(No Model.)

H. KENTON.

MAGNETIC GOLD SEPARATOR.

No. 266,841. Patented Oct. 31, 1882.

Fig. 1.

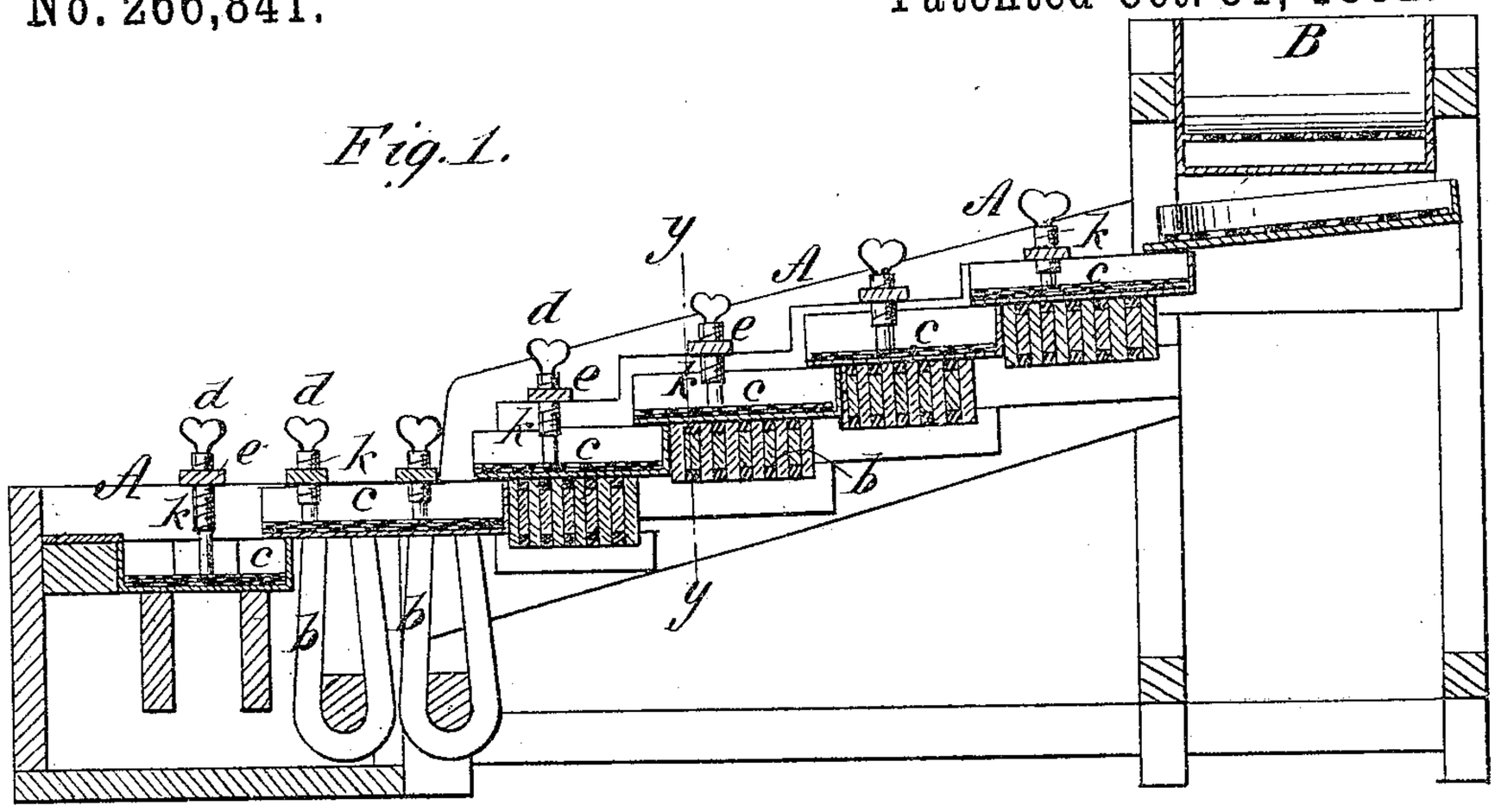


Fig. 2.

