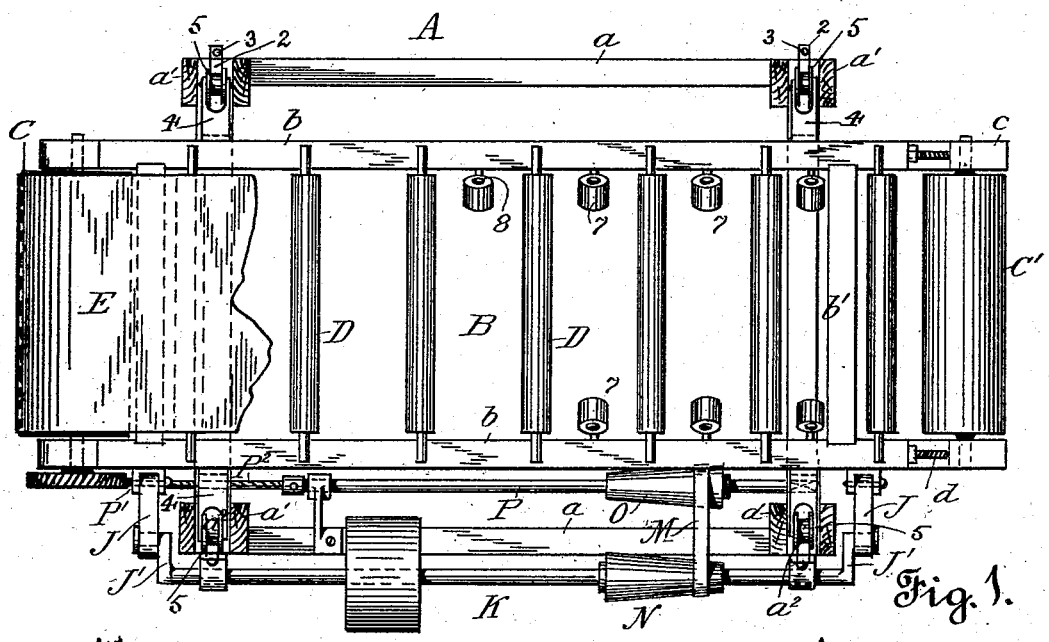

Fig. 1.

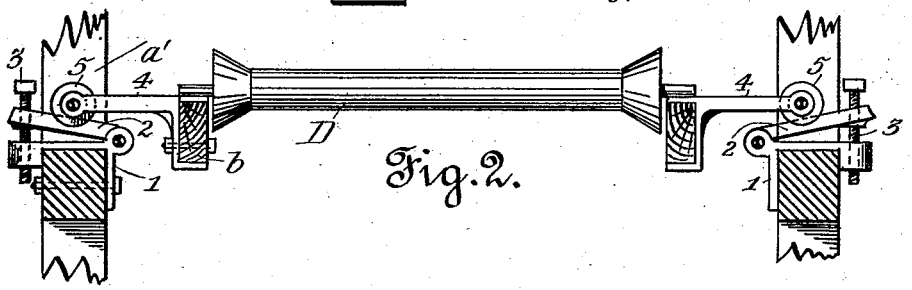

Fig. 2.

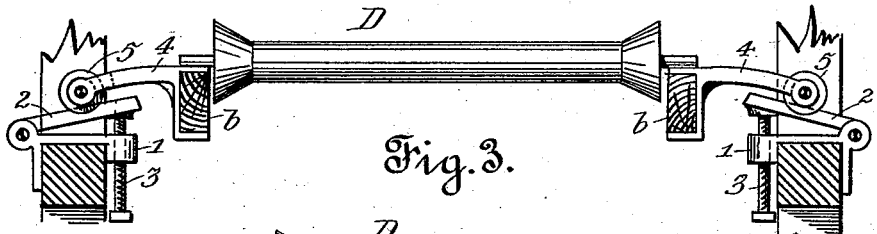

Fig. 3.

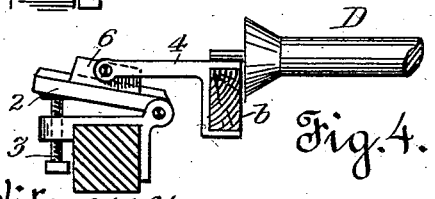

Fig. 4.

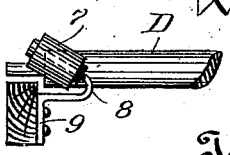

Fig. 5.

Fig. 6.

Witnesses
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UNITED STATES PATENT OFFICE.

GEORGE JOHNSTON, OF SAN FRANCISCO, CALIFORNIA.

ORE-CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 490,850, dated January 31, 1893.

Application filed October 23, 1891. Serial No. 409,574. (No model.)

To all whom it may concern:

Be it known that I, GEORGE JOHNSTON, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Ore-Concentrators; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to ore concentrators of the class in which an inclined endless belt is carried by, and has a longitudinal movement upon, a frame to which a lateral movement is imparted. The pulp from the stamp mill is supplied to the belt by suitable feeding devices, and is carried up the incline to a point where it meets a supply of water. The combined lateral and longitudinal movements of the belt, and the agitation of the pulp and water thus produced, causes a separation of the pulp, the sulphurets and heavier precious particles sinking to the bottom in contact with the belt, and the water and waste material running down the incline and escaping at its lower end. The sulphurets pass up the incline and are carried with the belt around the guide roller at its upper end and down through a water tank below, where they are washed off and deposited.

