

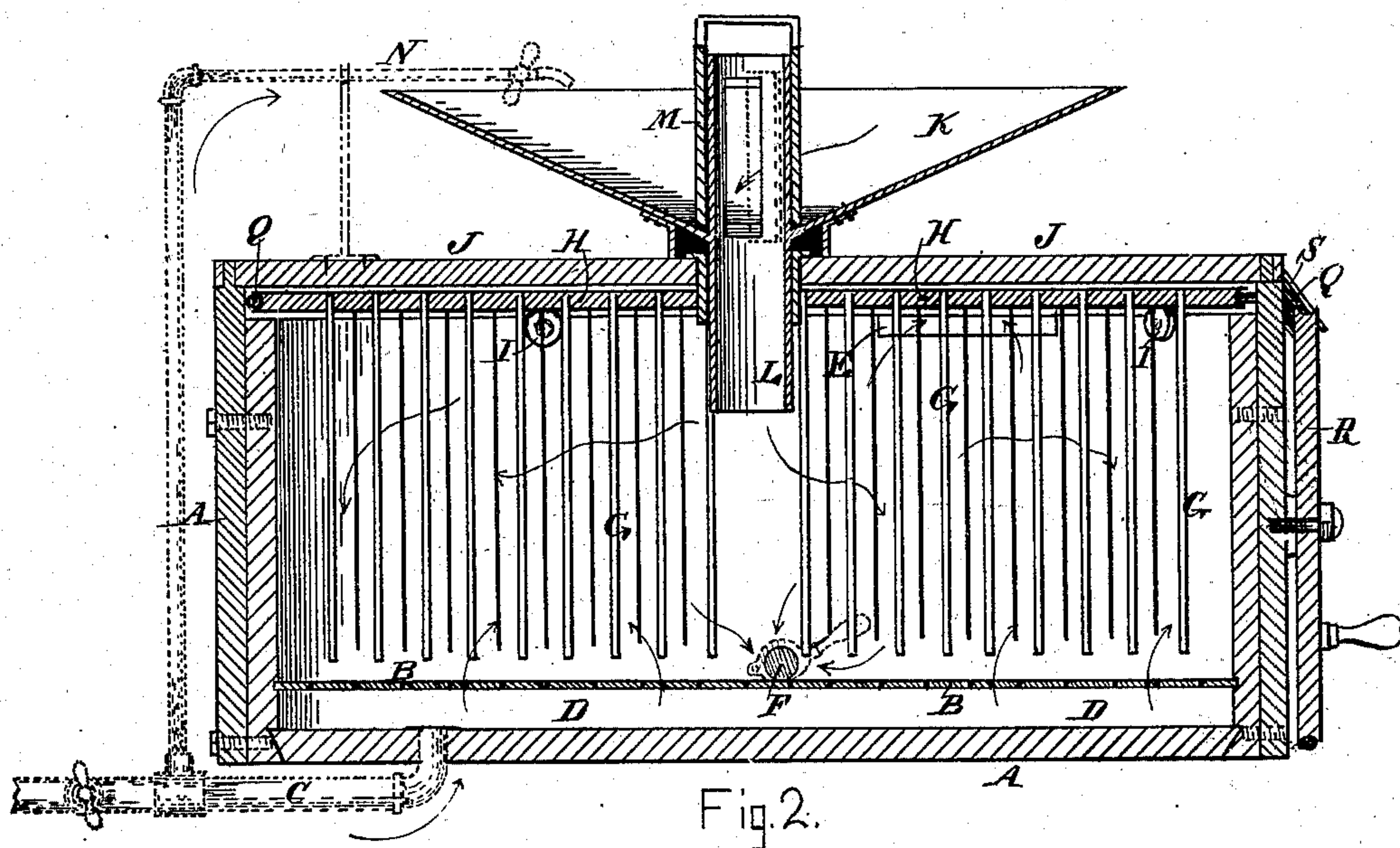