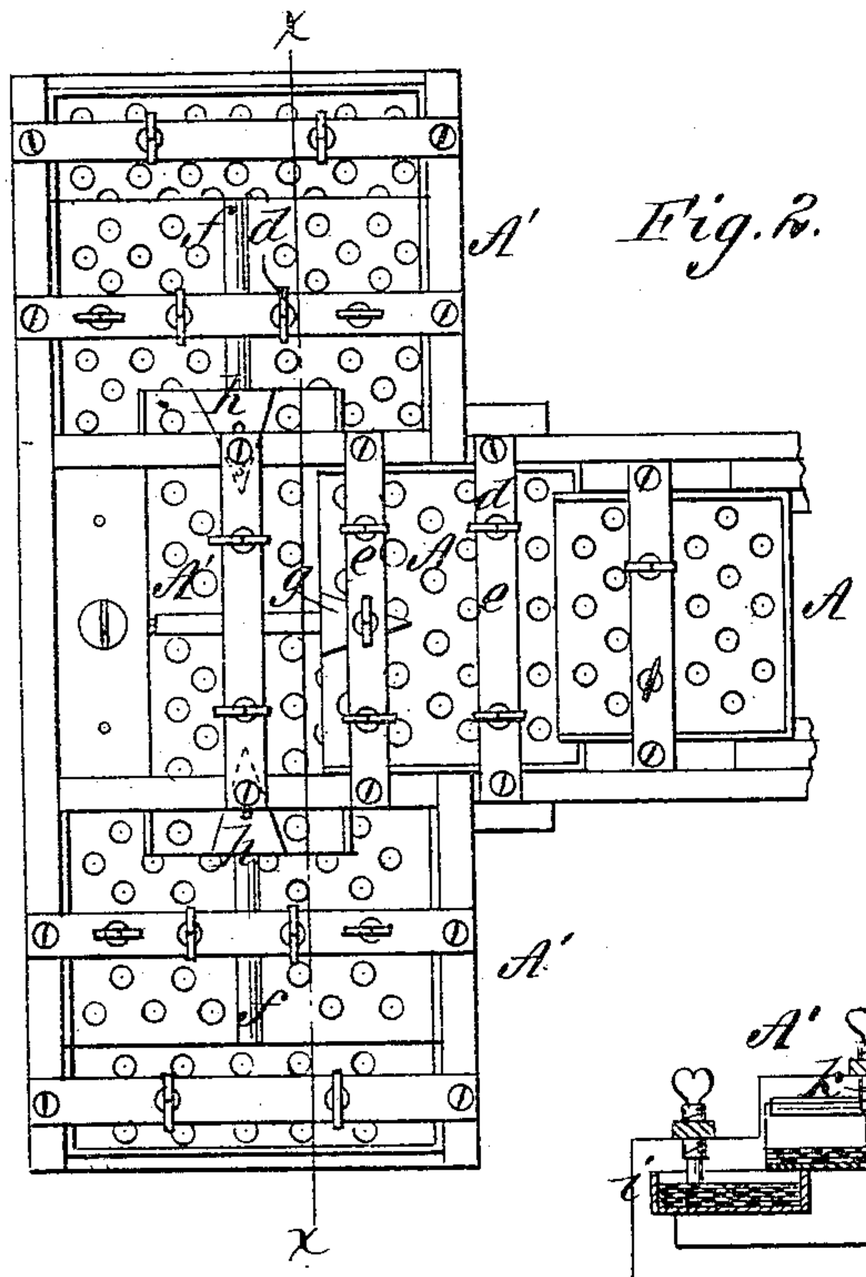


Fig. 4.

