(No Model.) 2 Sheets—Sheet 1.

A. J. VAN DRAKE.

ORE STAMP BATTERY.

No. 266,662. Patented Oct. 31, 1882.

Fig. 1.

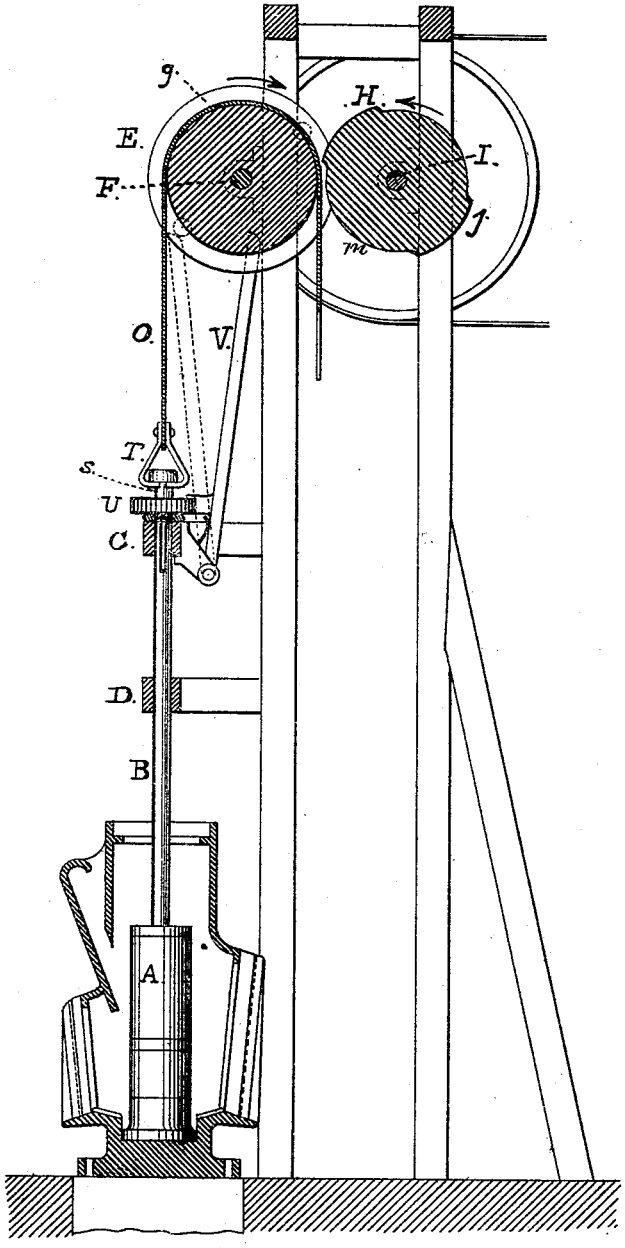
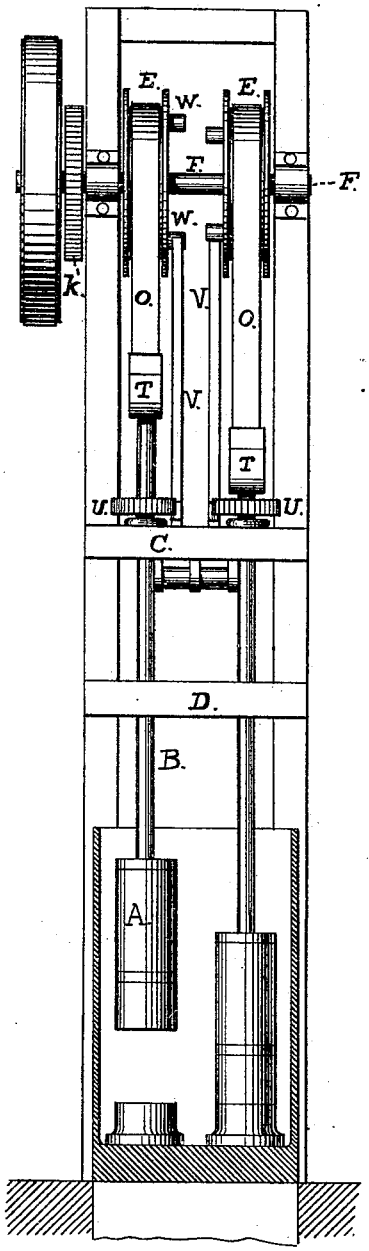


Fig. 2.



Witnesses:

W. Voit

Wm. A. Clark

Inventor:

Alfred J. Van Drake

By his Attys. Bond & Adam

(No Model.) 2 Sheets—Sheet 2.

A. J. VAN DRAKE.

ORE STAMP BATTERY.

No. 266,662. Patented Oct. 31, 1882.

Fig. 3.

