Feb. 23, 1943. F. L. PALMQUIST 2,311,862

LIQUID REAGENT FEEDER

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Fig. 1.

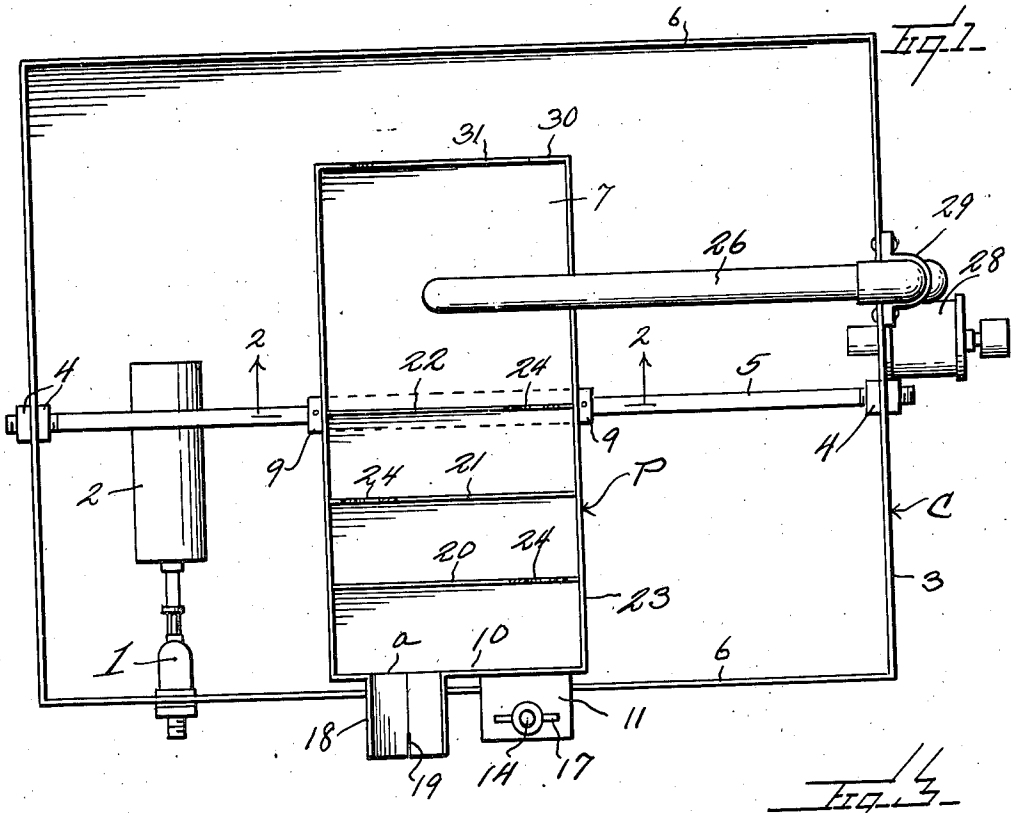


Fig. 3.

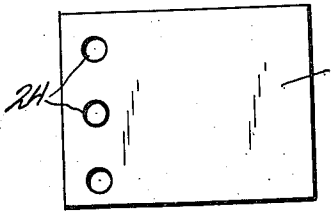


Fig. 2.

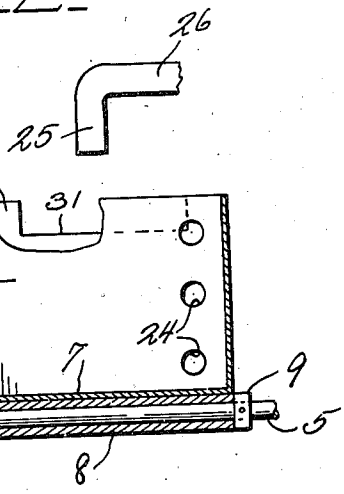
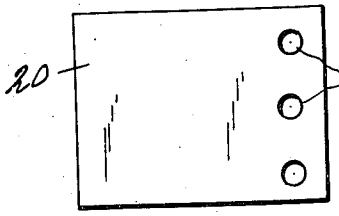


Fig. 4.



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Fig. 5.

