(No Model.)

# O. ABELING.

## PLUNGER WORKER FOR CONCENTRATING JIGS.

No. 520,287. Patented May 22, 1894.

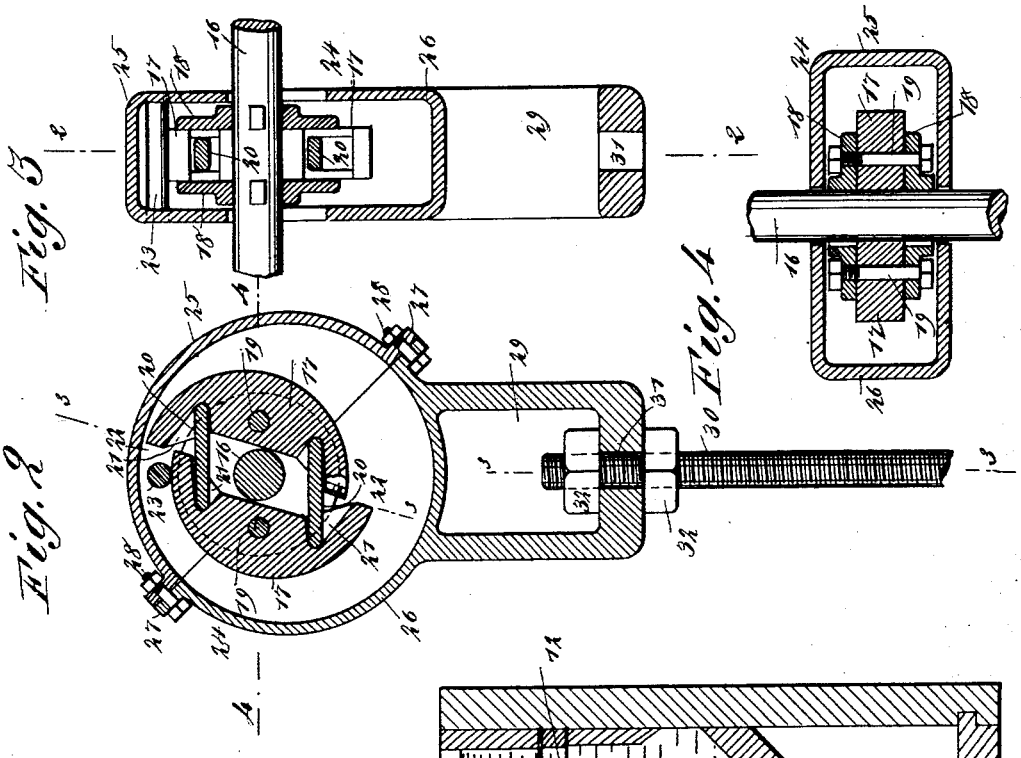

Fig. 3



Fig. 4



Fig. 2

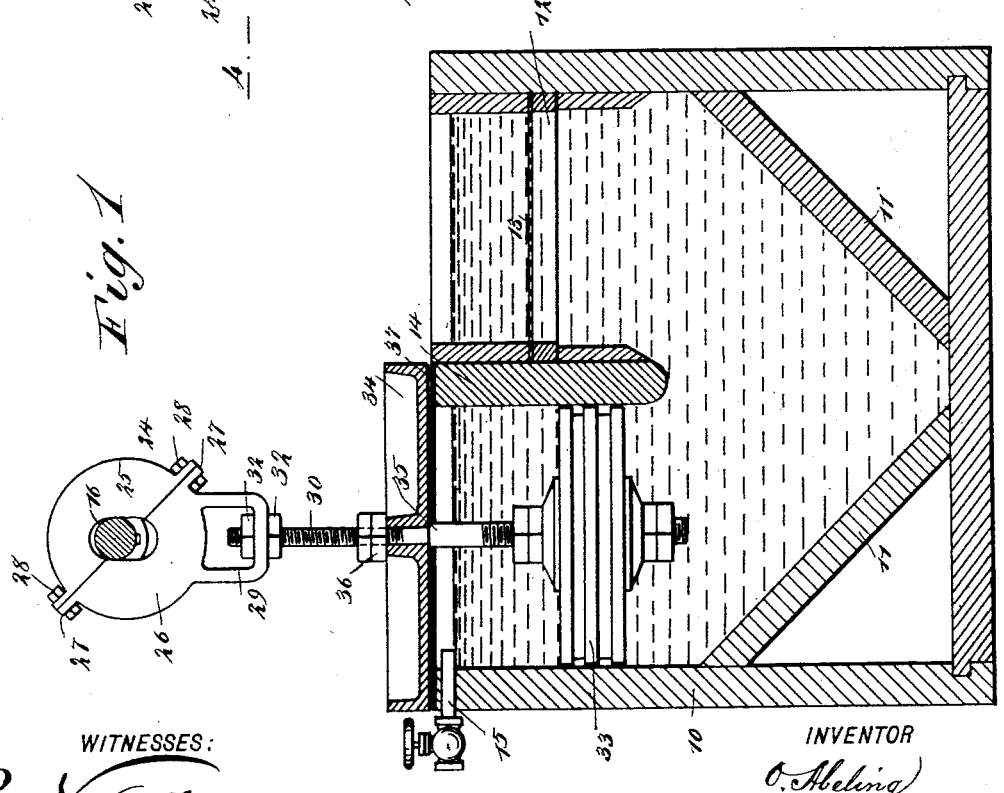

Fig. 1

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## PLUNGER-WORKER FOR CONCENTRATING-JIGS.

SPECIFICATION forming part of Letters Patent No. 520,287, dated May 22, 1894.

Application filed June 3, 1893. Serial No. 476,495. (No model.)

*To all whom it may concern:*

Be it known that I, OTTO ABELING, of Burke, in the county of Shoshone and State of Idaho, have invented a new and Improved Plunger-Worker for Concentrating-Jigs, of which the following is a full, clear, and exact description.

My invention relates to improvements in that class of ore concentrating machinery known as "jigs," in which a plunger is made to move rapidly down and slowly up in a body of water, so as to force the water into contact with the material in the ore and concentrate the ore.

My invention relates more particularly to the means of actuating the plunger; and the object of my invention is to produce a strong, simple and adjustable plunger worker which raises the plunger very slowly so as not to create any suction on the ore, and permits it to drop very rapidly so as to force the water in the jig up quickly through the ore body, so as to raise the lighter particles of ore in the manner hereinafter described.

A further object of my invention is to provide a convenient means of working the plunger so that it will drop, of itself, with sufficient force to give the proper movement to the water in the "jig."

To these ends my invention consists in certain features of construction and combinations of parts, as will be hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures of reference indicate corresponding parts in all the views.

