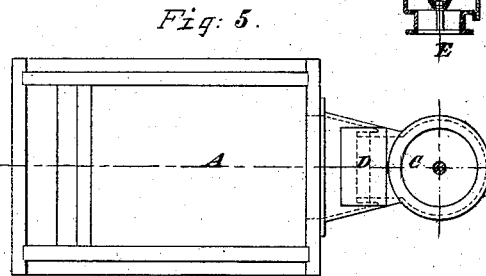
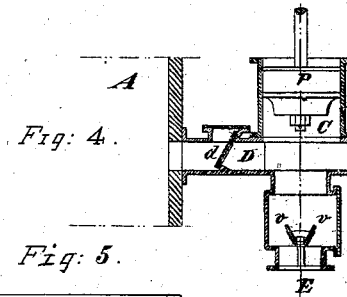
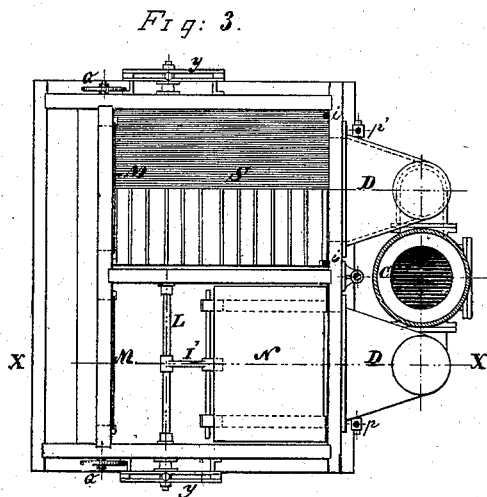
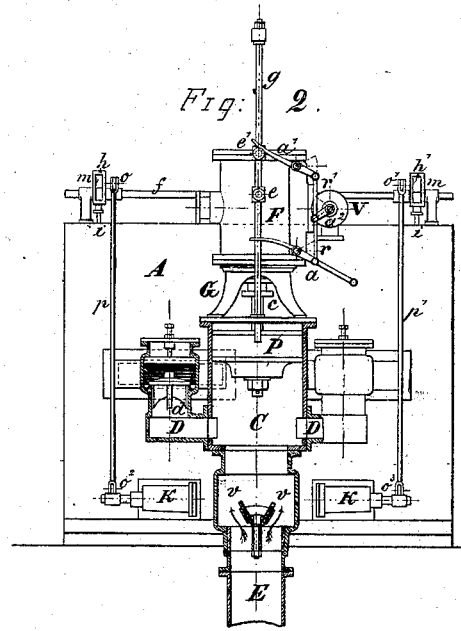
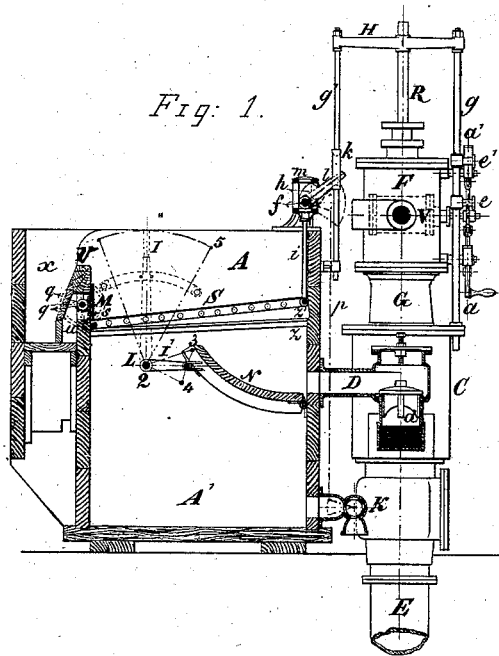


S. STUTZ.
ORE-JIGGERS.

No. 194,060.

Patented Aug. 14, 1877.



WITNESSES:
J. S. Hatfield
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INVENTOR:
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UNITED STATES PATENT OFFICE.

SEBASTIAN STUTZ, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN ORE-JIGGERS.

Specification forming part of Letters Patent No. 194,060, dated August 14, 1877; application filed September 21, 1876.

To all whom it may concern:

Be it known that I, SEBASTIAN STUTZ, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented new and useful Improvements in Ore Washing and Separating Machinery; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a vertical section taken at *x x* of Fig. 3. Fig. 2 represents a back view, with a part of the pump in section. Fig. 3 represents a top view, with a horizontal section through the pump. Figs. 4 and 5 refer to a separator with a single sieve only, the former being a vertical section through the pump and box, and the latter a top view.

The general combination and arrangement of the machinery differs from the one shown in the application filed by me on the 11th day of April, 1876, in the Patent Office, in the following particulars:

First, the plunger-box, with the mechanism imparting action to the water, is taken away, and a direct-acting steam-pump of a particular construction is adapted to the separator-box.

Second, a vertical reciprocating movement is automatically imparted to the rear end of the sieves receiving the layer of material to be separated, whereas these sieves in the above application have a fixed position.

Third, the rotary valve, by which the outlet of stones, &c., was effected, has been replaced by a slide-valve, moved by means of pinions and racks.

Fourth, the curved partition or pallet directing the water against the sieve, which has a fixed position in my application of April 11, 1876, is, in this, made movable.

Fifth, the outlet of the mud from the bottom of the washing-box is effected automatically.

The above-mentioned direct-acting steam-pump is fixed to one of the sides of the separator-box A. The pump-cylinder C may be provided with either one or two discharging-openings, D, according to the number of sieves of the separator. E is the suction-pipe, and P the piston of the pump. The latter, as rep-

resented in the drawing, is at the upper end of its stroke, and the valves *v v* of the suction-pipe are opened to allow the inlet of the water while the discharging-valves *d d* are closed.