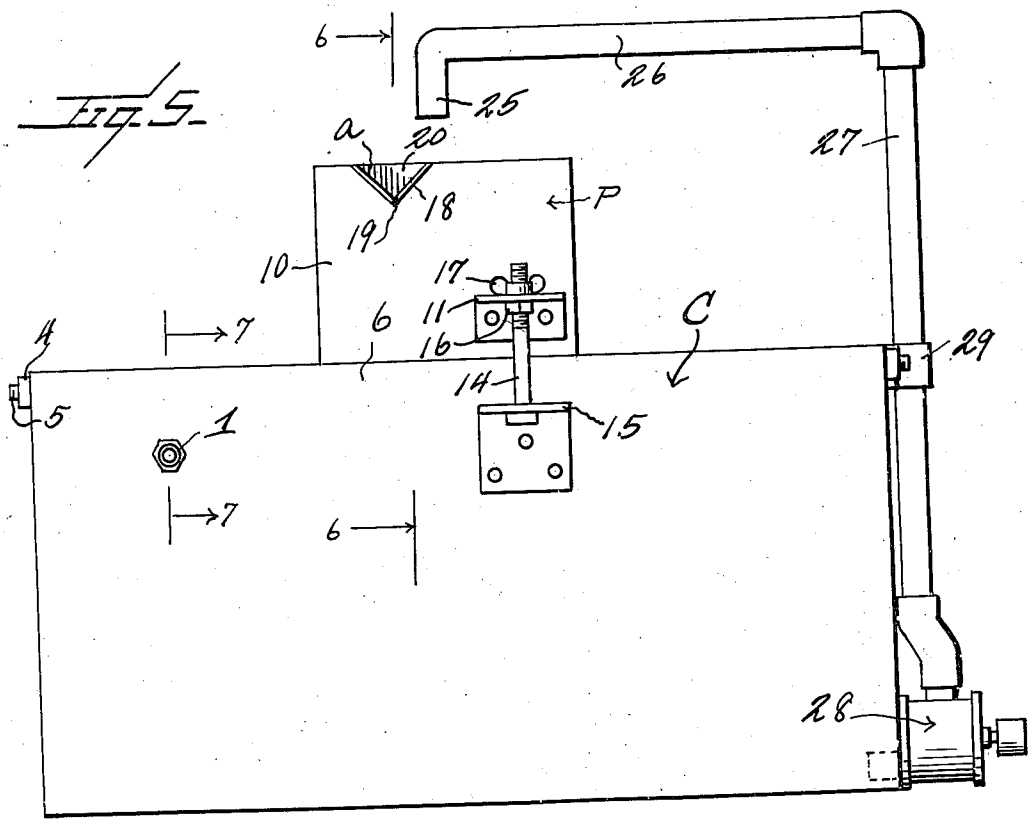


Fig. 6.

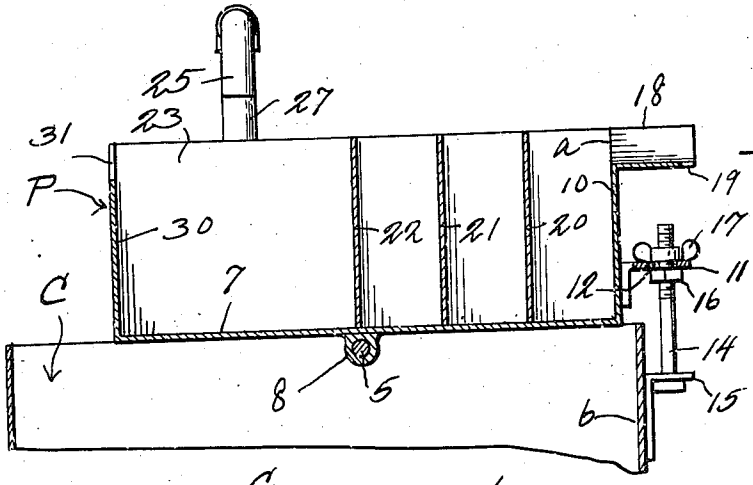
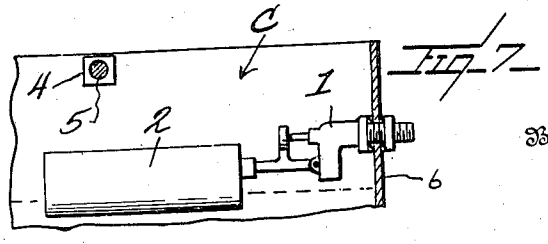


Fig. 7.



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LIQUID REAGENT FEEDER

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Application June 3, 1941, Serial No. 396,481

4 Claims. (Cl. 137—78)

This invention relates to a liquid reagent feeder, and has relation to a machine of this kind intended primarily to feed or distribute liquids, reagents and chemicals to flotation machines such as are used in separating minerals from rock and waste material, minerals from each other, coal from waste materials, hulls from wheat in the process of peeling wheat, and for various other purposes.

It is a particular object of the invention to provide a feeder to be used in distributing liquid materials wherever the amount to be distributed needs to be controlled.