Figure 1 is a sectional elevation of a jig provided with my improved plunger worker mechanism. Fig. 2 is a detail cross section of the cam mechanism and the cam housing, on the line 2—2 in Fig. 3. Fig. 3 is a vertical section on the line 3—3 in Fig. 2; and Fig. 4 is a sectional plan on the line 4—4 in Fig. 2.

The jig 10 is of substantially the usual kind, having the inclined bottom 11, the sieve frame 12 in one side and at the top, which is provided with a sieve 13 adapted to carry the ore to be operated upon, the depending partition 14 which forms a support for one side of the sieve frame and forms also a sort of sluiceway up through which the water passes on the descent of the plunger, and with a suitable valve-controlled water supply pipe 15 by means of which the jig is filled. The above construction is common and is not claimed as a part of my invention.

Above the jig is a horizontal shaft 16, which carries the plunger working cam, this being made of two parts 17 which are exactly similar and which are held between collars 18 keyed to the shaft, being bolted to the said collars by bolts 19, and the two parts of the cam are twisted so that shoulders will be formed near their meeting edges. It is necessary that the two sides of the cam be adjusted evenly, and to insure this the two parts are connected on opposite sides of the shaft by levers 20 which rest in recesses 21 in the cam sections. The cam sections are twisted, as above described, so that the square edge of one will project beyond the corresponding edge of the other, and thus two diametrically opposite shoulders 22 are formed which are abrupt and on which the roller 23 runs. It will be seen then that as the cam revolves it will raise the roller 23 very gradually on the oval faces of the cam and drop it very suddenly over the shoulders 22, and it is this movement that actuates the jig plunger, as described below.

