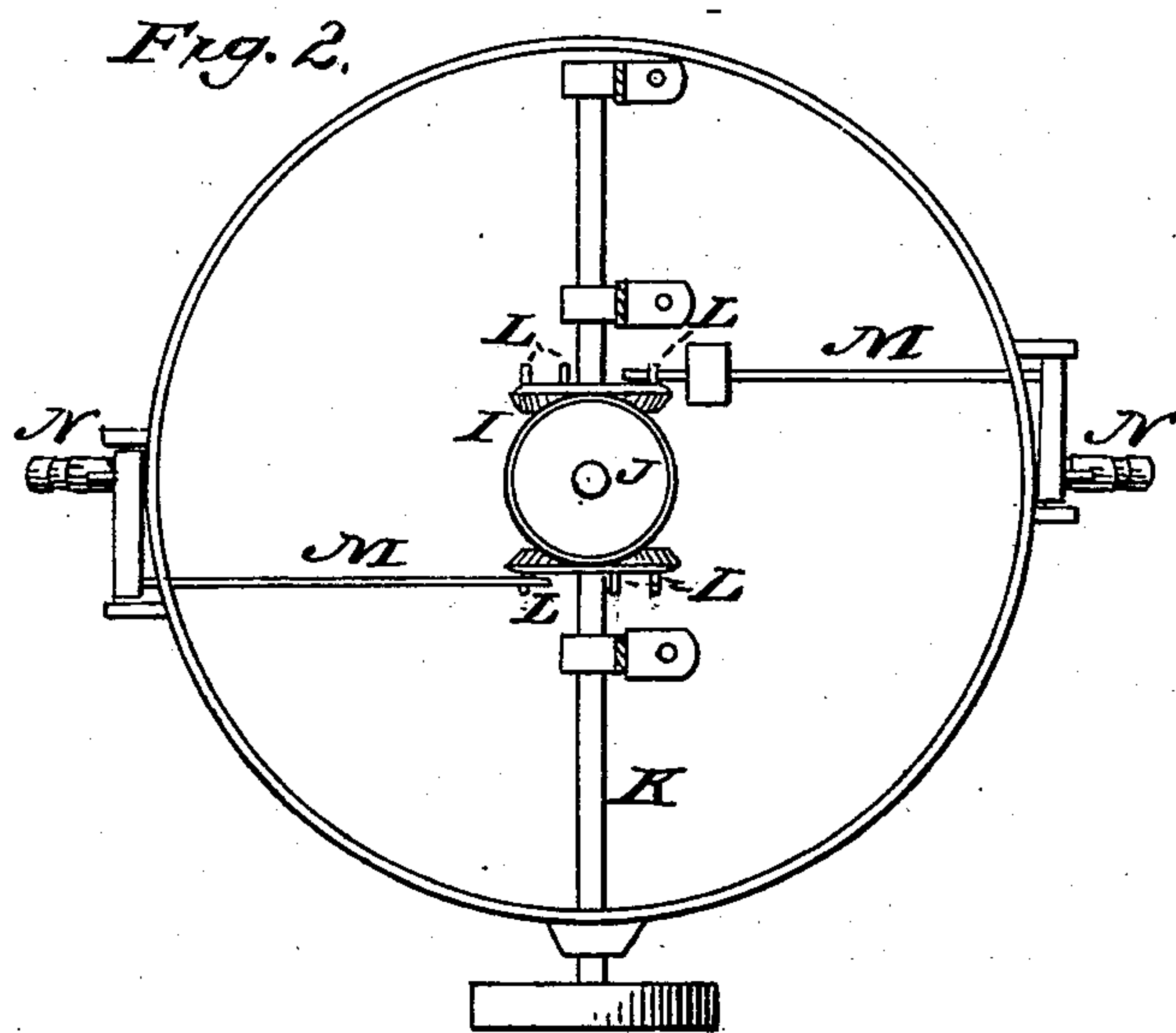
