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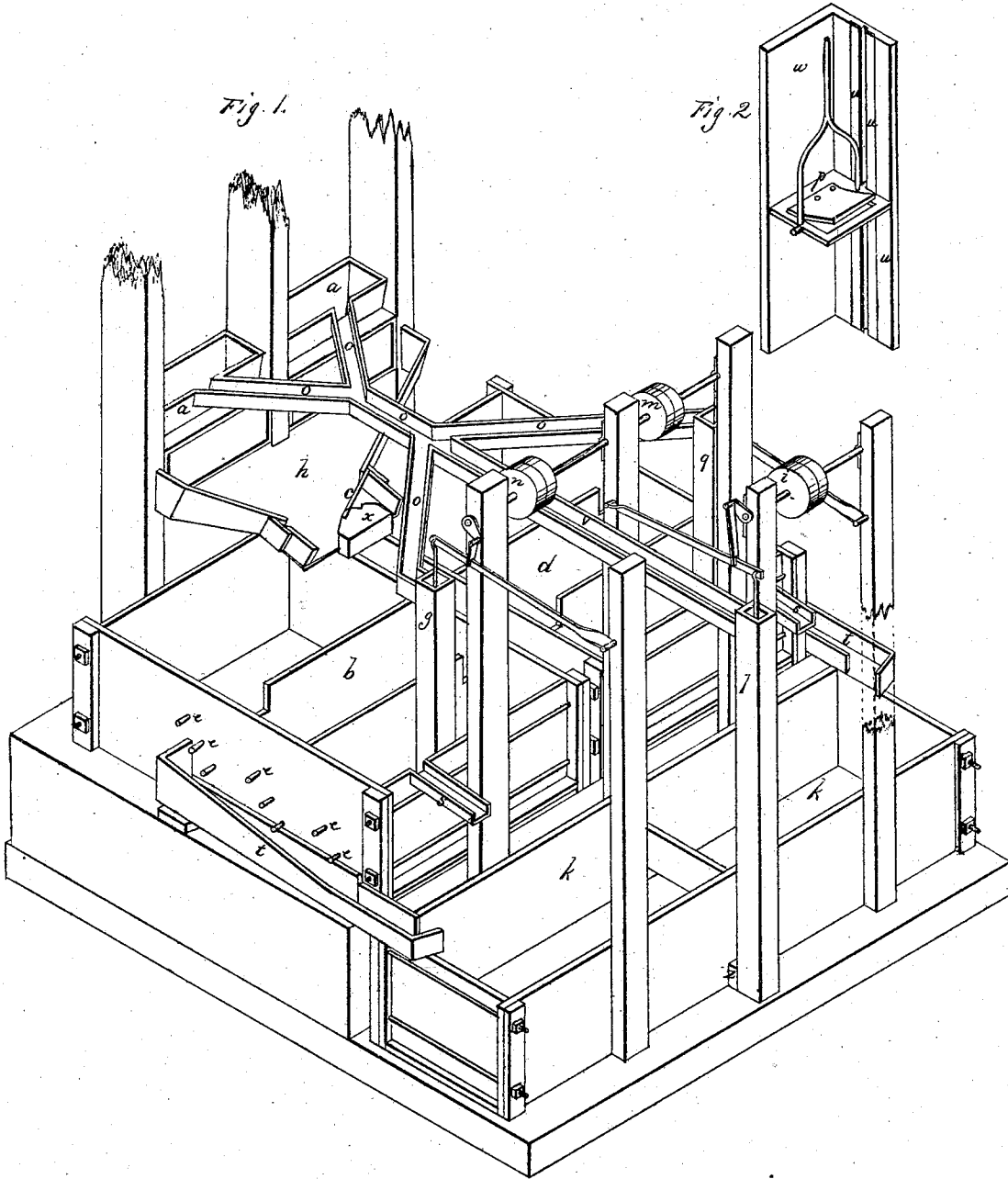
Ore Washer.

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Fig. 1.

Fig. 2.



Witnesses.
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AUGUST F. W. PARTZ, OF OAKLAND, CALIFORNIA.

Letters Patent No. 98,518, dated January 4, 1870.

