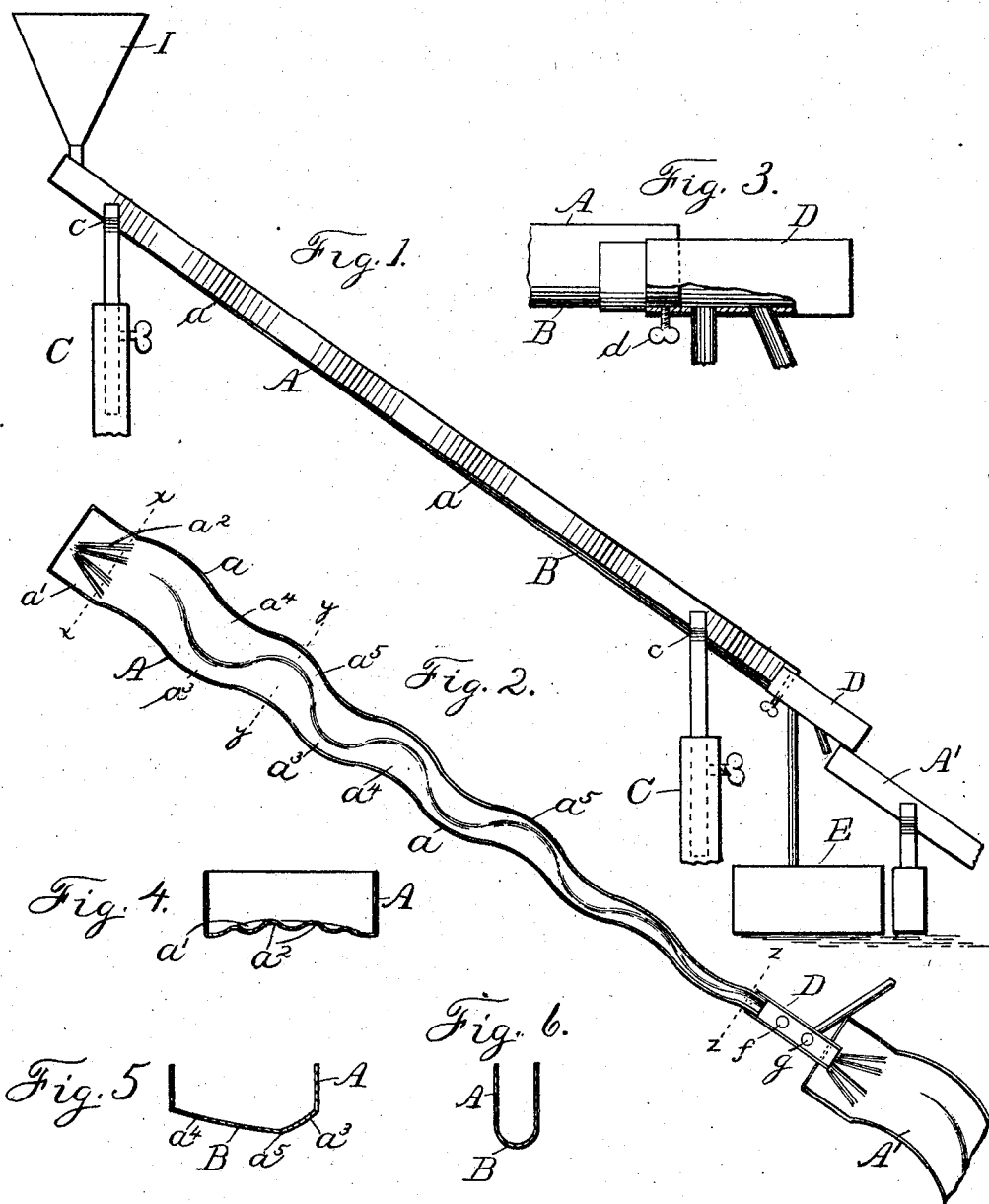


S. L. HAGUE.
CONCENTRATOR.

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CONCENTRATOR.

No. 800,293.

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To all whom it may concern:

Be it known that I, SNYDER L. HAGUE, a citizen of the United States, residing at Salt Lake City, in the county of Salt Lake and State of Utah, have invented certain new and useful Improvements in Concentrators; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This is a device for separating from the gangue by gravity the metallic values found in pulverized ores. This separation is effected by subjecting the ores to a motion similar to that of "panning," but making that motion continuous and automatic. At the same time my invention separates automatically and in mass the concentrates from the pure gangue and from the "middlings" or mixed gangue and metals, continuously subjecting the middlings to similar treatment until the values are practically all secured.

The first cost of my concentrating plant is very small, and the expense of maintaining the plant is merely nominal, while the cost of operating the device is practically nothing.