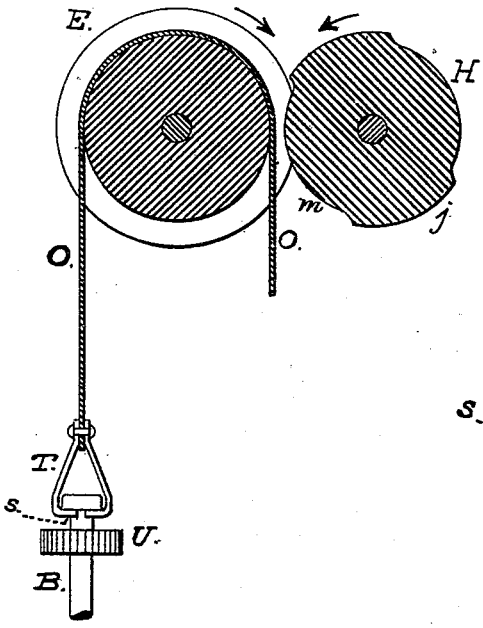
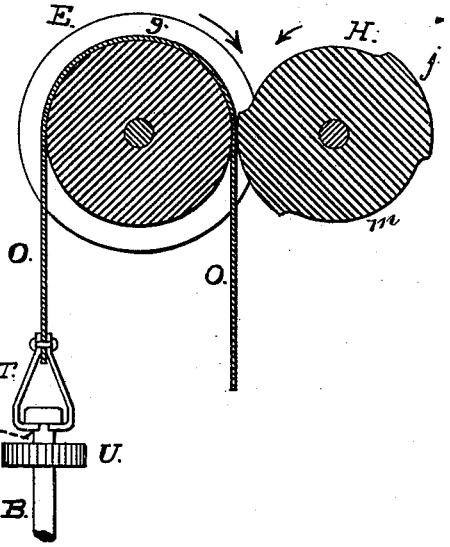


Fig. 4.



Witnesses:

W. Hoste

Wm. H. Clark

Inventor:

Alfred J. Van Drake

By his Attys., Dame & Osborn

UNITED STATES PATENT OFFICE.

ALFRED J. VAN DRAKE, OF SAN FRANCISCO, CALIFORNIA.

ORE-STAMP BATTERY.

SPECIFICATION forming part of Letters Patent No. 266,662, dated October 31, 1882.

Application filed December 9, 1880. (No model.)

To all whom it may concern:

Be it known that I, ALFRED J. VAN DRAKE, of the city and county of San Francisco, in the State of California, have invented certain new and useful Improvements in Ore-Stamp Batteries; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings.

My invention relates to devices for lifting and dropping stamps and weights in machinery for breaking rock, crushing ores, and in operations where a weight is to be alternately raised to a height and released to fall of its own gravity. In one class of such devices the stamp or weight to be lifted is connected to the lower end of an upright rigid rod or bar that is carried up between the adjacent edges or rims of two pulleys turning upon horizontal axles and driven with a continuous rotary motion in an outward direction, or away from each other, and which operate when rotated simultaneously to draw up the bar between them and raise the weight attached to its lower end by the pressure and grip of the concentric faces of their rims against the opposite sides of the bar at the point where it is tangent to the pulleys. The rim of one of these pulleys has notches, or recesses, or depressions in it alternating with the projecting concentric portions, and while these projections in connection with the other pulley bear against and operate to draw up the bar the depressions in the one pulley allow the bar to slip through and the weight to drop as often as one comes into conjunction with the other pulley. In this construction the lifting is effected simply by the upright bar being pinched or gripped between the two pulleys at one point and the two pulleys required to be held or to run with a very strong pressure against the bar in order to lift and raise the weight.

My invention is an improvement upon such devices; and it consists in the construction and combination hereinafter set forth and claimed.

In the drawings herein referred to, Figure 1 is a side elevation, partly in section. Fig. 2 is a front elevation thereof, and Figs. 3 and 4 are detail sections through the lifting and dropping mechanism.

A represents the stamp, and B the stamp-stem, of an ore-stamp battery. In this case I make the stamp-stem much shorter than when the ordinary cams and tappets are used, and I provide guides for the stem in two horizontal guide-timbers, C D, to keep it in the required upright position.

