Nov. 8, 1932. T. A. EVANS 1,887,347

REAGENT FEEDER

Filed March 21, 1931

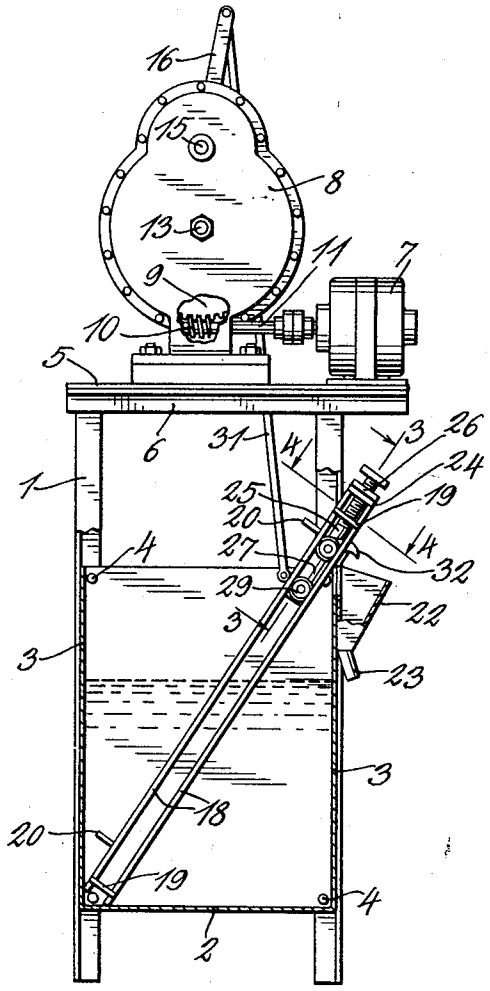


Fig. 1.

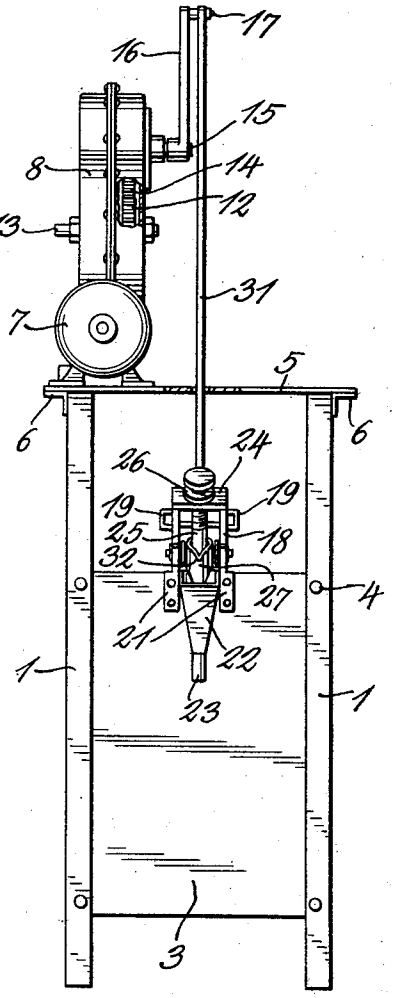


Fig. 2.

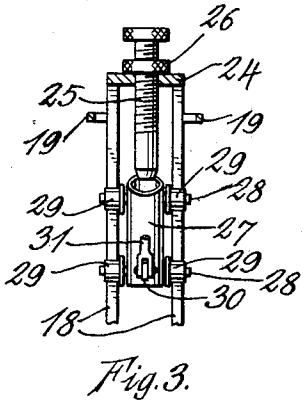


Fig. 3.

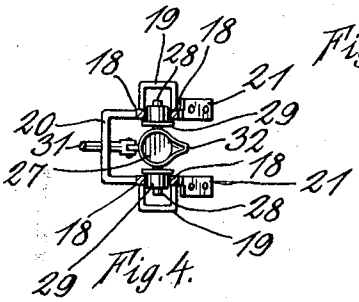


Fig. 4.

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REAGENT FEEDER

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This invention relates to improvements in reagent feeders of the type employed in connection with the conditioning of pulp for flotation separation of its mineral contents.

In the treatment of ores for the purpose of separating the mineral contents from the gangue by the flotation method, it is necessary to add to the pulp certain chemicals in predetermined proportions and these proportions must be maintained within narrow limits in order to get the best results.

It is the object of this invention to produce a simple and substantial reagent feeder for delivering certain predetermined amounts of a liquid chemical to the pulp that is being treated.

Another object of this invention is to produce a device of the type specified that shall be so constructed that the quantity of chemicals delivered can be very accurately adjusted so that the exact proportions can be maintained.

This invention, briefly described, consists of a tank that is adapted to contain a liquid chemical and which is provided with a platform located above the upper edge of the tank and which serves to support a motor and an operating mechanism. Extending upwardly from the bottom of the tank and terminating above the top thereof is a guide comprising four bars that are assembled in such a way as to form a rectangular structure. Located within the sides of this guide is a cup which is provided on opposite sides with two spaced rollers that are located between the bars of the guide and which serve to guide the cup in its upward and downward movement. Supported on the platform or table above the tank is a mechanism having a crank arm that rotates in a plane parallel to the plane in which the cup moves when it is reciprocated along the guides. A connecting rod has one end secured to a pin on the end of the crank and has the other end pivotally connected with the cup. When the crank rotates it reciprocates the cup along the guides. When the cup is immersed in the liquid it becomes filled with the liquid chemical and for the purpose of delivering a certain amount of this chemical when the cup reaches the upper end of its travel, a plunger has been provided that extends into the cup and displaces an amount of liquid proportional to the distance to which the plunger extends into the cup. Means is provided for adjusting the plunger so as to vary the amount of chemicals displaced.