It is also an object of the invention to provide a feeder of this kind including a pan mounted in a manner to be tipped forwards or backwards to provide means for regulating or controlling the flow of the liquid reagent to the flotation machine, and wherein means are provided for recovering surplus liquid which may overflow the pan.

Another object of the invention is to provide a feeder of this kind including a pan mounted for tilting movement, and wherein said pan is provided with a discharge spout V-shape in cross-section so that the spout may carry the smallest possible flow when necessary, and wherein the discharge end portion of the spout is provided in its bottom with means to break capillary attraction to allow the liquid to flow in drops when only a small amount of liquid is desired for the flotation machine.

Another object of the invention is to provide a feeder of this kind including a tiltable pan provided with a discharge spout and wherein the pan is provided with means to prevent surging of the liquid within the pan.

The invention consists in the details of construction and in the combination and arrangement of the several parts of my improved liquid reagent feeder whereby certain important advantages are attained, as will be hereinafter more fully set forth.

In order that my invention may be the better understood, I will now proceed to describe the same with reference to the accompanying drawings, wherein:

Figure 1 is a view, in top plan, of a liquid reagent feeder constructed in accordance with an embodiment of my invention;

Figure 2 is a fragmentary detailed sectional view taken substantially on the line 2—2 of Figure 1;

Figure 3 is an elevational view of one of the baffle plates unapplied;

Figure 4 is an elevational view of a second baffle plate unapplied;

Figure 5 is a view in side elevation of the feeder as illustrated in Figure 1;

Figure 6 is a detailed vertical sectional view taken substantially on the line 6—6 of Figure 5; and

Figure 7 is a fragmentary detailed sectional view taken substantially on the line 7—7 of Figure 5.

As illustrated in the accompanying drawings C denotes a container of desired dimensions and having its top face open. This container serves as a reservoir for the desired liquid reagent or chemical. This liquid, as herein disclosed, is delivered within the container C through a float controlled spout or nozzle 1 supported within the container C at the upper portion thereof, and adapted for communication with a suitable source of liquid supply. The float 2 associated with the spout or nozzle 1 operates in a conventional manner to close off the flow into the container C through the spout or nozzle 1 when the liquid within the container C reaches a predetermined level. As the structural details of the nozzle or spout 1 and the float 2 form no particular part of the present invention, a detailed description and illustration thereof is believed unnecessary.

Bridging the space between the end walls 3 of the container C and secured thereto in a conventional manner by the nuts 4 is a rod 5. This rod is positioned closely adjacent to the upper or open face of the container C and at a desired location between the side walls 6 of the container. Supported from above on the rod 5 is an elongated pan P, with the longitudinal axis of such pan P disposed at right angles to the rod 5. Depending from the bottom wall 7 of the pan P and disposed transversely thereof, is an elongated bearing 8 through which the rod 5 is freely disposed so that the pan P is supported for tilting movement. This bearing 8 is positioned at substantially the longitudinal center of the pan P and is maintained in desired position upon the rod 5 by the collars 9, keyed or otherwise suitably fixed to the rod 5 closely adjacent to the ends of the bearing 8.

The pan P is of such dimensions and the rod 5 is so located to allow the pan P to have unhampered tilting movement. As illustrated in Figures 1 and 6 of the drawings, the front or outer end wall 10 of the pan P is closely adjacent to a side wall 6 of the container C. This outer or front wall 10 carries an outstanding bracket 11 having an elongated opening 12 through which passes an end portion of an elongated headed shank or bolt 14 inserted from below through an outstanding bracket 15 carried by the adjacent side wall 6 of the container C. The shank or bolt 14, below the bracket 11, has threaded thereon a nut 16 which constitutes an adjustable stop for contact with the bracket 11 from below. Threading on the shank or bolt 14 above the bracket 11 is a wing nut 17 providing

means whereby the pan P may be effectively held or locked in its selected tilting position, as may be determined by the requirements of practice. It is believed to be obvious that the pan P may be held in a desired forward or backward tilting position upon proper adjustment of the nuts 16 and 17.

The upper portion of the front wall 10 of the pan P is provided with a V-notch *a* of desired size and which is defined by an outstanding spout 18. This spout 18 is of a length preferred and the bottom or apex of the spout 18, at its outer portion, is provided with a narrow or restricted slot 19 of desired length and open at its outer end.