The cam is held in a cam housing 24 which is composed of two parts 25 and 26 to facilitate its attachment to the cam, and these parts are preferably constructed as shown, having meeting flanges 27 which are held together by bolts 28. The roller 23 is journaled in the cam housing and consequently the cam housing will be raised and lowered with the roller. The cam housing has, at its lower end, a yoke 29 through which the piston rod 30 of the plunger 33 is secured, the piston rod being threaded, as shown, and extending through a hole 31 in the bottom of the yoke and it is held in place by nuts 32. This arrangement provides for adjusting the piston rod vertically. The plunger 33 is of the usual type and may be of any approved kind, and it is held to move up and down in the jig between the partition 14 and the opposite outer wall of the jig, as shown in Fig. 1.

On the piston rod is a tray 34, which rests on a shoulder 35 on the rod, and it is held down snug against the shoulder by nuts 36. This tray is sufficiently heavy to cause the

plunger 33 to drop quickly when the roller 23 passes over one of the shoulders 22 of the actuating cam, but if a particularly quick drop is desired, additional weights may be placed in the tray. The top of the jig frame is cushioned, as shown at 37, at a point in the path of the tray 34, so as to prevent excessive shock when the tray strikes the jig frame.

The amount of throw given to the plunger may be regulated by adjusting the cam sections 17, and when the shaft 16 is set in motion, the cam is revolved and at every revolution of the cam the cam housing and plunger are raised and dropped twice. The plunger is dropped very suddenly, and when it moves downward it causes the water to rush up through the sieve 13, thus raising the lighter particles of ore a great deal higher than the heavier particles, in fact so much so that it hardly disturbs the heavier particles before the stroke ceases and the comparatively slow upward movement of the plunger scarcely produces any suction in the ore bed above the sieve, the heavier particles of ore being permitted to drop to or through the sieve of their own specific gravity unaided by suction. The result is a comparatively great capacity for the apparatus, good work, and it requires but little attention. The sieve is also kept perfectly clean by the passage of the water through it in a strong upward current.

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

1. A plunger worker for concentrating jigs, comprising a revoluble cam having abrupt shoulders, the height of which is adjustable, a cam housing supported on the cam and reciprocated thereby, and a plunger connected to the housing by a rod and arranged to reciprocate in the jig, substantially as described.

2. A plunger worker for concentrating jigs, comprising a revoluble cam having abrupt shoulders thereon, the height of which is adjustable, a housing arranged to ride on the cam and reciprocated thereby, a plunger arranged to move in the jig, a piston rod connected to the plunger and cam housing, and a tray secured to the piston rod, substantially as described.

3. In a concentrating jig, the combination with a revoluble cam carried above the jig and provided with abrupt shoulders and oval faces, of a cam housing supported on the cam and reciprocated thereby, a plunger arranged to move in the jig, a piston rod connected to the plunger, a weighted tray secured to the piston rod and arranged above the jig frame, and a cushion secured to the top of the jig frame in the path of the weighted tray, as and for the purpose set forth.

4. A plunger worker for concentrating jigs, comprising a revoluble two-part cam having abrupt shoulders, the height of which is adjustable, a cam housing held to ride on the cam, a weighted piston rod depending from the cam housing, and a plunger secured to the rod, substantially as described.

5. The combination of the driving shaft, the two part cam secured to the shaft, and provided with connecting levers, the cam housing held to run on the cam, the weighted tray, and the plunger carried by the housing, substantially as described.

6. The combination, of the revoluble two-part cam having abrupt shoulders, the separable cam housing incasing the cam, the roller journaled in the cam housing and riding on the cam, a yoke on the lower end of the cam housing, a weighted piston rod suspended from the yoke, and a plunger secured to the piston rod, substantially as described.

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Witnesses:
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