

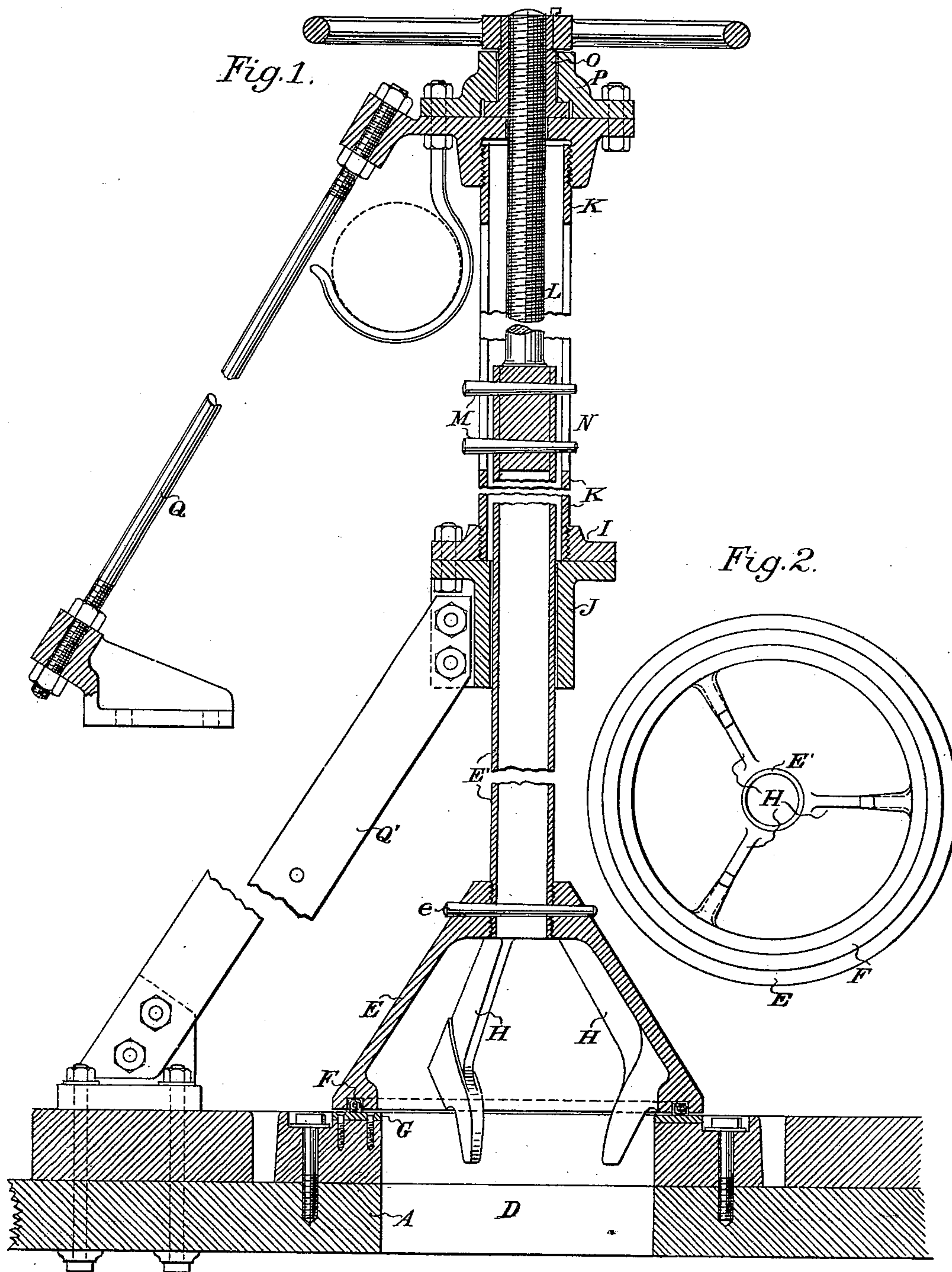
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C. W. MERRILL.  
DISCHARGE GATE FOR TANKS.

(Application filed Mar. 28, 1899.)

(No Model.)



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# UNITED STATES PATENT OFFICE.

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## DISCHARGE-GATE FOR TANKS.

SPECIFICATION forming part of Letters Patent No. 635,442, dated October 24, 1899.

Application filed March 28, 1899. Serial No. 710,738. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES W. MERRILL, a citizen of the United States, residing at Alameda, county of Alameda, State of California, have invented an Improvement in Bottom Discharge-Gates for Vats and Tanks; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to a discharge-gate which is especially applicable for use in vats and tanks of large diameter, such as are employed in the treatment of ores by cyanid and other processes.

It consists, essentially, of a bottom discharge-gate and superposed operating mechanism and in details of construction, which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a vertical section. Fig. 2 is a plan looking up under the gate.

In the treatment of ores and the pulp containing valuable precious metal various processes are employed in which tanks or vats of large capacity are used. In what is known as the "cyanid" process these vats reach the diameter of fifty feet, and the pulp which is introduced into these vats and subjected to the cyanid solution must afterward be removed to make room for another charge. The use of exterior side discharge-gates is accompanied by some difficulty and considerable loss of time, and if bottom gates are operated from below there is danger that workmen will be overwhelmed with the discharge when the gates are opened.