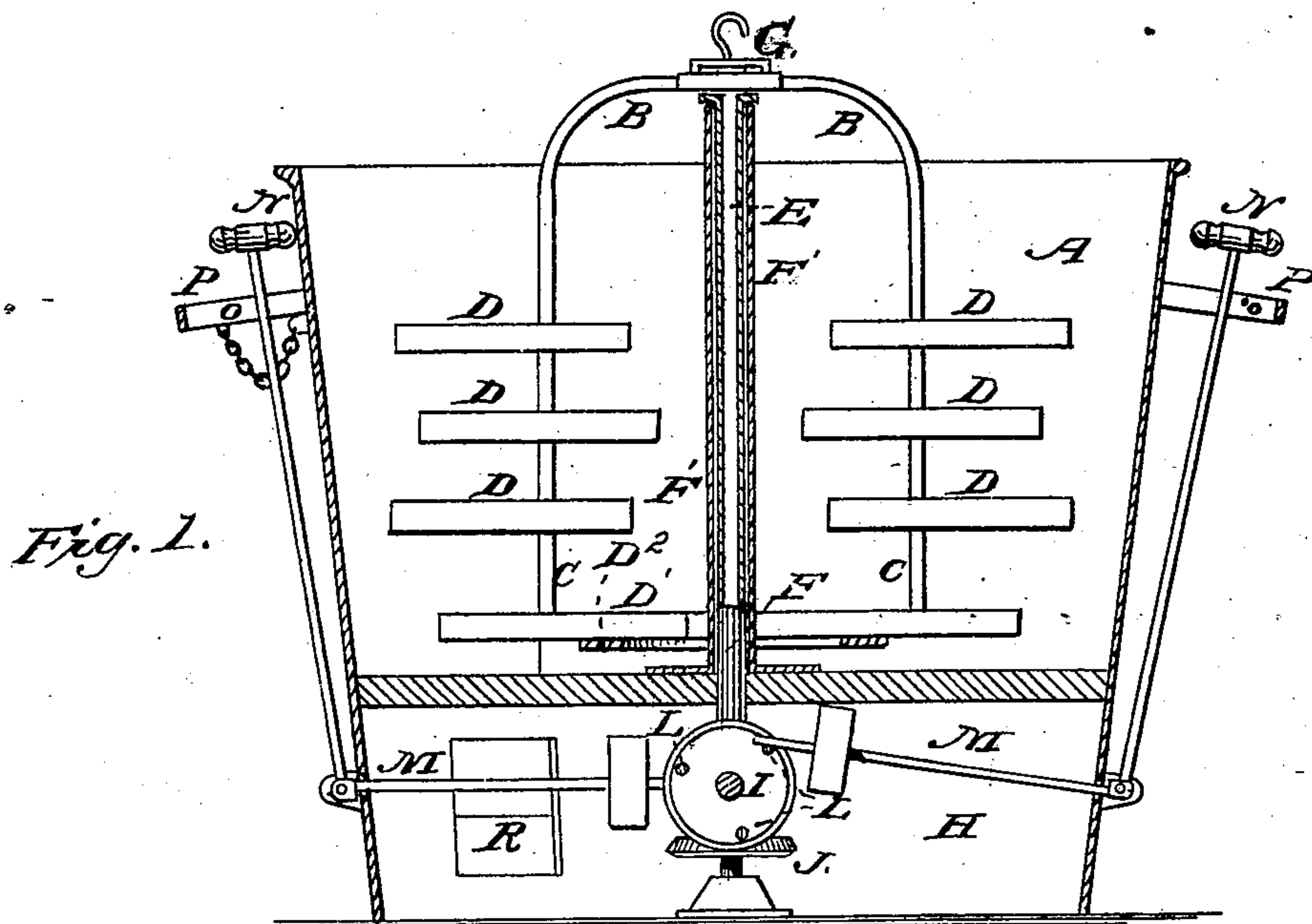