Near the top of the battery-frame, and to one side of the line of the stamp-stem, I place a horizontal shaft or axle, F, on which I fix a wide pulley, E, and behind and parallel with this shaft I fix another horizontal shaft, I, having a pulley, H. These two shafts are mounted in boxes in the uprights of the frame, and by means of gears K, I connect one to the other, so that power applied to one will work the two pulleys and drive them with a continuous rotary movement. The wide pulley has a flange on each side extending around and projecting beyond the arm, so as to form a flat-bottom groove, *g*, running all around the pulley. The position of this pulley above the stamp is to one side of the line of the stamp-stem, so as to bring the bottom of the groove perpendicularly over or tangent to a vertical line running through the stem, and to the upper end of the stem I attach one end of a flexible band or strap, O, which is carried up over this pulley and forms the means for lifting the stamp or weight. The other pulley, H, is placed immediately behind the flanged pulley E, and as its office is to clamp or hold the strap at one point against the rim of the flanged pulley I call it the "gripping-pulley," while the flanged pulley, which acts principally upon the strap to draw up the weight, I term the "lifting-pulley." The pulley H is made narrow enough to fit and run in the groove of the flanged pulley, and its edge is formed of one or more projecting concentric segments, *j*, that run closely against the periphery of the grooved pulley, and of depressed portions or recesses *m*, that alternate with the segment or segments and run clear of the flanged pulley. These two pulleys are driven together to run at uniform speed in a downward direction toward each other. The band or strap O from the stamp-stem is connected with these pulleys by being carried up over and around the top of the grooved pulley, in the groove, and then down between it and the rim of the gripping-pulley H. This strap is long enough to extend below the point of contact of the two pulleys

when the stamp is at its lowest position. Now, by this construction the two pulleys, when set in motion, will run toward each other, and as one of the projecting segments *j* is brought around against the strap O the continued rotation of the two pulleys will draw on the strap and lift the weight at the lower end. As long as the rim of a projecting segment runs against the grooved pulley the strap O will be caught between the two pulleys with sufficient pressure or grip to prevent it being drawn through by the weight of the stamp, and the friction between the inner face of the strap and that portion of the grooved pulley over which it runs will cause the rotation of the pulley to lift the stamp. When one of the recesses in the gripping-pulley approaches the strap, however, the grip will cease, and the strap being released will allow the stamp to drop.

The advantage of employing the grooved pulley and a strap which is carried over and around a portion of its rim lies in the increased frictional contact obtained, so that the weight is raised chiefly by the rotation of the grooved pulley acting upon a long extent of surface of the band, instead of by the gripping action of two pulleys acting against opposite sides and at one point only of the lifting medium connected with the stamp or weight.

A much heavier weight can be lifted by my improved means, and, as there is no liability to slip while being lifted, the length of the lift is more uniform and reliable.

It will be evident that the lift of the stamp is regulated in its length by the length of the projecting face of the pulley H, and that the number of times that the stamp will be lifted in one revolution of the pulleys will be regulated by the number of alternate projections and depressions provided on the rim of the gripping-pulley.

By this arrangement the pulley E does the work of raising the stamp, while the pulley H acts with just enough pressure or grip against the strap O to prevent any slip of the strap, and the weight of the stamp when being raised is sustained by the surface of the strap in contact with the surface of the lifting-pulley H, as before described.

This arrangement has the advantage of always lifting the stamp to the same height above its striking position, regardless of the quantity of ore underneath it, whereas in the ordinary cam-and-tappet device for performing this work the stamp is always raised to a fixed height, so that its drop is less effective as the ore accumulates under the stamp.

In connection with this device I employ a means for causing the stamp to rotate as it drops, and thus give the most effective crushing blow, as well as to cause the face to wear evenly. This consists of a metal clasp, T, secured to the end of the strap or belt fitted around the head of the stamp-stem, and in a groove, *s*, formed therein, so that the stem can turn freely without the strap being twisted. Upon the upper guide-timber, D, I then fix a ratchet-wheel, U, and carry the stamp-stem through the hub of this wheel. By means of a groove and feather I connect the stem and ratchet-wheel, so that while the stem shall turn with the wheel it shall be free to rise and drop without affecting the ratchet-wheel. I then arrange a lever-pawl, V, so that the upper end of its lever-arm shall extend up alongside the pulley E, and on the side of the pulley I secure one or more pins or projections, W, which will strike the upper end of the lever V at the proper moment as the stamp falls, and throw it forward so as to cause its lower or ratchet end to move the ratchet-wheel U around and carry the stamp and stem around a certain distance. This gives a positive rotation at each drop, and insures the effective action of the stamp.

This arrangement for lifting and dropping stamps can be applied also to a trip-hammer.

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

1. The large plain-faced pulley presenting a large extent of frictional surface for the strap to work in contact with, in combination with the stamp-stem, intermittently-acting gripping pulley placed behind the plain-faced pulley and geared with it, as described, so that the two pulleys rotate with uniform motion in opposite directions and at the same rate of speed, and the flexible band or strap attached at the lower end to the stamp-stem and passed over the plain pulley and between it and the gripping-pulley, substantially as set forth.

2. In combination with a stamp-stem or rod, the means for rotating the same, consisting of the ratchet-wheel U, the grooved stem working through it independently of its rotary movement, the lever V, pivoted to a fixed point and provided with a pawl, and the pulley E, provided with its pins or stops W, substantially as and for the purpose herein set forth.

In witness whereof I have hereunto set my hand and seal.

ALFRED J. VAN DRAKE. [L.S.]

Attest:
WM. F. CLARK,
EDWARD E. OSBORN.