S. PORTER.

WASHING ORES, &c.

No. 8,582. Patented Dec. 9, 1851.

Fig. 5

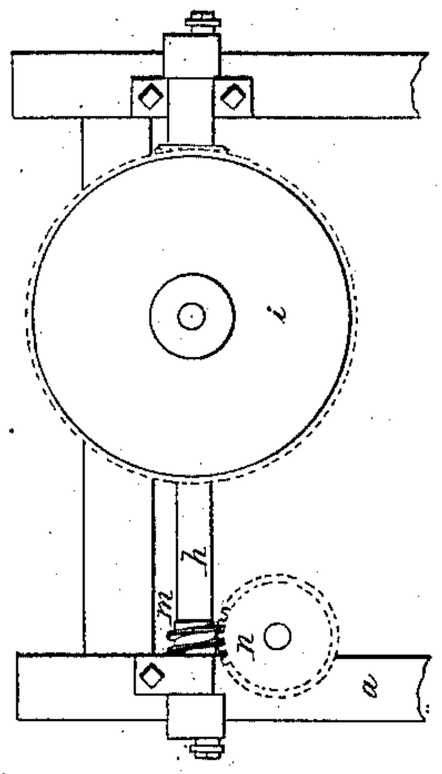


Fig. 4, C.c

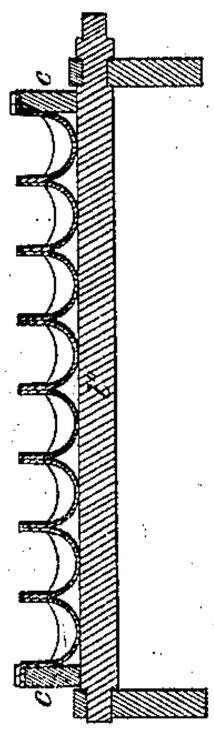


Fig. 3. B. b.