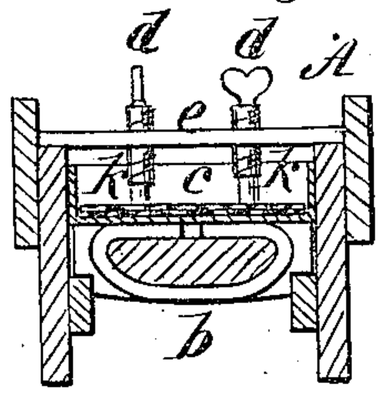
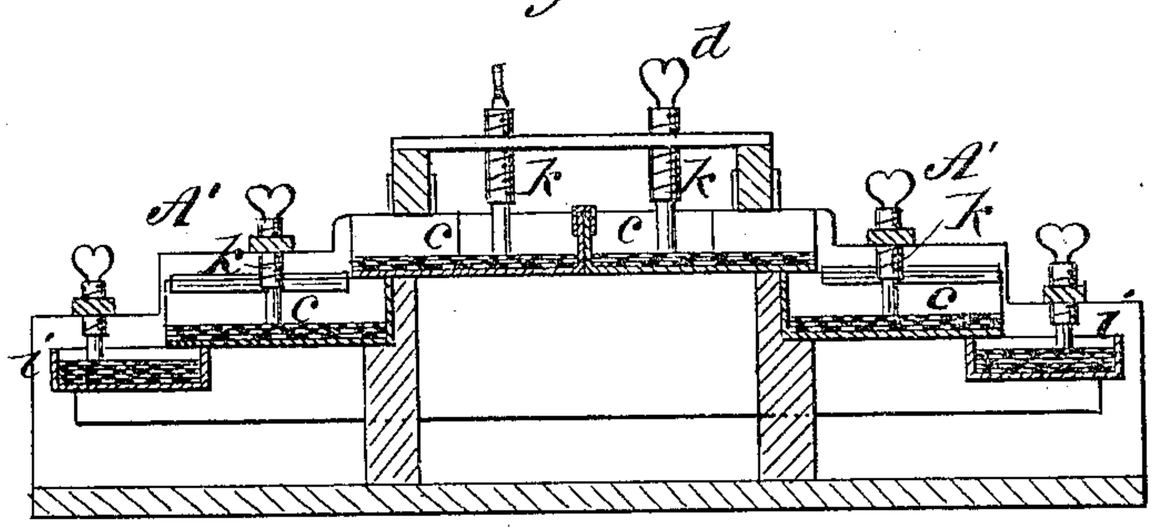


Fig. 3.



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HIRAM KENTON, OF ALBANY, OREGON, ASSIGNOR TO HIMSELF AND SAMUEL H. ALTHOUSE, OF SAME PLACE.

MAGNETIC GOLD-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 266,841, dated October 31, 1882.

Application filed June 24, 1882. (No model.)

To all whom it may concern:

Be it known that I, HIRAM KENTON, of Albany, in the county of Linn and State of Oregon, have invented a new and Improved Magnetic Gold-Separator, of which the following is a full, clear, and exact description.

My improvements relate to apparatus for separating fine gold and other metals from magnetic sand and other gold-bearing sands and gravel in hydraulic mining, and also for the working of the tailings from quartz-mills for saving the gold carried off in the sluiceways.

My invention consists in the peculiar construction and arrangement of the parts of an apparatus wherein magnetic power is employed, as hereinafter more fully set forth, and pointed out in the claims.

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

Figure 1 is a vertical longitudinal section of my improved apparatus. Fig. 2 is a partial plan view of the same. Fig. 3 is a vertical transverse section on the line *x x* of Fig. 2. Fig. 4 is a cross-section on line *y y* of Fig. 1, showing the construction of the sluice-boxes and a modification in the form of magnets.

A A are the pans or boxes of the main sluice, which are arranged in a suitable supporting-frame to form a continuous sluiceway from the elevated screen-box B. Any suitable number of boxes or pans A may be used, and they are fixed in order, one below the other, so as to receive the material in succession. The pans are constructed of copper, and beneath each of the pans are fitted a suitable number of permanent magnets, *b*, which are boxed in wood and placed with their poles in contact with the bottoms of the pans. These magnets may be of the ordinary horseshoe form, as shown in Fig. 1, or of the form shown in Fig. 4; or, if desired, they may be electro-magnets and connected with a battery. In the pans or boxes A are placed any suitable number of perforated sheets, *c*, of copper, which are galvanized or otherwise coated with quicksilver, and held down firmly to their place by means of copper set-screws *d*, that pass through bars *e*, fitted across the boxes. The perforations in these plates form cavities, which are to be partially filled with quicksilver, for the purpose of retaining small particles of amalgam or quicksilver which may break loose from the upper box, so as to prevent such particles from being carried away by the action of the water. At the end of the sluiceway formed by the boxes A, I provide for increasing the surface by the addition of other boxes, A′, which are placed to extend at right angles and in both directions from the lower box, A, and these boxes A′ are preferably made in double form, divided by a partition-plate, *f*, so as to still further increase the extent of surface. In the lower box, A, of the main sluiceway is a dividing-plate, *g*, for directing the sand and water in both directions, and in the box A′ are similar dividing-plates, *h h*, which carry the material to the opposite sides of the partition-plates *f*.