The object of my invention is to provide an opening or openings in the bottom of vats, tanks, or other inclosures through which all the material within said vats or inclosures may be discharged, passing over the shortest distance from the periphery inward, and with it is a mechanism and operating devices situated entirely above the sand, which gives perfect safety to the operator and much longer life to the wearing parts.

In the present illustration I have shown a single discharge-opening; but it will be manifest that the number of openings and gates may be increased without altering the character of the invention.

A represents a portion of the bottom of a vat or tank made up of suitable material.

Through the bottom of this vat or inclosure an opening or openings D are made of sufficient number and diameter for the requirements of discharge. The gate E is here shown in the form of a hollow cone, the upper end of which has a screw-threaded opening, into which a pipe or tube E' is screwed, and through which pipe the gate is raised or lowered, as will be hereinafter explained. The parts are more securely united by means of a key e passing through them after they have been screwed together. The lower periphery of the gate is made of sufficient width and is channeled to receive a packing-ring F, which fits closely upon an annular seat G, the seat being fixed around the periphery of the discharge-opening, as shown. In the interior of the conical gate are fixed guide-arms H, the lower ends of which converge and extend below the level of the seat. These arms serve to guide the gate by first entering the opening, and as the gate arrives near its seat they center it, so that it seats properly.

At a point near the top of the tank or above the line of any material which may be introduced therein is a pipe-flange I, secured to the head or casting J, which also forms the gate-stem guide and through which the tubular stem E passes. Into the flange I is secured a pipe K of sufficiently larger diameter than the stem E to allow the latter to move freely within it. The upper end of the inner pipe or gate-stem has fixed into it the lower end of a screw L, which is here shown as secured by keys M. The ends of these keys project sufficiently to pass through open slots N upon opposite sides of the exterior pipe K, and these serve as guides to prevent the turning of the gate-stem, while allowing it to slide up and down by the action of the screw. The screw passes through a nut O, properly supported and turnable in a top piece P, and upon the upper end of the nut is keyed a hand-wheel of sufficient size, so that by turning it the screw will be advanced in either direction and the gate-stem and gate either raised or depressed. Braces Q Q' are suitably located and diverge from the upper and lower heads of the outer tube K, and these braces strengthen and support the parts which serve to guide the gates and their stems in their movements. These parts are all sit-



uated high above the level of the pulp within the tank and are out of reach of it, so that the wear upon the movable parts will be only that due to ordinary friction. By thus plac-  
 5 ing the operative parts above the gate may be opened and closed at any time without exposing the operator to the rush of pulp and other dangers if the gate were opened from below.

10 The operation will be as follows: The pulp or sand or other material to be treated is introduced into the vat, tank, or any inclosure to any desired depth and the cyanid or other solution is mingled with it. After the sand  
 15 or other material has been sufficiently subjected to the cyanid or other solution said solution is drawn off in the usual manner and the remaining sand, pulp, or other material is ready to be discharged. The gate is then  
 20 raised, and by means of hose carrying jets of water the sand or other material is all washed toward the gate or gates and discharged through said opening or openings, after which the gate or gates may be again closed in readi-  
 25 ness for a new charge.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with the vat, tank, or  
 30 like inclosure having a bottom opening or openings of a vertically-movable, hollow conical gate or gates having packing-rings fitted in the bottom, annular seats around the openings upon which the gates are closable, guides  
 35 on the interior of the conical gate by which the gates are centered upon the seats and mechanism situated above the gates by which they are raised or depressed.

2. The combination with a vat or like in-  
 40 closure having a bottom discharge-opening and an annular seat surrounding it, of a hol-

low conical gate having a packing-ring fitting a channel in the bottom and adapted to close upon the seat, interior guides by which the gate is centered in closing, a tubular stem 45 fixed to the upper end of the gate extending upwardly therefrom having a screw fixed in its upper end, a nut having a hand-wheel by which it is turnable about the screw, an exterior pipe within which the gate-stem is 50 movable having a head in which the revoluble nut is movable and guides whereby the screw and gate are prevented from turning when opening or closing.

3. The combination with a vat or like in- 55 closure having a bottom discharge-opening and an annular seat surrounding said opening, of a hollow conical gate with a thickened channeled rim at the lower edge and a packing-ring fitted therein and adapted to close 60 upon the seat, interior guides by which the gate is centered when closing, a tubular stem fixed in the top of the gate, extending upwardly therefrom having a screw-shank fixed in its upper end, an exterior tube within 65 which the gate-stem and screw are movable, a nut having a hand-wheel fixed thereto and turnable in a retaining-head whereby the screw and connected parts are caused to rise or fall, keys by which the lower end of the 70 screw is secured in the gate-stem, slots made in the sides of the outer tube through which the ends of the keys project to serve as guides and prevent the screw and gate from rotating when the nut is turned. 75

In witness whereof I have hereunto set my hand.

CHARLES W. MERRILL.

Witnesses:

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 JESSIE C. BRODIE.