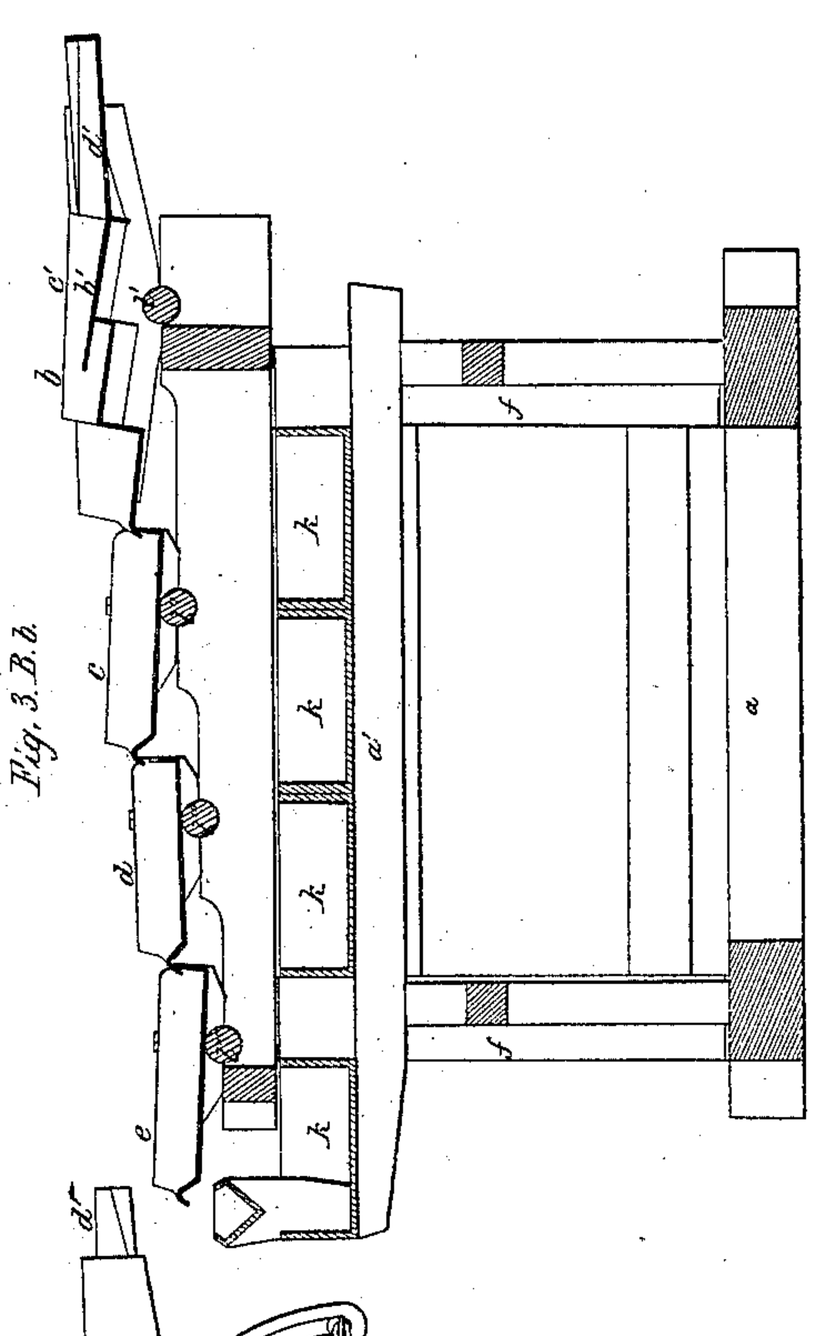


Fig. 1

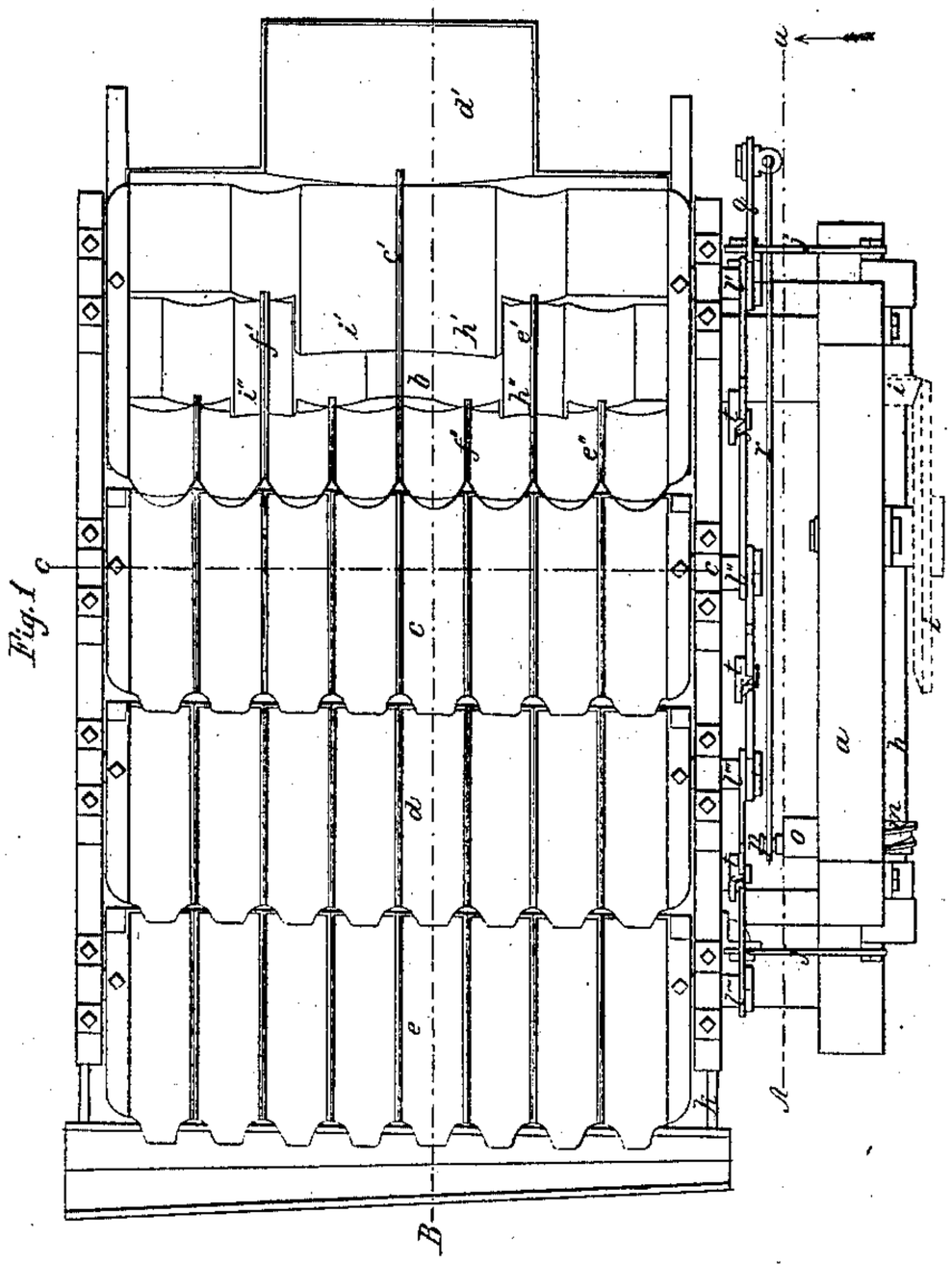
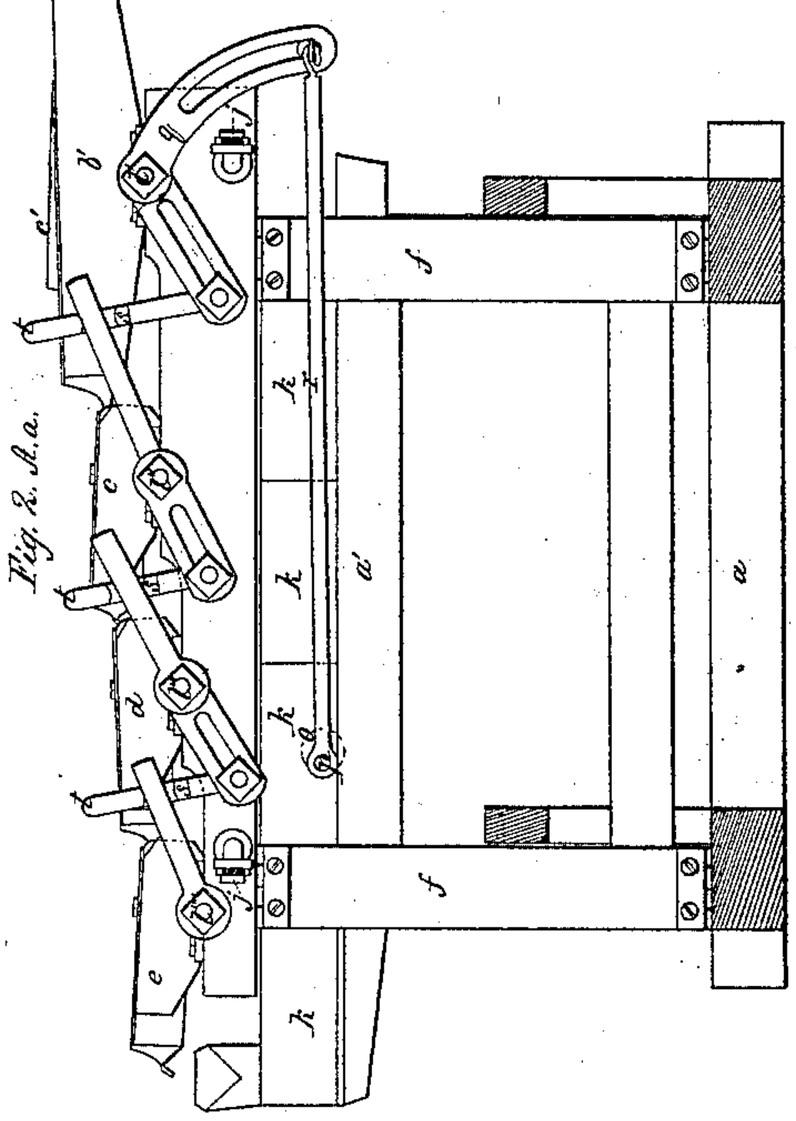


Fig. 2. A. a.



UNITED STATES PATENT OFFICE.

SAML. PORTER, OF HARTFORD, CONNECTICUT.

ARRANGEMENT OF PANS FOR WASHING ORES, MINERALS, &c.

Specification of Letters Patent No. 8,582, dated December 9, 1851.

To all whom it may concern:

Be it known that I, SAMUEL PORTER, of Hartford, in the State of Connecticut, have made certain new and useful Improvements in Machinery for Washing and Separating Metals, Ores, and other Substances from Foreign Matters, and that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1, is a plan of the machine; Figs. 2 and 3, longitudinal vertical sections taken at the lines A, *a* and B *b*, of Fig. 1; Fig. 4, a cross vertical section taken at the line C *c*, of Fig. 1; and Fig. 5, a side elevation of the gearing.