Having thus briefly described the invention the same will now be described in detail and for this purpose reference will be had to the accompanying drawing in which the preferred embodiment of the invention has been illustrated, and in which:

Fig. 1 is a view partly in section and partly in elevation showing the improved reagent feeder;

Fig. 2 is a front elevation of the same;

Fig. 3 is a section taken on line 3—3, Fig. 1; and

Fig. 4 is a section taken on line 4—4, Fig. 1.

The tank is preferably formed from four angle irons which have been indicated by reference numeral 1 and which form supports for a sheet metal tank whose bottom has been indicated by reference numeral 2, and whose four sides have been indicated by reference numeral 3. The angle irons are secured to the corners of the tank by means of bolts or rivets 4. Secured to the upper ends of the corner members is a plate 5 that is preferably held in place by means of angle iron brackets 6. Secured to the plate 5 is a motor 7 and a gear housing 8. This housing contains a worm gear 9 that cooperates with a worm 10 on the end of the motor shaft 11. A gear 12 is secured to the shaft 13 that carries the worm gear and this in turn is in mesh with a gear 14 carried by the shaft 15. Secured to one end of shaft 15 is a crank 16 to the end of which a crank pin 17 is secured. When the motor operates crank 16 will be rotated about the shaft 15.

Located within the tank is a guide comprising four rectangular bars 18. These bars form a rectangular guide and are held together by means of U-shaped parts 19 and 20 in the manner indicated in Fig. 4. The width of the members 19 is less than that of the members 20 and the four bars therefore form the corners of a rectangle whose adjacent sides are of different lengths. The upper

end of the guide is provided with brackets 21 by means of which it is secured to the tank in the manner shown in Figs. 1 and 2. Secured to the outside of the tank directly beneath the guides and between the brackets 21 is a hopper 22, from the lower end of which a tubular discharge spout 23 projects. The upper end of the guide is provided with a transverse plate 24 that has a threaded opening in which is located a threaded plunger 25. A lock nut 26 is provided for holding the plunger in adjusted position.

Located between the bars 18 is a cup 27. This cup is provided on opposite sides with a pair of trunnions 28, on which are rotatably mounted rollers 29. These rollers are of the proper size to fit between two of the bars 18 and guide the cup in its movement along the guide. The lower end of the cup is provided with an upwardly extending lug 30 to which the lower end of the connecting rod 31 is pivotally connected. When the crank arm 16 rotates, it will reciprocate the cup along the guides. The length of the crank arm is so proportioned that it will move the cup the entire length of the guides and therefore during each revolution of the crank the cup will move from the position shown in Fig. 1 to the bottom of the tank and back again. During the time that the cup is submerged in the liquid it will become filled with liquid chemical and when it reaches the upper end of the stroke, the plunger 25 will enter the upper end of the cup and displace a certain amount of the liquid which will flow outwardly through the spout 32 and be deposited in the hopper 22 from which it will pass into the conditioning tank. By the simple expedient of turning the plug 25 so as to move it either upwardly or downwardly, the amount of liquid displaced at each stroke, or at the end of the travel of the cup can be regulated with great nicety, and in this way the exact amount of chemicals delivered to the pulp in a given time can be adjusted. In Fig. 3 I have shown the lower end of the plunger as slightly tapered, but I wish it understood that it can be tapered to a point or rounded, or made of any other shape that may be found advantageous.

From the above description, it will be seen that I have produced a reagent feeder of a very simple construction that is adapted for feeding liquid chemicals at a predetermined rate. The quantity of liquid delivered at the end of the travel of the cup can be regulated with great nicety by means of the plunger shown and described.

Having described the invention what is claimed as new is:

1. A device of the class described, comprising, in combination, a tank for containing a chemical, an inclined guide extending from the bottom of the tank to the top thereof, a cup slidably connected with the guide, means for reciprocating the cup along the guide, and an adjustable plunger secured to the upper end of the guide and so positioned that its lower end will project downwardly into the cup when the latter is in its uppermost position whereby a quantity of liquid proportional to the depth to which the plunger extends into the cup will be displaced.

2. A device of the class described, comprising, in combination, a tank for containing a liquid chemical, a guide extending into the tank from top to bottom thereof, said guide comprising two pair of spaced bars, a cup having two rollers on each side for extending into the space between the bars at each pair, and for slidably supporting the cup, a crank arm secured to the tank above the top thereof, said arm being rotatable in a plane parallel to the guides, a connecting rod having one end connected with the end of the crank arm and the other end pivotally connected with the cup whereby the latter will be moved along the guides when the crank arm rotates, a plunger secured to the upper end of the guide and so positioned that it will extend into the open end of the cup when the latter is in its uppermost position whereby liquid will be displaced from the cup and means for adjusting the position of the plunger in the direction of its length whereby the amount of liquid displaced at the end of the travel of the cup can be varied.

In testimony whereof I affix my signature.

THOMAS ARNOLD EVANS.