In the operation of the apparatus the sand and water are led to the screen-box B, and the coarser materials—such as gravel, sticks, and roots—are held back by the screen and thrown off at one side, while the sand and water and finer materials pass through the screen and into the head of the sluiceway. As the sand and water pass through the boxes the action of the magnets *b* is to throw the sand into an open or porous condition, so that the water may act freely, and the sand being carried through the sluice rapidly and in this open separated condition, the gold rapidly finds its way to the quicksilver in the bottoms of the boxes. A similar action takes place throughout the whole length of the sluiceway, and the large extent of surface insures the thorough separation of all the fine particles of gold. This surface is to be increased according to the grade or quality of the sand that is being worked. As the sand leaves the ends of the sluiceway it passes over the quicksilver-boxes *i i*, which serve to retain any particles of amalgam that may have been brought down from above.

In operating upon sands taken from sea-beaches it is essential that the copper plates be protected from the action of the sea-water, which otherwise would rapidly destroy them.

This corrosive action is due to the presence of chloride of sodium, which has a strong affinity for copper and attacks it with great violence, forming a chloride of copper, which is at once dissolved by the water, and the plates are thus rapidly wasted, while the chloride is continually collecting and forming a scum or coating on the surface of the quicksilver that prevents amalgamation of the gold. To remedy this difficulty, I provide the clamping-screws *d* with coverings *k*, of zinc, that extend to near the lower end of the screws, but not low enough to come in contact with the quicksilver. All the screws *d* may be so fitted, or a certain number placed at suitable intervals along the sluice.

In order to understand the principle which I here utilize, the following explanation may be necessary. It is well known that if zinc be placed in dilute sulphuric acid it will decompose the water with great rapidity, and the consequent oxidation of the zinc will rapidly destroy it. If, however, the zinc be made electrically negative by the connection to the negative pole of a battery, and a piece of platinum or other electrically-positive metal be attached to the positive pole and placed in the liquid, the water will not be decomposed and the zinc will suffer no oxidation, for the reason that the acid is repelled by the negative zinc. In like manner copper will rapidly decompose hydrochloric acid, forming chloride of copper, and finally be itself wholly dissolved; but if the copper be rendered negatively electrical it will remain unaffected by the acid, for the reason that chlorine is negatively electric, and is repelled from a body charged with negative electricity. In this way it is possible to protect metals by means of galvanic arrangement from the influence of the most corrosive liquid, and it is this principle that I utilize for the protection of the copper plates in the sluice-boxes. The zincs upon the screws are electrically positive, and, attracting the chlorine, generate an electrical current, while the copper becomes the conducting-plate. The copper is thus made electro-negative, and will tend as strongly to repel the chlorine as the zinc does to attract it. By this arrangement the plates are protected and kept free from corrosion.

The apparatus is especially applicable for the separation of fine gold and other metals from black magnetic sands, which, being very fine and heavy, become compacted on the bottoms of ordinary sluice-boxes, so that the riffles become useless for the separation of the gold and other metals. It is also applicable, as before stated, for the separation of gold from any auriferous sands or gold-bearing material in a pulverized condition.

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

1. The apparatus for separating gold, consisting of the sluice pans or boxes A A′, arranged in step-like order and fitted with the perforated copper plates *c*, substantially as shown and described.

2. The set-screws *d*, in combination with the perforated plates *c* and sluice-boxes A, substantially as and for the purposes set forth.

3. In apparatus for separating gold, the zincs K, combined with the copper screws *d* and plates *c*, substantially as and for the purposes set forth.

4. In an apparatus for separating gold, the combination of the sluice-box A A′, arranged in step-like order and fitted with the perforated plates *c* and magnets *b*, substantially as described, and for the purpose set forth.

HIRAM KENTON.

Witnesses:
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