H. P. RUSS.

Spiral Amalgamator and Separator.

No. 20,666. Patented June 22, 1858.

Fig: 3.

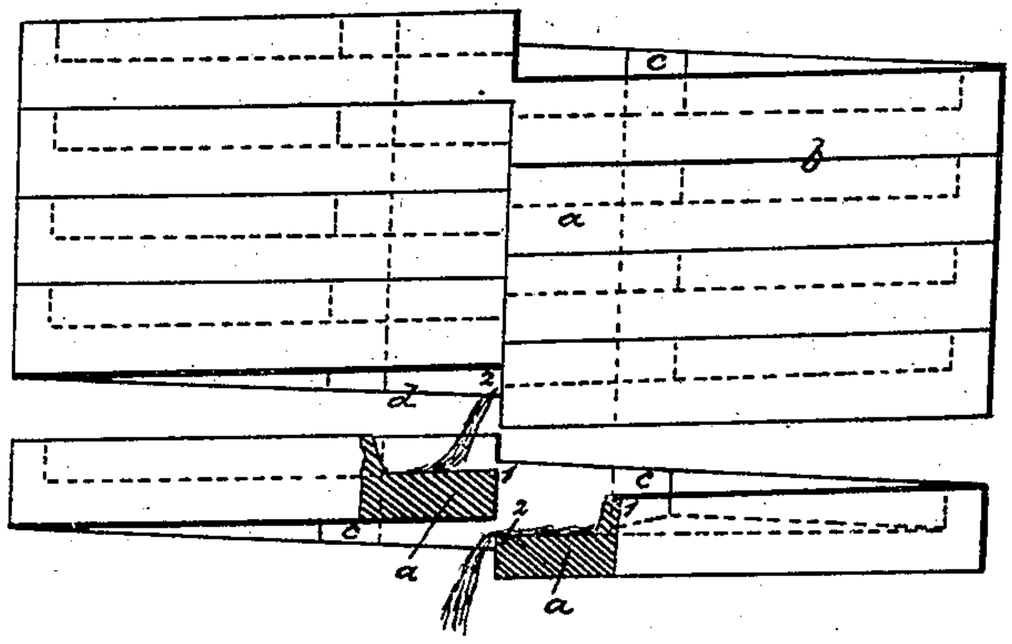


Fig: 2.

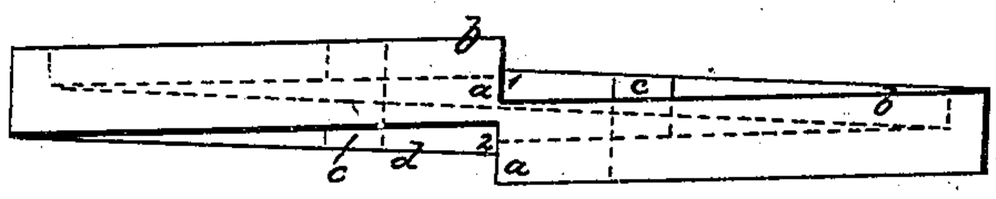
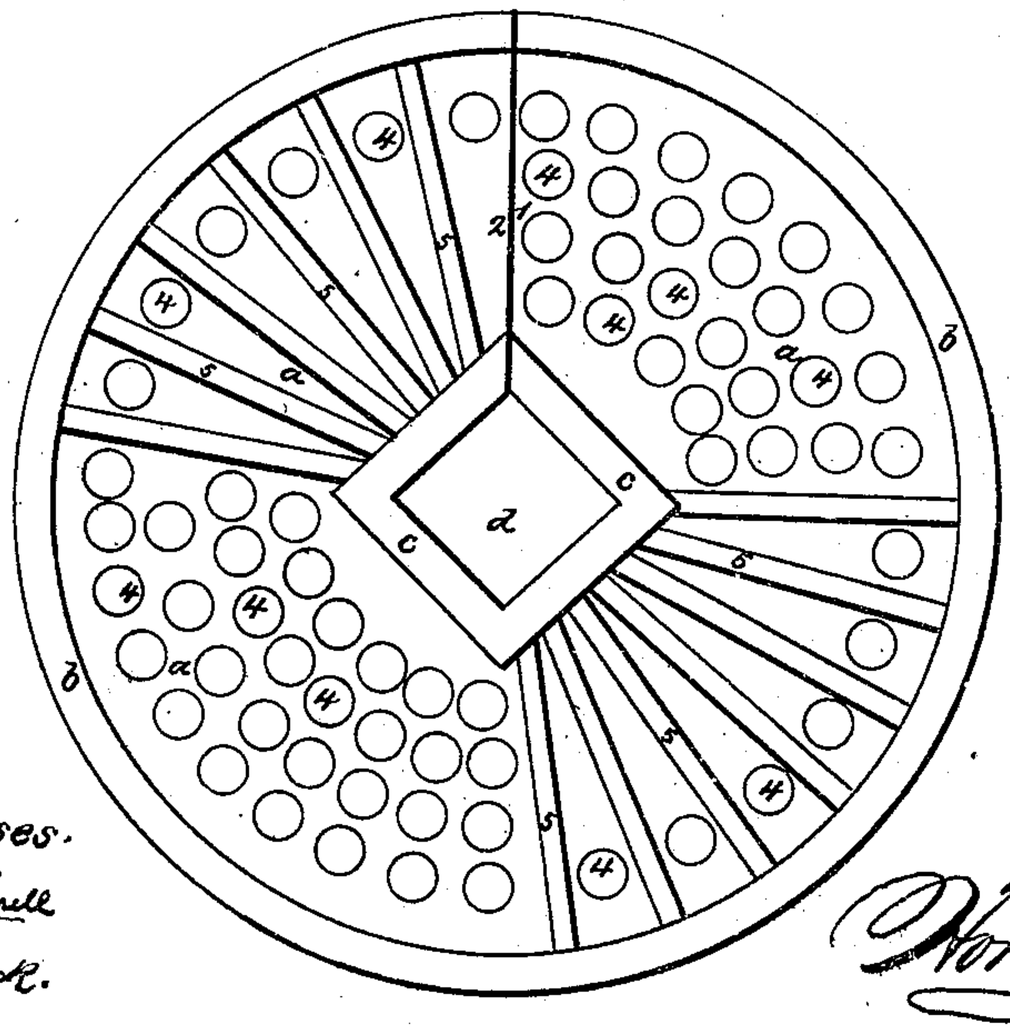