IMPROVEMENT IN COLLECTING GOLD FROM ORES.

The Schedule referred to in these Letters Patent and making part of the same

To all whom it may concern:

Be it known that I, AUGUST F. W. PARTZ, of Oakland, in the county of Alameda, and State of California, have invented certain new and useful Improvements in Pulverizing and Collecting Ores; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the annexed drawings, forming part of this specification, in which—

Figure 1 is an isometrical projection of the apparatus I employ, and

Figure 2, a like sectional view of the pump I make use of, as part of the said apparatus.

In the mechanical reduction of gold and silver-bearing ores, by stamps, and other machinery, from which the ore, when sufficiently pulverized, is removed by water, great losses are experienced on account of the water carrying off a considerable portion of the ore, when it is finally allowed to escape from the mill, although it may have been conducted through various tanks, sluice-boxes, or other apparatus designed to retain the ore, by settling or other means. The prevention of such losses, in the treatment of ores containing metallic particles of gold and silver, has proven the more difficult, because of the peculiarity possessed by metals, especially by gold, in a finely-divided state, of remaining suspended in water, even longer than clay and silex, the latter being in an equal state of division. The pulverizing of such ores, without the use of water, is, therefore, frequently resorted to, and, in many instances, it has been found the only means of saving the greater portion of the precious metals. But the dry pulverizing of ores, which is commonly done by stamps, is an operation undertaken only through necessity, because the wear and tear caused to the machinery is far greater than in the wet treatment, the motion has to be slower, the loss of ore by dust is considerable, and the inhaling of the fine particles of ore, with which the atmosphere about the mill is constantly charged, has a most injurious effect upon the health of the men in attendance.

The nature of my invention consists in performing the pulverization of ores, by the use of water, in such a manner that the water is not allowed to flow off, but is continually returned, by means of pumps and troughs, to the stamps, or other pulverizing-machinery, while the ore is allowed to settle in tanks, from which it may from time to time be removed, without interruption to the process.

The invention also includes a pump, particularly adapted to the elevation of water in which earthy matter is suspended.

The accompanying drawing, fig. 1, represents, as connected with a stamp-battery, an arrangement of tanks, pumps, troughs, and other appliances, well calculated for accomplishing the object of my invention.

a a are the mortars of a ten-stamp battery.

b and *d* are two tanks, of equal dimensions, each one being divided by vertical partitions, so as to contain several separate compartments. These partitions have, at one of their upper corners, and at opposite ends, a portion cut away, so that water, entering the first compartment, will, at a certain height, flow over into the next, and, in flowing from the first to the last compartment, will move in a serpentine line.

s s are two spouts, intended to lead off any liquid that may enter the tanks *b* and *d*, after they are filled to a proper level.

h is an "apron," across which the pounded ore is carried by the water from the battery to the tanks *b* and *d*.

c is a gate, so adjustable, on either side of the block *x*, that, accordingly as it is placed, the ore and water, coming from the mortars *a a*, may be directed into either one of the tanks *b* and *d*.

g and *q* are pumps, so arranged, in the compartments of the tanks *b* and *d* farthest from the battery, that their suction-valves are about midway between the upper edges and the bottoms of the said tanks.

These pumps are worked separately, by power applied to the pulleys *n* and *m*, near each of which is a "loose" pulley.

The troughs *o o* are intended to convey the water, elevated by the said pumps, to the mortars *a a*.

k is a tank, of about the same capacity as either of the tanks *b* and *d*, and is so placed, in relation to them, that its upper edge is, horizontally, about in line with their bottoms.

e e e are plugs, by the removal of which the liquid in each of the compartments of the tanks *b* and *d* may, to certain levels, be drawn off into the troughs *t t*, which convey the same to the tank *k*.

Outside of this tank, and communicating with its interior, by an orifice near its bottom, and a tube, *z*, is a pump, *l*, which is operated by power applied to the pulley *i*, near which is also a loose pulley.

The water elevated by this pump is discharged into the trough *v*, through which, and the troughs *o o*, it is conducted to the mortars *a a*.

To illustrate the inner construction of the pumps *g*, *q*, and *l*, I have, in fig. 2, shown their main features on a larger scale.

p is a piston, with a valve and lifting-rod attached to it.