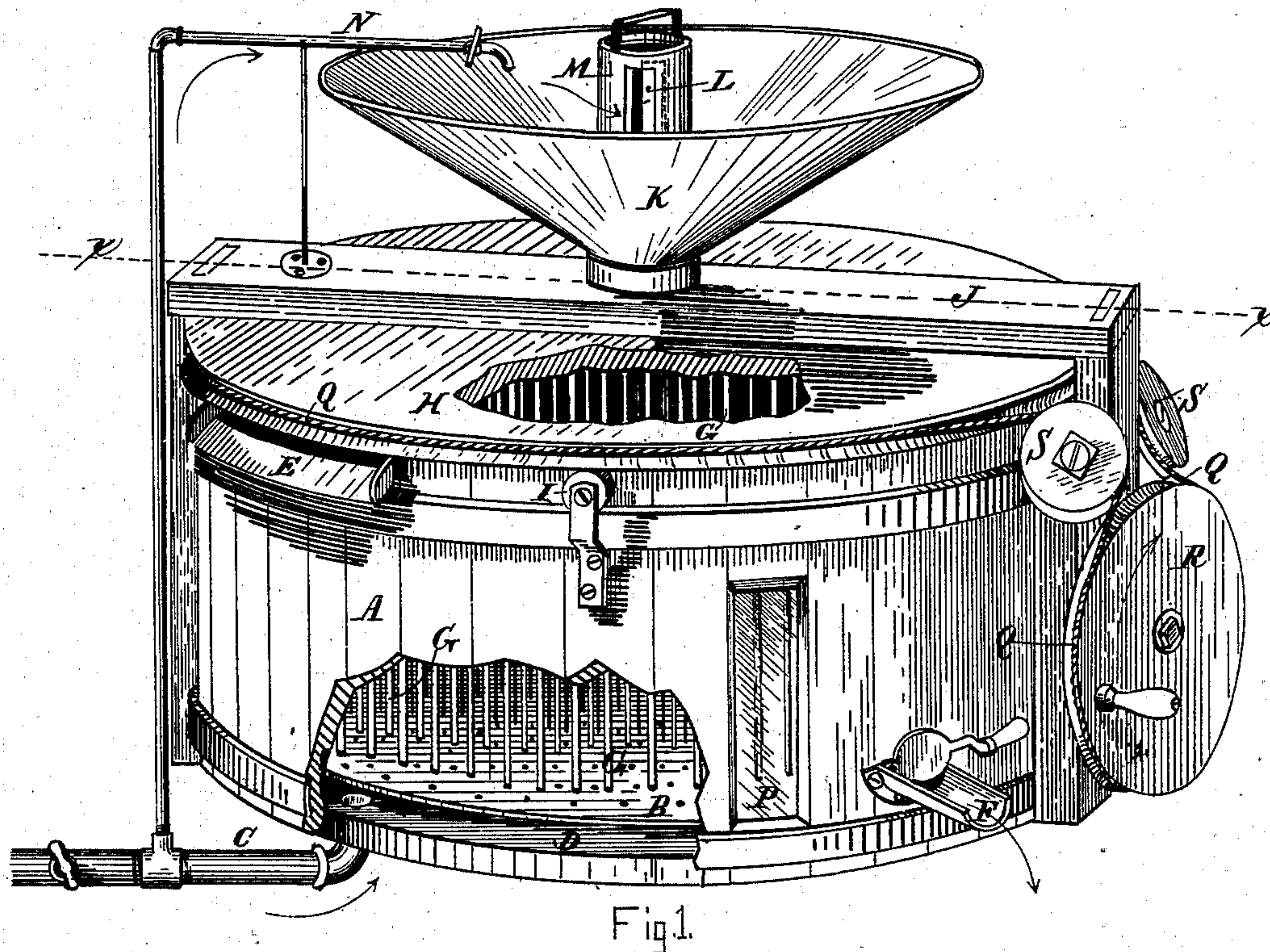
(No Model.)

