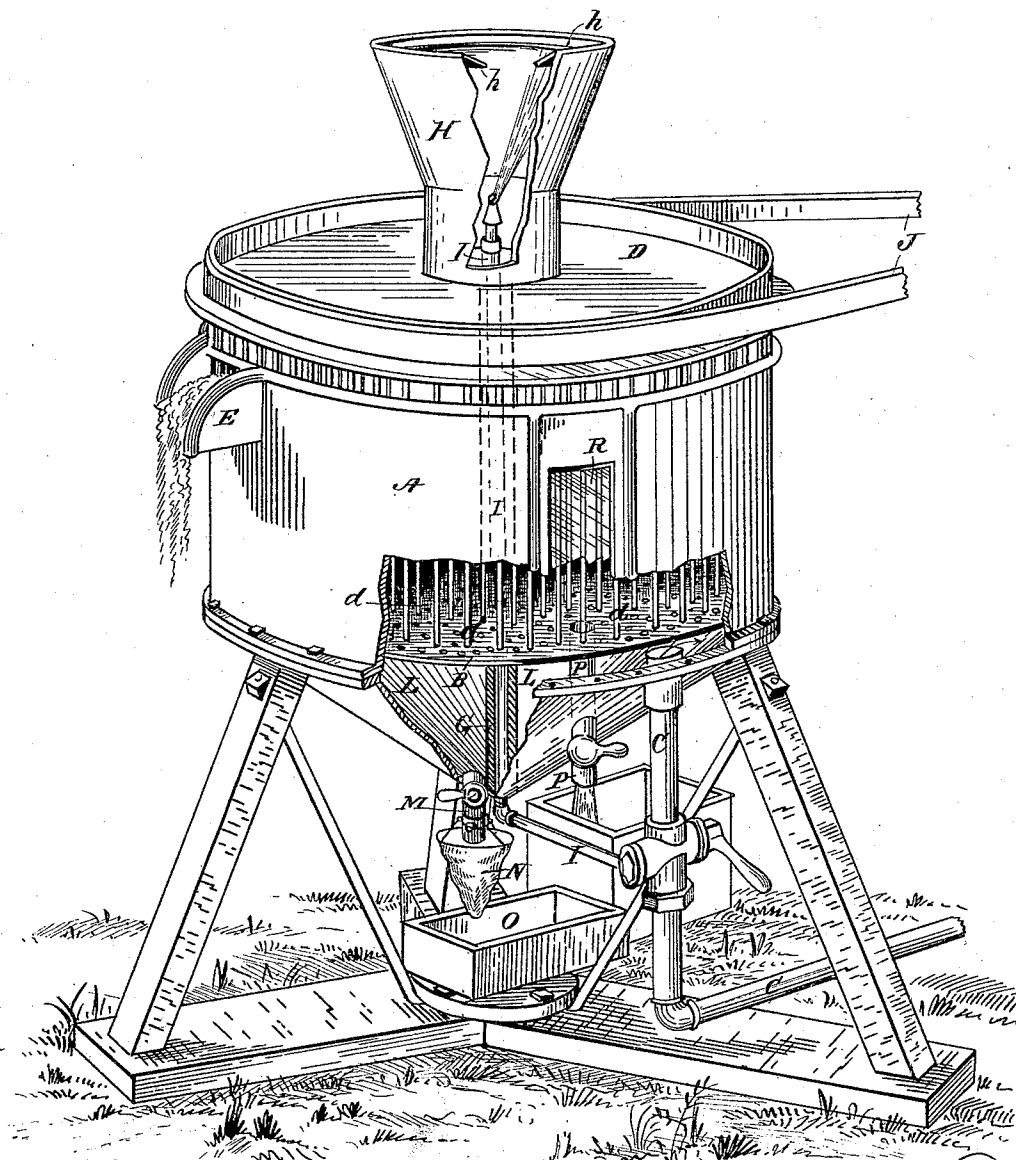


(No Model.)

G. A. METCALF.
CONCENTRATOR.

No. 286,050.

Patented Oct. 2, 1883.



Witnesses:
E. A. Phelps.
H. Shaw

Inventor:
George A. Metcalf
by A. H. Jewell, his atty

UNITED STATES PATENT OFFICE.

GEORGE A. METCALF, OF MALDEN, MASSACHUSETTS.

CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 286,050, dated October 2, 1883.

Application filed May 3, 1883. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. METCALF, a citizen of the United States, residing at Malden, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Concentrators; and I do hereby declare that the same are fully described in the following specification and illustrated in the accompanying drawing.