The same letters indicate like parts in all figures.

The object of my invention is to separate metals, ores or other substances, from foreign matters with which they are mixed, such substances being of greater specific gravity than the foreign matters from which they are to be separated.

The nature of my invention consists in arranging and operating a series of two or more pans or sets of pans, hung in a vibrating frame, said pans, or sets of pans, having severally an oscillating or rocking motion on the frame, distinct from the vibrating motion of the frame, in such a manner that when a portion of the contents, which consist of water and the substances operated on, passes freely from any one pan or set of pans, of the series into the next, the contents shall at the same time pass less freely or not at all, out of the said next pan, or set of pans, and vice versa. As they pass less freely or not at all out any one pan, or set, they shall then pass more freely out of the next pan, or set, of the series—the same being accomplished, by making the said oscillating or rocking motion in each of two adjoining pans, or set of pans, of the series, the reverse of what it is in the other.

My invention consists also in arranging on a vibrating frame a series of separate pans, or sets of pans, through which the contents (except that portion designedly retained in the pans) shall pass in succession from one to the other, each pan, or set of pans separately suspended in the frame, and secured in such a manner that it may at any time be conveniently tilted, so as to discharge the whole contents, and deposit the same in a separate trough or receptacle for each pan, or set of pans. This arrangement is to be particularly serviceable when the substance to be saved is of considerable bulk; for as the valuable substance accumulates in the upper or first pan, or set of pans, of the series, free as much as may be from the refuse matter, the pans, or set of pans, below, will contain a portion of the same less concentrated—that is, mixed with a larger proportion of refuse matter—and in each pan, or set, less concentrated, than in the preceding pan, or set, of the series. By the arrangement described the contents of the several pans, or sets of pans, will be separated for the purpose of re-washing the less concentrated portions of the same.

My invention consists also in arranging groups of pans succeeding one another by constant duplication in such a manner, that the contents shall pass by an equal division from one pan, or one section of a pan, into two other pans or sections of a pan, and from each of these two, shall pass in like manner into two others—making a group of four—and from each of these four into two—making another group of eight—and so on to any desired extent, the number of pans in each successive group being constantly doubled. This subdivision renders practicable the employment to advantage of small and shallow pans, with a gentle agitation, and the saving thereby of the minuter particles of metal or ore, even when not of very great specific gravity.

In the accompanying drawings, *a*, represents a frame properly adapted to receive the working parts—the sets of pans *b*, *c*, *d*, *e*, are arranged in a series on a frame which being mounted on the hinged supports *f*, readily admits of the requisite vibration. At the side of this vibrating frame and in the main frame *a*, of the machine, is placed the main horizontal shaft *h*, from which, by means of the cog-gearing *i*, and connecting rods *j*, the vibrating motion is given to the frame *f*. Under the delivery ends of the sets of pans *b*, *c*, *d*, *e*, and supported on the secondary frame *a'* is arranged a series of troughs k, to be hereafter described.

Besides the vibrating motion of the frame *f*, in which they are hung, the several sets of pans composing the series, have also a slight oscillating or rocking motion on their shafts *l'*, *l''*, *l'''*, *l''''*, which motion is slow, while the vibrating motion is rapid. This motion

is given to the first set b of the series in the folowing manner. On the main shaft h, is a worm m, which works into the cog wheel n, on one end of the short shaft o, which has at the other end a crank arm p, which is connected with one of the adjustable arms q, on the end of the shaft l', of the first set of pans b, by means of the connecting rod r. From this set of pans the motion is conveyed through the series by means of the arms t, on the ends of the shafts of the several sets of pans, together with the catches s, connecting the same; the arrangement of the arms and catches being such, that in any two adjoining sets of pans the said oscillating motion of each shall be the reverse of the other; the forward end of one rising and again falling with the rear end of the other—so that as the contents pass freely out of one set of pans into another, they will at the same time pass out of the latter less freely or not at all and vice versa.