SYMONS, HARRY & STEPHENS.

Ore Separator and Concentrator.

No. 83,221.

Patented Oct. 20, 1868.



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United States Patent Office.

RICHARD DUNN SYMONS, JOHN TREMELLING HARRY, AND SAMUEL STEPHENS, OF GRASS VALLEY, CALIFORNIA.

Letters Patent No. 83,221, dated October 20, 1868.

IMPROVED ORE-SEPARATOR AND CONCENTRATOR

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that we, RICHARD DUNN SYMONS, JOHN TREMELLING HARRY, and SAMUEL STEPHENS, of Grass Valley, county of Nevada, State of California, have invented an Improved Tossing and Refining Concentrator; and we do hereby declare the following description and accompanying drawings are sufficient to enable any person skilled in the art or science to which it most nearly appertains to make and use our said invention or improvements without further invention or experiment.

The nature of our invention is to provide an apparatus for separating the fine particles of sand from the sulphurets contained in ores, and relates more particularly to the further separation and concentration of the valuable portion, or fine sulphurets, gold and amalgam, that have been partially treated in other devices by the buddle-process.

Our invention consists of a pan-shaped vessel, of considerable height, and from the centre of which arises a vertical hollow shaft. A driving-shaft turns in the hollow shaft, having its step in the frame-work beneath. This shaft is made with a half-round opening from the top downward, in which the spindle of a yoke or bow sets. To the arms of the yoke are attached horizontal stirrers or puddlers, and when the machine is in motion, these agitators stir the pulp or material being treated. At each side of the pan is a hammer, which are operated by gearing beneath, which strike alternately against the pan, and serve, by percussion, to settle the heavy particles of metal to the bottom of the pan.

Referring to the accompanying drawings, which form a part of this specification, for a better illustration of the construction and operation of our machine—

Figure 1 is a side sectional elevation.

Figure 2 is a bottom view.

A is a pan or tub, within which rotates the yoke or bow, B. The yoke is constructed with two arms, C C, transversely across which are plated agitators, D D D, of uneven lengths. The lower one, D¹, being continuous, has a curve in its centre for the hollow shaft. An annular ring, D², is attached to the lower agitator, to prevent it from sinking in the sand. In the centre of this yoke is a half-round depending spindle, E, which sets in a corresponding opening in the driving-shaft F. The shaft F is surrounded by a hollow vertical shaft, F', rising from the centre of the pan.

Attached to the top of the yoke is a hook, G, which is employed for raising or tossing the yoke up and down, and stirring up the loose sand which may have settled upon the hollow of the pan.

Below the bottom of this pan is a chamber, H, for the protection of the gear, which consists of two horizontal-bevelled gears, operated by the vertical gear J, above the step of the driving-shaft. The gear I is at-

tached to the pulley-shaft K, and the gear I' to a shaft, at the opposite side of the pan, operating in suitable bearings. The outer faces of these gears are provided with pins L L, which, in their revolution, strike against the ends of weighted arms M M, which operate the hammers N N, upon the outside of the pan. These hammers strike against the sides of the pan, and, by the percussion and jarring force, tend to settle the heavier particles of metal rapidly to the bottom, and thus avoid waiting an unnecessary length of time for that purpose. The force of the blow may be regulated by a pin, O, placed through a hollow ear, P, at the side of the pan. Man-holes R R may be made at each side of the pan, below the tub-bottom, through which the operations of the machine may be watched.

The operation of our machine is as follows, to wit: The ore-pulp or tailings are admitted, with a sufficient quantity of water, into the pan, and the machine set in motion, when the hammers are caused to strike repeated blows against the sides of the pan, by the percussion of which the heavier particles are thrown to the bottom, while, by the rotation of the yoke and stirrers, the light and worthless particles are kept afloat and pass over the pan. When too much agitated by the constant rotation of the stirrers, the yoke may be lifted up by a block above, which is attached to the hook on the top. The sides of the pan, and bottom, if a metal bottom is used, may be amalgamated, if desired, and the cleaning up be made from the amalgamated surface.

Having thus described our invention,

What we claim, and desire to secure by Letters Patent, is—

1. In combination with the pan or tub A and chamber H, the yoke B, provided with stirrers or agitators D D D¹ and annular ring D², or their equivalents, substantially as and for the purpose described.

2. The hollow vertical shaft F' and driving-shaft F, with a half-round opening, in which the half-round depending spindle E of the yoke sets, substantially as described, for the purposes set forth.

3. The pins L L, on the gear I I', which operate the hammer, the weighted arm M M, and the hammers N N, the whole constructed and arranged to operate substantially as and for the purpose described.

In witness whereof, we have hereunto set our hands and seals.

RICHARD DUNN SYMONS. [L. S.]

JOHN TREMELLING HARRY. [L. S.]

SAMUEL STEPHENS. [L. S.]

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