Fig: 1.



Witnesses.
Lemuel W. Serrell
James V. Dick.

Inventor.
Horace P. Russ

UNITED STATES PATENT OFFICE.

H. P. RUSS, OF RUSSVILLE, CALIFORNIA.

ORE-SEPARATOR.

Specification of Letters Patent No. 20,666, dated June 22, 1858.

To all whom it may concern:

Be it known that I, HORACE P. RUSS, of Russville, in the county of Sacramento and State of California, have invented, made, and applied to use certain new and useful Improvements in Means for Separating or Amalgamating Metals, which I term "Russ's Spiral Amalgamator and Separator;" and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawing, making part of this specification, wherein—

Figure 1, is a plan of my said amalgamator and separator. Fig. 2, is a side view of one of the inclined separating plates, and Fig. 3, is a side view of four of said plates as set together ready for use.

Similar marks of reference indicate the same parts.

In several gold washers or amalgamators that have heretofore been made use of, the sand is placed on an incline, over which a stream of water is caused to flow, and the particles of metal are retained and lodge in crevices or cavities of various characters in said incline. In this instance the rush of water is in one general direction, and does not produce any whirl or eddy to cause the gold to deposit and the sand to pass away, beside this the water attains an accelerated velocity which is injurious in effecting a perfect separation. Separators have also been formed similar to a circular stair way, but in this case the descent of the water, if allowed to flow rapidly over the same, would wash away both the metallic as well as the earthy particles from the flat steps forming the surface of this separator.

The nature of my said invention consists in the use of spiral or circular inclined plates set together in a screw form in such a manner that the sand and water passes successively from one, down onto the next, and in running down and around this inclined and circular plate produces an eddy or whirl in each of the cavities or crevices that are left on the surface of said plate, whereby the sand or ore is washed away while the metal remains in said crevices, either in the form of dust or fine particles, or becomes amalgamated with quick-silver placed in the bottom of said cavities; and the water flowing in a screw form has not the opportunity of increasing its velocity, as would be the case on a straight inclined plane, and the water passing from one plate onto the next, any acceleration of the velocity is effectually prevented, and by revolving a series of these plates, as they stand one above the other, on a center shaft, in either direction, the speed of the water can be accelerated or retarded.

In the drawing *a*, is a circular plate which is formed as a gradual incline; the surface of said plate would be described by the revolution of a straight line around an axis, descending in its revolution from the point 1, to the point 2, and around this plate a rim or edge *b*, is formed of the necessary height to prevent the overflow of water, and the center of said plate is formed with another rim *c*, around the center opening *d*, through which opening a shaft is to pass for connecting the plates together, or if said shaft be dispensed with, a circular projection in the center of said plate, may take the place of said shaft. The part 1, of the plate *a*, being above the part 2, leaves an opening or mouth from which the water passes off one plate onto the one next below as seen in Fig. 3, and in so doing its accelerated velocity is checked, at the same time the water in traveling over the surface of the plate *a*, produces a whirl or eddy in each of the cavities formed in the surface of said plate *a*. These cavities or crevices may be of any desired shape. I however have shown conical cavities 4, 4, and straight grooves 5, 5, and the number, position and size of these may be varied at pleasure. Two, three, four or more of these plates set together as shown in Fig. 3, are used to form my separator or amalgamator, and the water is to be supplied in any convenient manner. When the crevices are sufficiently full of metal the plates are to be lifted off and washed out, or may be partially washed out by a larger flow of water. The plates may be separated a short distance, one from the other by suitable blocks or projections.

The quantity of water admitted to flow onto the upper plate, and thence over the others, is to be regulated according to the character of material being operated on; and if a series of these plates be revolved in the contrary direction to the flow of water the velocity of said water will be accelerated, and if in the same direction the velocity will be retarded. The water in flowing over

these plates in the circular direction it travels in, has a tendency to accumulate more at the periphery than at the center, to compensate which the plate should be rather lower at the center than at the circumference. The size of these plates *a* may be varied according to the purpose required.

I am aware that flat surfaces have been arranged one above the other in a circular form similar to a circular or spiral stair way: but I am not aware of any previous instance in which plates formed circularly and of a gradual incline with cavities or recesses in the surface have ever before been set together in pairs or several pairs, so that the water after traveling around the surface of each plate passes down to the next one, and so on until the earthy matters are washed away and the metallic particles left in the cavities of the said plates.

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

The series of inclined circular plates (*a*, *a*,) in which the water passes from one plate onto the next, while the metallic particles are retained in cavities in the surfaces of said plates, substantially as and for the purposes specified.

In witness whereof I have hereunto set my signature this twenty-fourth day of May 1858.

HORACE P. RUSS.

Witnesses:

LEMUEL W. SERRELL,

JAMES S. DIACK.