The first set of pans b, is constructed so as to subdivide the water and the substances operated on. It consists of a head or feeding pan d', and three successive groups of pans. The first group embrace two pans, separated by a partition c', which divides the water and other matters as they pass from the head pan into the two pans of the first group. Each of these two pans has two compartments viz: a central compartment, from which the contents pass on into the pans of the second group and which is located midway between the partition c', and the outside of the whole set of pans; and another compartment h', in one of the pans, and i', in the other—in the space between the partition c', and the central compartment. The compartments h' and i', project over the backs of the pans of the next group. The form and arrangement of these compartments are such, that when by the slow rocking motion already described, the forward ends of the pans are slightly depressed, or the rear ends raised, the current will shoot with more or less force along and near the partition c', toward the forward ends of the compartments h', and i', but the forward ends ar not to be so far depressed as that the contents of these compartments shall escape in that direction, but the currents shall sweep around to the right and left, and when again by the slow rocking motion, the forward ends of the pans are raised, the contents will pass over freely by the rear corner of this compartment into the adjoining central compartment of the pan. In case any portion of the substances operated on, should consist of coarse particles, these will not pass forward in the current with the finer particles, but will work directly across from the entering to the issuing place of the current, to an obvious advantage. It will be observed that the arrangement of these compartments is such, that as the contents pass freely out of the side compartment into the central, they at the same time pass out of the latter less freely or not at all, and vice versa, in like manner as in the pans or separate shafts and having alternately reverse motions as already described. In case of such a distance between the partition c', and the central compartment, as to require it, the space may be occupied by two or more intervening compartments instead of one.

The second group embraces four pans, constructed like the two pans of the first group, having the partitions e', and f', corresponding to the partition c', having compartments h'', and i'', corresponding to h', and i', and having also corresponding central compartments. The third group embraces eight pans, having partitions as in the first and second group, but each pan consisting of only a single compartment.

The remaining sets of pans do not differ from each other in their construction. Each set contains a number of pans, equal to the number in the last group of the first set, and the back of each pan is cut down so as to give room for the forward ends of the pans of the preceding set.

The troughs k, are designed to receive the contents of the sets of pans severally, whenever it is desired thus to deposit the same. The several sets of pans may readily be disconnected for this purpose by means of the catches on the arms of the shafts. The special purpose to be served by this arrangement, in the case of bulky ores, has already been stated.

In the washing of auriferous sands quicksilver may be advantageously employed in the pans.

It is obvious that the essential features of my machine may be employed with various modifications. A pair of pans, or compartments, like the side and central compartments in the pans of the first and second groups of the first set b, may be followed by another pair of the same sort, without subdivision, or the subdivision having been already carried to the desired extent, and this second pair may be followed by a third, and so on as far as required, and such an arrangement may be substituted for alternate pans having reverse rocking motions on separate axles; or pans one above the other with ends reversed and on a common axle, might be substituted in like manner. Again—the slow rocking motion might be sidewise, the vibrating motion being also sidewise, and yet, with a suitable shape of pan, the effect, as respects the alternate transmission and non-transmission of the contents, be substantially the same as it is with the two motions in two different directions; or again—both motions might be

endwise with the same effect. Neither do I desire to limit myself as to the number of pans in a successive series, or the number of pans in a single set, or to confine myself to any particular devices for producing the vibrating motion of the frame, or the rocking motion on the frame or for connecting and dis-connecting the pans. What I desire is to employ the essential principles of my machine under such circumstantial modifications as may in any case be expedient. I do not claim the device of arranging a movable pan in a vibrating frame, and of operating the same so as to give a double motion to the pan,—since Letters Patent for this invention have been granted to Arnold Buffum and Philip Thorp.

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

1. The arranging and operating of a series of ore-washing pans, or sets of pans, in a vibrating frame, said pans, or sets of pans, having also an oscillating or rocking motion in the frame, in such a manner, that as the superficial portion of the contents passes freely from any one pan, or set, of the series into the next, the contents shall at the same time pass out of the latter less freely or not at all, and vice versa, substantially as already described.

2. I claim also the arranging in a vibrating frame, of a series of pans, or sets of pans, one after the other, each pan, or set, being hung upon the frame by a separate axle or equivalent attachment, and secured in its working position by a catch, or other equivalent means, in such a manner, that each pan, or set, may be conveniently disconnected and tilted, so as to discharge its whole contents into a receptacle separate from those of the other pans.

3. I claim also the arranging of a succession of groups of pans by a constant duplication, for the sub-division of the contents in such a manner, that the contents issuing from each pan of any one group, the last excepted, shall pass by an equal division into two pans of the next succeeding group, substantially as described.

SAMUEL PORTER.

Witnesses:
COLLINS STONE,
HENRY B. CAMP.