The end portion of the pan P provided with the spout 18 has disposed thereacross a plurality of baffle plates 20, 21 and 22. While these plates in the present embodiment of the invention are three in number, it is believed that such number may be increased or even reduced if deemed advisable. These plates 20, 21 and 22 extend entirely between the side walls 23 of the pan P and are preferably equi-distantly spaced from each other with the forward baffle or plate 20 similarly spaced from the front wall 10. These plates 20, 21 and 22 are provided in their end portions with a series of vertically disposed openings 24 with the openings in said baffles or plates alternately arranged in staggered relation. The openings 24 in each of the plates 20, 21 and 22 have a total capacity equal to the largest flow intended to pass out through the spout 18. These baffles or plates 20, 21 and 22 serve to prevent surges when the feed of liquid from the container C to the pan P is uneven. This maintenance of the liquid in quiescence within the pan P is further assured by not having the openings 24 of one of the baffles or plates 20, 21 and 22 opposed to the openings in a second plate.

The pan P may be more particularly referred to as a distributing pan and the liquid reagent within the container C is discharged from above within the end portion of the pan P remote from the spout 18 through a discharge nozzle 25 depending from a pipe line 26 extending above the container C and leading from the upper end portion of a standpipe 27. This standpipe 27 has its lower portion in communication with a pump 28 of any desired type which serves to draw out the liquid within the container C and force the same up through the standpipe 27 for delivery into the pan P through the spout or nozzle 25. In the present embodiment of my invention the pump 28 is carried by an end wall 3 of the container C and an intermediate portion of said standpipe 27 is held to said end wall 3 by a suitable clamp 29.

The amount of flow out through the spout 18 is determined by the tilting adjustment of the pan P. The lower the forward tilt of the pan P, the greater the discharge through the spout 18 and vice versa. Therefore, it is to be particularly noted that effective control of the discharge through the spout 18 can be readily obtained upon proper tilting adjustment of the pan P and it is to be further stated that by having the notch *a* and, of course, the spout 18 in the form of a V, the stream flowing out through the spout 18 can range from substantially zero to full. The slot 19 in the outer end of the spout 18 at its low point serves to break the capillary attraction and will allow the liquid to flow in drops when only a small amount of discharge is needed.

The inner or rear end wall 30 of the pan P is provided in its upper marginal portion with an elongated opening or recess 31. This recess or opening 31 provides an overflow for the surplus liquid delivered to the pan P, and which surplus liquid returns within the container C.

From the foregoing description it is thought to be obvious that a liquid reagent feeder constructed in accordance with my invention is particularly well adapted for use by reason of the convenience and facility with which it may be assembled and operated.

I claim:

1. A liquid reagent feeder including a pan, means for holding the pan in selected tilted position, and a discharge spout carried by a wall of the pan and disposed substantially at right angles to the axis about which the pan tilts, said spout being V-shape in cross-section, the outer portion of the spout at its low point being provided with a restricted slot open at the outer end of the spout to provide means whereby liquid may flow from the spout in drops.

2. A liquid reagent feeder including an elongated pan, means for holding the pan in selected tilting position, a discharge spout carried by an end wall of the pan at the upper portion thereof and disposed substantially at right angles to the axis about which the pan tilts, and baffles disposed across the pan at the portion thereof to the discharge side of the axis upon which the pan tilts, each of said baffles being provided in one end portion with a plurality of vertically spaced openings, the openings in the baffles being alternately arranged in staggered relation, the openings of each baffle having a total capacity substantially equal to the largest flow of liquid to pass out through the spout.

3. A liquid reagent feeder including an elongated pan, means for holding the pan in selected tilting position, a discharge spout carried by an end wall of the pan at the upper portion thereof and disposed substantially at right angles to the axis about which the pan tilts, baffles disposed across the pan at the portion thereof to the discharge side of the axis upon which the pan tilts, each of said baffles being provided in one end portion with a plurality of vertically spaced openings, the openings in the baffles being alternately arranged in staggered relation, the openings of each baffle having a total capacity substantially equal to the largest flow of liquid to pass out through the spout, and means for delivering liquid within the end portion of the pan at the side of the axis upon which the pan tilts opposite to the discharge side of the pan, the end wall of said portion of the pan having an opening in its upper marginal portion to provide an overflow.

4. A liquid reagent feeder including an elongated pan, means for holding the pan in a tilted position, a discharge spout carried by an end wall of the pan at the upper portion thereof, said spout being disposed substantially at right angles to the axis about which the pan tilts and baffles disposed across the pan, said baffles lying in a plane substantially parallel to the plane of the axis about which the pan tilts each of said baffles being provided in one end portion with a plurality of vertically spaced openings, the openings in the baffles being alternately arranged in staggered relation, the openings of each baffle having a total capacity substantially equal to the largest flow of liquid to pass out through the spout.

FRITZ L. PALMQUIST.