To guide the same, and prevent friction with the wooden tube *w*, in which it is designed to move quite freely, the said piston is supplied with two pins, *r r*, which glide in grooves, that are protected against wear by strips of band-iron *u u*.

The operation, by means of the apparatus above described, is as follows:

The tanks *b* and *d* are filled with water. The gate *c* is placed (as shown in the drawing) so that the ore

and water, coming from the stamps, will be directed into the tank *b*. On starting the stamps, the pump *g* is also put in motion to supply the mortars *a* with the necessary water, and to continually replenish the same, as the water thus conveyed flows off through the mortar-screens, carrying the pulverized ore over the "apron" *h*, into the tank *b*. Most of the ore will naturally settle in the first compartment, less in the second, and still less in the third. As the ore accumulates in the tank, the surplus water flows through the spout *s* into the tank *k*. The operation having thus been carried on for a practicable length of time, that is to say, until the first compartment is about half filled with ore, or, as the case may be, the water in the third compartment becomes too muddy, the gate *c* is changed, so as to let the water, with the ore, flow into the tank *d*; the pump *g* is put in motion, and the pump *g* is stopped by slipping the belt from the pulley *n* upon the "loose" pulley alongside of it. While the ore is now collecting in the tank *d*, the mass contained in the tank *b* is left undisturbed, until the ore remaining suspended in the water has settled. By removing some or all of the plugs *e e e*, the water is then drawn off into the tank *k*, whereupon the plugs are replaced, and the ore is taken out. When it becomes necessary, on account of the accumulation of ore, or the muddy state of the water in the tank *d*, to discontinue the discharge into the same, the gate *c* is again changed, so as to allow the water, with the ore, to flow into the tank *b*; the pump *l* is put in motion to supply the mortars *a* with water, and the pump *g* is stopped. As soon as all the water has been returned from the tank *k* to the tank *b*, the pump *l* is stopped, and the pump *g* again set to work. Meanwhile, time is given to the ore in the tank *d* to settle, whereupon the water is drawn off into the tank *k*, the ore is removed, and the process repeated, in the same manner as already described with reference to the tank *b*.

It will require no further explanation to show how, by means of the consecutive changes and manipulations above set forth, the pulverizing and collecting of ores may be continued without interruption.

In place of the water taken with the settled ore from the tanks *b* and *d*, a corresponding amount of fresh water must be supplied. If the ore passes into amal-

gamating-pans, tubs, or barrels, the water necessary for thinning the ore-pulp should always be taken from the tanks *b* and *d*, and be replaced by fresh water.

It will be best to have the tanks *b* and *d* of such size, (that of the tank *k* to be corresponding,) that each of them will hold all the ore of a twelve-hours' run, together with the necessary water, in order that there may be sufficient time for the settling and removing of the ore.

Under circumstances, it may be expedient to have one or more reserve tanks or cisterns, into which the water, in case it becomes slimy with earthy matter, may from time to time be led, and in which it can remain until the fine particles of ore suspended therein have subsided.

Instead of being connected with a stamp-battery, the same apparatus may, in like manner, be applied to any other ore-pulverizing machinery which is operated with flowing water.

Instead of the two pumps *g* and *g*, only one pump may be used, the same being so arranged between the tanks *b* and *d*, that by a suitable adjustment of valves, it can be made to draw water from either one of the said tanks.

Instead of the kind of pumps herein described, chain-pumps, or any other suitable contrivance for raising water containing earthy matter, may be employed. For the troughs *o o* and *v*, pipes may be substituted, and it will be apparent that various other alterations may be made, by which essentially the same effect is produced. I, therefore, do not confine myself to the exact shape and construction of the apparatus herein described.

What I claim as my invention, and desire to secure by Letters Patent, is—

The use, in connection with stamp-batteries and other ore-pulverizing machinery, of the tanks *b*, *d*, and *k*, together with the pumps *g*, *g*, and *l*, and the troughs *o* and *v*, or their respective equivalents, substantially as and for the purpose herein specified.

AUGUST F. W. PARTZ. [L. s.]

Witnesses:

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