10 This invention is in the nature of an improvement upon that for which Letters Patent of the United States, No. 255,651, were granted to me March 28, 1882, for ore-separators. In that device the heavy and valuable ore was 15 separated from the waste material by specific gravity in an upward current of water divided into minute jets by a finely-perforated diaphragm, and a rotary agitator was employed to continuously stir the mass and expose all its 20 particles to the force of the numerous jets. My present improvement retains these various features, and adapts the apparatus for use as a concentrator by the additions and alterations herein shown and described.

25 This invention consists in the devices and combinations of devices set forth in the appended claims.

The drawing is a perspective view of my improved machine, a part being shown broken 30 away to make clear the internal construction, illustrating certain details.

The primary object of this improvement is to adapt my former apparatus to use as a concentrator, and to provide means for gathering 35 up the ores and preserving the quicksilver that escapes downwardly through the finely-perforated diaphragm, and carries with it the finest particles of the ore, thus accumulating, with the quicksilver, the flour gold or silver, 40 which is subsequently separated.

The apparatus requires a tank, A, preferably of metal, and made of dimensions adapted to the amount of material to be operated upon at once.

45 B is the diaphragm, upon which the mass of material rests while under treatment. It spans the tank near the bottom, is preferably of iron or steel, and is pierced with numerous minute holes, through which the water, admitted beneath it, under pressure, from the pipe 50 C, ascends in forcible jets through the mineral-

bearing mass, which is effectually stirred meanwhile by the downwardly-projecting prongs *d* of the rotary head D, to separate the material, so that the waste is discharged at the top by 55 the gate E, as stated in my former patent.

I make the bottom of the tank to taper downwardly toward the center, from which point rises a hollow post, G, to support by a collar or shoulder the center of the diaphragm under 60 the weight of material. This post also supports on a suitable shoulder (not shown) the rotary agitator D and the hopper H, formed in one with it, and serves as a shaft around which the agitator and hopper revolve, driven 65 by any suitable power, a belt, J, being shown in the drawing.

A tube, I, running up through the post G, carries a small stream of water to the hopper to facilitate the feeding of the material downward for treatment, and this stream is controlled and kept from throwing out the material by an inward-turned lip, *h*, at the top of the hopper. The quicksilver mingled with the mass makes its way rapidly downward 75 against the water-currents, and carries through the perforations of the diaphragm and into the pocket L, beneath it, the fine particles of gold and silver which it has taken up. This amalgam is withdrawn from time to time 80 through a siphon or cock, M, extending from the lowest part of the pocket L, whence it passes into a fine canvas strainer, N, which retains the ore, while the quicksilver is received in the tank O. 85

A glass panel, R, may be provided in the side of the tank for inspection of the work as it proceeds.

A tube, P, extending down through the diaphragm and bottom of the tank A, has a suitable gate for discharge of the concentrates or metal too coarse to pass through the minute perforations of the diaphragm B. This material is received in any suitable vessel and subjected to further treatment to eliminate all 95 impurities.

The tailings discharged at the gate E may be run over amalgamating-plates, riffles, or blankets, if desired, in order to extract any valuable metal that might otherwise be lost. 100

I claim as my invention—

1. The tank A, provided with a fixed central

post, in combination with a finely-perforated diaphragm fixed marginally to the tank, and supported centrally by said post, and with a rotary agitator adapted to revolve around said fixed post, substantially as and for the purposes set forth.

2. The tank A, provided with a fixed and finely-perforated diaphragm, and with an inlet-pipe admitting water under pressure beneath said diaphragm, in combination with a hollow stationary central post, and with an agitator and hopper adapted to revolve together around said post, substantially as and for the purposes set forth.

3. The tank A, having a finely-perforated diaphragm, B, and a tapering bottom provided with a discharge pipe or cock, in combination with a rotary head having a series of vertical stirring-prongs extending downward, and a rotary hopper extending upward from it, substantially as set forth.

4. The tank A, having a hollow central shaft adapted to admit a pipe carrying an upward jet of water, under pressure, to the hopper, in combination with the hopper H, having its upper edge turned inward to control said jet, substantially as set forth.

5. The tank A, rotary agitator D d, perforated diaphragm B, and amalgam-pocket L, in combination with the gates M and P, serving, respectively, to discharge the metal from below and above the diaphragm, and the gate or overflow E for discharge of the tailings, substantially as set forth.

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

GEORGE A. METCALF.

Witnesses:

A. H. SPENCER,
E. A. PHELPS.