G. A. METCALF.

ORE SEPARATOR.

No. 255,651.

Patented Mar. 28, 1882.



Witnesses.

A. E. Remick.
S. B. Logan

Inventor.

George A. Metcalf
by A. H. Jewett
his Attorney

UNITED STATES PATENT OFFICE.

GEORGE A. METCALF, OF MALDEN, MASSACHUSETTS.

ORE-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 255,651, dated March 28, 1882.

Application filed July 16, 1881. (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 Ore-Separators; and I do hereby declare that the same are fully described in the following specification and illustrated in the accompanying drawings.

10 This invention relates to that class of machines which operate to separate the heavier metals from sand or crushed quartz by the difference of their specific gravity in water.

My improvement is embodied in a tank or vessel having near its bottom a finely-perforated diaphragm adapted to support the mass to be operated upon, a water space and inlet thereto beneath the diaphragm, so as to give a regulated upward current of water under pressure through the fine perforations, and a rotary stirring apparatus adapted to act continuously and at all points in the mass to agitate it while the water flows upwardly through it.

My invention further consists in the devices and combinations of devices set forth in the appended claim.

The drawings represent a machine embracing the several features of my invention, Figure 1 being a perspective view thereof with some parts broken away to show the internal construction, and Fig. 2 a vertical central section on the line *xx* of Fig. 1.

A is the tank, made of wood or metal, and of such dimensions as may be most convenient.

35 B is the diaphragm or false bottom, preferably of thin metal, but of sufficient strength to support the weight and strain coming upon it. It is pierced with fine perforations, near together, so that the water entering through the inlet C to the water-space D beneath the diaphragm under pressure shall ascend in minute forcible currents through the mineral-bearing mass. These upward currents have a buoyant tendency on the mass in the tank, affecting the lighter materials most and carrying them gradually toward the top of the tank, where they overflow or pass off by the gate or gates E, while the heavier and more valuable metal remains or is withdrawn laterally through the gate or gates F.

In order that the entire mass may be acted upon equally, without the formation of chan-

nels for the water through it, leaving parts undisturbed, I provide a rotary agitator consisting of a head, H, filled with downwardly-projecting prongs G, which penetrate the mass from top to bottom and continually stir it, so as to bring new material directly into the path of the several jets with every revolution.

60 The head H is supported in any convenient manner, preferably on three or more rollers, I, which are journaled near the top of the walls of the tank. A cross-bar or frame, J, supports the hopper K to receive the material to be operated upon, which enters the tank through a slotted tube, L, forming a central bearing around which the agitator revolves, and provided with an adjustable gage, M, adapted by a sliding movement to reduce the dimensions of the slotted inlet to any extent desired. A water-pipe, N, may conduct a stream of water to the hopper to facilitate the feed. The material therefore enters the tank centrally, at or below the water-level, by means of the tube L through an aperture of less area than said tube, which prevents clogging and promotes a regular and systematic feed, graduated to the speed of rotation of the agitator and to the rapidity of flow of the upward water-current; and hence the several parts of the apparatus are adapted to co-operate and act continuously, the material being received centrally, separated horizontally, and discharged laterally through the lower and upper gates respectively.

80 I provide the walls of the tank with one or more glass panels, P, through which the progress of the work may be observed as it proceeds. Such panels may be readily removed and replaced when required, and access may thus be had to the interior of the tank, if desired. The movement of the mass being from center to circumference during the separating process, an accumulation of the heavier metal will appear at the bottom through the glass after sufficient working, and by setting the gate F in the proper position a continuous stream of the heavier metal will escape therefrom, while a constant discharge of the lighter material occurs at the other gate, thus making the entire apparatus automatic in its action.

105 The rotation of the agitator may be effected by any suitable means. In the drawings the head is grooved to receive a belt, Q, which also surrounds a crank-wheel, R, mounted on

One of the vertical standards. Other grooved wheels or idlers, S S, are employed to retain the belt in position in changing its direction.

I am aware that in coal and ore washers an upward current of water has been employed to remove the dust and refuse matter from the lumps. Hence I do not claim broadly an ore-separator having such direction of current.

I am also aware of the patent to Ambler, dated December 26, 1865, showing a wire sieve on which the material is stirred by four radiating arms bearing vertical prongs provided with or connected by horizontal knives, by which devices it is proposed to separate sand from ore in an upward current, the ore to pass downwardly through the sieve against the current. My invention does not contemplate such a passage, such a screen, nor such an agitator, and my experience shows such apparatus to be insufficient for the purpose I have in view. I separate the material by specific gravity only, and not mechanically, by a screen, allowing

the ore to pass downwardly through it; and my agitator stirs the entire mass uniformly, and not certain lines merely beneath the radial arms. I discharge the ore from above the perforated plate, and not from below the separating-sieve, as in the device referred to.

I claim as of my invention—

The tank A, having the perforated diaphragm B and water-space beneath it, as described, and provided with a gate for the discharge of the heavier metal above the diaphragm, and a gate or overflow in a higher plane for the escape of the lighter material, in combination with a rotary agitator adapted to act simultaneously on all portions of the mass, for the purpose set forth.

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

GEORGE A. METCALF.

Witnesses:

A. H. SPENCER,
C. G. KEYES.