The mechanism employed in applying the principle of my invention consists in the main of a serpentiform tube or spout through which the ore is passed after being ground to a fineness that will release the metallic values from the gangue. The sides of the spout by preference gradually converge from its upper to its lower end, and the spout curves from right to left and from left to right again, preferably throughout its entire length. The spout inclines downwardly, and its bottom is transversely curved, with its concave side up, the depth of the curve increasing from near its wider to its narrower end. The spout is placed on an incline with the wider end above, the incline being such as to allow the pulverized ore to pass down by its own weight. The inclination of the spout can be regulated to secure any desired speed in the passing of the ore. This will depend on the fineness to which the ore has been ground or the nature of the ore and the moisture it contains. The device can be operated with or without water, and in either case no power beyond the force of gravity is required. An automatic feeding device is desirable, and this may be operated by any preferred means.

The accompanying drawings illustrate a form of the device which embodies the spirit of my invention and in which I prefer to make it.

In the drawings, Figure 1 is a side elevation of a spout in operative position and the upper end of another spout in connection with it. Fig. 2 is a plan view of the same. Fig. 3 is an enlarged side elevation of a trap. Fig. 4 is an enlarged cross-section on line xx of Fig. 2. Fig. 5 is an enlarged cross-section on line yy of Fig. 2. Fig. 6 is an enlarged cross-section on line zz of Fig. 2.

The various features of the device are referred to by letters, similar letters denoting corresponding parts in the several views.

The letter A designates the spout. It has the lateral curves aa and the concave bottom B. This spout is held in an inclined position by vertically-adjustable supports C C, having spout-seats $c c$. The bottom a' of the extreme upper end of the spout A is upwardly convex, being slightly rounded over from side to side, and is provided with shallow radial corrugations a'' to spread out the ore over the bottom as it comes from the hopper I. There is provided at the lower end of each spout any preferred means for separating the materials according to their values at that point. These means may form a part of the spout itself or be attached thereto, as shown in the drawings, where a second spout D, having a depending open pipe, is adjustably held to spout A by a set-screw d . By this second spout D the concentrates or middlings are drawn off through openings f and g and conducted through pipes to the concentrate-bin E and into other spouts, as desired. The spout A' is similar to the spout A, and any desired number of these spouts may be arranged in series, the concentrates being trapped out and the middlings going into the next spout below and the gangue being finally directed to the dump.

The downward curvature of the bottom of the spout is irregular, its deepest part or channel not being at all points in the middle of the spout, but being nearer the outer side at each lateral curve a . By this construction the outer side a^3 of the bottom is narrower and steeper than the inner side a^4 at each curve a , and it is upon these shallower areas a^4 of the bottom that concentration is effected most rapidly and completely. The film of concentrates which settles upon these shallow portions by their greater specific gravity will by the same natural law seek and pass along

down the channel a^5 of the bottom, so as to be easily trapped out at the lower end of the spout.

The device is operated as follows: The pulverized ore is automatically fed from the hopper I into the upper end of the spout, where as it starts down the decline it is spread out into a thin sheet or film across the bottom of the spout. Following the lateral curvings of the spout it goes from side to side, having almost the same movement it would have in panning. The metallic particles quickly sink to the bottom of the ore and will not rise again through the lighter layer of gangue. This process continues through the entire length of the spout, the concentrates being there drawn off, as already described.

Having now described my invention, what I claim is—

1. A concentrator for ores comprising a serpentine spout having lateral curvatures and converging sides.

2. A concentrator for ores comprising an inclined spout having lateral curvatures, converging sides, and a bottom having a downward, transverse, irregular curvature, as herein set forth.

3. In a concentrator having an inclined spout with lateral curvatures and converging sides, the bottom of said spout having a downward, transverse curvature and a channel

along said bottom which is nearer the outer than the inner side of said spout in said lateral curvatures, as specified.

4. In a concentrator for ores a spout having lateral curvatures and converging sides, a bottom in said spout having a downward, transverse curvature, a channel along said bottom, and an area of said bottom in said lateral curvatures between said channel and the inner side of the spout having less inclination, in cross-section, than the area of said bottom between said channel and the outer side of the spout, substantially as described.

5. In a gravity-concentrator for ores having an inclined spout a short portion of the upper end of said spout having an upwardly-convex bottom with radial corrugations thereon, for the purpose specified.

6. A gravity ore-concentrator comprising a spout having converging sides, lateral curvatures and a bottom with a downward transverse curvature, and a second spout attached to the first spout having a depending open pipe in its bottom, substantially as herein set forth.

In testimony whereof I affix my signature in presence of two witnesses.

SNYDER L. HAGUE.

Witnesses:

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C. A. NEALE.