In an application for Letters Patent filed by me July 25, 1891, and serially numbered 400,730, I described an ore concentrator belonging to the general class above referred to. My present invention in its general features of construction and operation, is substantially like that described in said application, but differs from it in various details of construction, relating more particularly to the means for giving the lateral oscillation to the belt frame and for changing the extent or degree of such oscillation; and also to the means for raising the edges of the belt so as to form continuous side flanges thereon. These features will be fully hereinafter described, and are shown in the accompanying drawings, in which—

Figure 1, is a plan view of an ore concentrator, with the belt broken away; Fig. 2, is a cross-section of the main frame and the belt frame to illustrate the means for imparting the oscillatory movement to the belt, as well as for changing the amount or extent of its oscillation; Fig. 3, is a similar cross-section illustrating a modification; Fig. 4, is a broken cross-section showing another modification; Fig. 5, is a detail view of one of the inclined rollers for forming the flange upon the edge of the belt; Fig. 6, is a cross-section of the slide and guide shown in Fig. 4.

In the drawings I have shown only so much of a concentrator as is necessary to give a clear idea of the essential features of my present invention; and it will be understood that any parts not herein shown, such as the devices for feeding the pulp, the means for supplying water, and the tank for washing off the belt, are substantially like those shown in my application above referred to.

A represents a stationary supporting frame of any suitable construction, but shown here as consisting of longitudinal sills a—a, uprights a'—a', and transverse beams a^2,—a^2.

B is the oscillating belt frame composed of longitudinal side beams b—b, connected by cross braces b'—b', and at the ends by the guide rollers C--C', the latter being journaled in movable bearings, one of which is shown at c, adjustable by means of a screw d in order that the belt may be tightened or loosened as may be required. A series of rollers D are journaled in the frame B over which, and around the rollers C—C' passes the ore belt E. The belt is made of some suitable flexible material such as canvas, and may be provided with riffles on its surface if desired.

The longitudinal movement of the ore belt is transmitted by the two-part shaft P—P', connected together by a length of flexible shafting P^2, and connected to the driving roller C by a worm and gear. The two-part shaft derives its motion from the driving shaft K by means of a belt M running on cone pulleys N—O, the latter forming a speed changing device. These means for driving the belt longitudinally are the same as those shown in my previous application.

The lateral movement of the belt frame is imparted by pitmen J connected to said frame and to cranks J' upon the driving shaft K. The oscillating movements given the frame are the same as those described in my previous application; but I have materially changed the means for giving the direction of oscilla-

tion, as well as those for changing its degree or extent. These means are shown in Fig. 2, and, modified, in Figs. 3, 4, and 6.

Fig. 2, shows means for giving the belt an oscillation or swing upon a downward curve. To the main frame is secured brackets 1, there being ordinarily two of such brackets upon each side placed respectively near each end and preferably opposite to each other. To each of these brackets is hinged a guide 2, the inclination of which is adjusted by a screw 3. Arms 4, are secured to the belt frame, each having a pulley or roller 5, at its end, which travels upon one of the guides 2. The lateral movement of the belt frame as imparted by the cranks and pitmen, is thus converted into a swing or oscillation upon a downward curve; and the amount of this swing, is dependent upon the degree of inclination given to the guides 2.

In the modification shown in Fig. 3, the lateral oscillation is upon an upward curve. This movement is secured by reversing the inclined guides as shown, so that the inclination upward is toward the belt instead of from it as in Fig. 2.

The modification shown in Fig. 4, consists only in the substitution for the roller 5, of a slide 6, pivoted upon the arm 4, so as to be self adjusting to the inclination of the guide 2; and while the guide is shown in this figure as having the outward inclination shown in Fig. 2, it is evident that the slide 6, may also be substituted for the roller shown in Fig. 3 and work in precisely the same way as that roller.

In my previous application I described a series of loose cones, alternating with the transverse rollers that guide the belt in its longitudinal movement, for turning up the upper edges of the belt to form the side flanges. In the present case (Figs. 1 and 5,) I have substituted for these cones, a series of cylindrical rollers 7, running freely upon the inclined arms 8, of brackets 9, secured to the belt frame. Their operation is substantially the same as that of the cones but in some cases I prefer to use them instead of the latter.

What I claim is:—

1. In an ore concentrator, a main supporting frame, a traveling belt, a belt frame and means for oscillating it laterally, pivoted inclined guides on the main frame and supports between the belt frame and said guides, movable on the latter, substantially as described.

2. In an ore concentrator, the main supporting frame, a traveling belt, a belt frame, means for oscillating it, brackets secured to the side beams of the belt frame and inclined pivoted and adjustable guides for the support of the brackets, substantially as described.

3. In an ore concentrator, a traveling belt, a belt frame having side beams, rollers D supported thereon, brackets 9 secured to the inner faces of the side beams, intermediate of the rollers D, terminating in inclined arms 8, and rollers 7 supported thereon, substantially as described.

In testimony whereof I have affixed my signature, in presence of two witnesses, this 14th day of October, 1891.

GEORGE JOHNSTON.

Witnesses:
L. W. SEELY,
F. C. GLADDEN.