Both sets of valves can at any time be easily examined and removed, if necessary.

A center piece, G, partly open at the front and back, to allow the necessary packing of the stuffing-box *c* and the water-cylinder piston, separates the water-cylinder C from the steam-cylinder F. By means of the piston-rod R, common to both, the movement is transmitted from the steam-cylinder to the pump.

The inlet and outlet of the steam into the cylinder is regulated through a cylindrical valve, V, by means of the levers *a a' a''* and the rods *r r'*.

Instead of the rotary valve, any other kind of valve may be used.

At the upper end of the piston-rod R is fixed a cross-head, H, which holds on its extremities the rods *g g'*. To the former, or *g*, two drivers, *e e'*, are secured, by which the levers *a a'* are alternately pushed up or down, in order to let the steam below or above the piston.

The reciprocating vertical movement of the rear of the sieve S is obtained by the rod *g'*, fixed to the other end of the cross-piece H, and acting through the shaft *f*, the lever *l* fixed thereon, the cams *h h'*, also fixed on the shaft *f*, and the rods *i i*, by which the sieve is suspended. The rod *g'* is provided with a slot, *k*, in which the lever *l* is engaged. Each upward movement of the piston, and, consequently, of the rod *g'*, raises also the lever *l*, as shown in Fig. 1, the result of this being that the shaft *f* is rocked to the same angle as the lever *l*, and with it the cams *h h'*. The latter are engaged into the guide-pieces *m m*, fixed at the end of the rods *i i*, so that, by moving the lever *l* upward, the rear of the sieve S will also be lifted up to the desired height—say from *z* to *z'*. The front end of the sieve S is pivoted, and the dropping down of the rear is effected by the weight of the material to be separated, and by the slot *k* in the return stroke.

Two other levers, *o o'*, are fixed upon the

shaft *f*, corresponding to similar levers $o^2 o^3$, keyed to the blocks of the stop-cocks K K. Both pairs of levers, $o^2 o^3$ and $o^1 o^3$, are connected by means of the rods *p p'*. Thus, it will be seen that, through the rotary movement of the shaft *f*, the outlet of the mud from the lower part A' of the separator-box is effected automatically, and in a most satisfactory way.

The curved partition or pallet N is suspended on hinges at its lower end, near the inlet of the clean water, and can be placed in different positions. By moving back the lever I, which is fixed to the end of the shaft L, into the position 1 2, the little lever I', fixed upon the same shaft L, will take the position 2 3, which brings the edge of the pallet N closer to the sieve S. The current of the water is thus directed below the back end of the sieve, and will forward the material more rapidly. The positions 2 5 and 2 4 of the levers I and I' bring the edge of the pallet farther from the sieve S, and allow the water-current to act at the front and near the outlet of the stones. These changes of action are very important for cleaning out the sieve.

The sliding gate M, by which the stones, &c., are allowed to escape, is moved up and down by means of the hand-wheel Q, the pinions *q q* on the shaft of these hand-wheels, and the corresponding racks *s s* on the gate. The material to be separated, being brought upon the sieve S at the back end, is moved forward by the action of the water to the front, and the lighter parts are drawn over the edge U into the channel *x*, where they can slide down on an inclined plane to the buckets, while the heavier material is let, from time to time, into the channel *u*, from which it passes down to the outside by another inclined plane.

To obtain a complete separation of the material the up-and-down movements of the pump have to be of different speed. This I obtain by allowing only a small quantity of steam to go below the piston, so that the suction of the water is going on slowly. The downward movement of the piston is carried out with a sharp percussive-action upon the body of water. In view of this the piston P is constructed very heavy, and the opening for the inlet of steam above the piston is so arranged that the pressure of the steam will act suddenly.

In regard to the utility of the invention I have to state that, by the arrangement of the

steam-pump in direct connection with the washing-box, the box of the plungers, with its mechanism, will be economical in operation, and thus a great saving of expense effected. The lifting up of the sieve at the rear end, and the changes of the current of the water, will separate a much greater quantity of material than has heretofore been done. The automatic cleaning out of the separator-box is also a saving of considerable time and money.

I claim as my invention—

1. In a machine for separating or washing coal, the combination, with the separator-box and one or more sieves, of a water-cylinder, C, and a steam-pump mounted thereon, substantially as described.

2. In a machine for separating and washing coal and other substances, the combination of a steam-pump, having a slow upward and sudden downward movement of the piston, with the valved connecting water-passages and the separator box or boxes, provided with one or more sieves, substantially as described.

3. In a coal-washing machine, the combination of the separator-box, the piston by which the water is driven, the passages leading from the piston-chamber to the box beneath the sieve, and a sieve hinged at one end and made to vibrate, as set forth.

4. In combination with the vibrating sieve, the rods *i i*, guides *m m*, cams *h h* on shaft *f*, rocked by arm *l* and rod *g*, as set forth.

5. In combination with the sieve S, and arranged in proper relation thereto and to the passage D, the movable pallet N, as set forth.

6. The pallet N, hinged near the passage D, in combination with the shaft L and levers connected therewith, whereby the position of said pallet may be changed, as set forth.

7. The automatically-moved cock K, in combination with the rod *p* and shaft *f*, as set forth.

8. The described separator, consisting of the two chambers or boxes, the vibrating sieves, the adjustable pallets, the steam-pump, with cylindrical valves, the water-supply pipe, and the induction-passages D D, the several parts being relatively arranged substantially as and for the purpose specified.

SEBASTIAN STUTZ.

Witnesses:

J. K. HATFIELD,
J. W. THORNE.