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UPWARD CURRENT SEPARATING PROCESS AND DEVICE.

APPLICATION FILED JULY 3, 1917.

1,339,683. **Patented May 11, 1920.**

FIG. 1

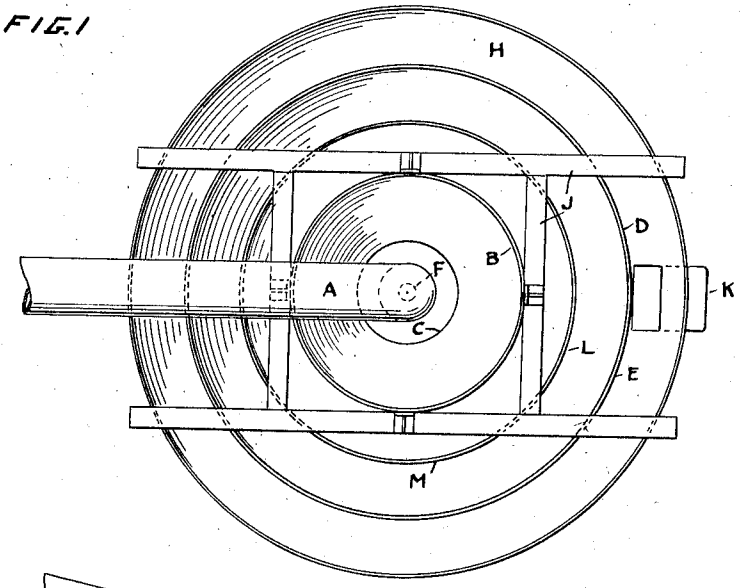
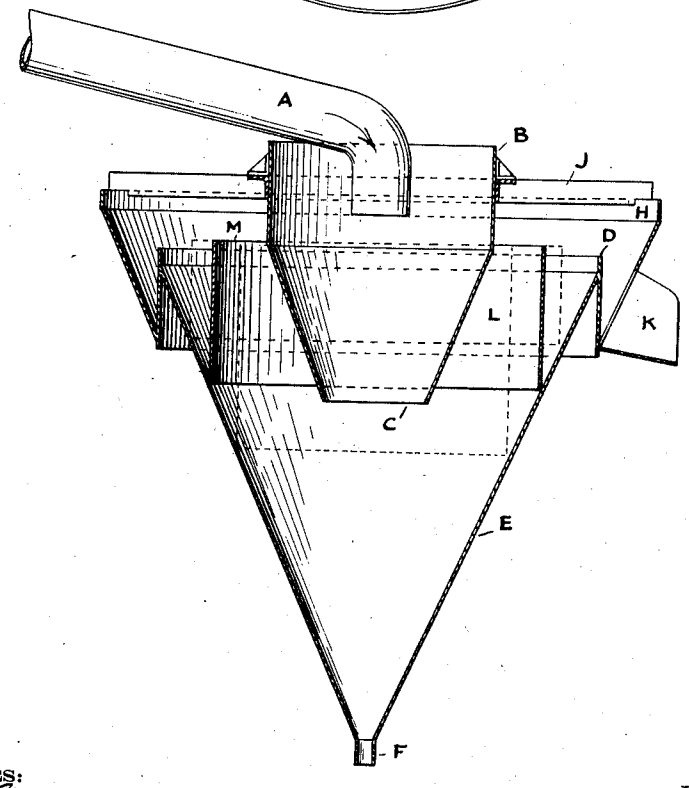


FIG. 2



WITNESSES:

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UPWARD-CURRENT SEPARATING PROCESS AND DEVICE.

1,339,683. Specification of Letters Patent. Patented May 11, 1920.

Application filed July 3, 1917. Serial No. 178,350.

To all whom it may concern:

Be it known that I, CHARLES ALLEN, a citizen of the United States, residing at El Paso, in the county of El Paso and State of Texas, have invented new and useful Improvements in Upward-Current Separating Processes and Devices, of which the following is a specification.

This invention relates to separating, classifying or dewatering devices wherein the material to be treated is introduced into a settling tank or cone at a point below the normal surface level of the contents and the finer particles are discharged by overflowing the rim of the tank. A centrally disposed nozzle or twyer having its lower end disposed below the normal level of the material in the tank is employed in this type of device for introducing the material to be treated. The annular space between the twyer and sides of the tank represents the working area of the device. A certain area has a definite capacity for a certain class of work and in order to be able to vary the class of work to the best advantage so that the working area of the tank will be properly proportioned according to the volume fed thereto, this annular space should be made variable in area. Then by installing a device of ample capacity the working area can be reduced to suit a variety of conditions and the present invention provides means which permits this being done with the greatest facility and ease.

One form which my invention may assume is exemplified in the following description and illustrated in the accompanying drawings, in which—

Figure 1 shows a plan view of a conventional type of separating device embodying my invention.

Fig. 2 shows a vertical, central, sectional view of the same.

In the accompanying drawings, I show a separator and classifier which for illustration may comprise an inverted cone-shaped tank E having a discharge orifice at its apex F and carrying at its top upon the supports J an open-ended cone-shaped nozzle or twyer B, stationarily mounted and adapted to have its mouth C extended below the top of the tank. The liquid carrying solids in suspension is supplied through a pipe A and enters the nozzle B passing through its mouth C into the tank E. A portion of the material introduced is discharged from the tank through the outlet orifice at the apex F and the remainder or finer particles rise from C around the outside of the twyer and is discharged by overflowing the rim or lips D of the tank, passing into a launder H and being carried off by a spout K.

With any given volume of liquid fed into the twyer the velocity of the upward flow from C to D depends on the area of the annular space between the outside of the twyer and the inside of the tank E, and as the rising velocity of this flow determines the size of the solid particles carried over the lip D, it is important that the velocity be under easy control. Assume that the velocity of the rising flow is insufficient to carry with it as large solid particles as is desired and it is not practicable to increase the volume of liquid fed from the pipe A, then to secure the necessary increase in velocity of the rising flow from C to D the area of the annular space between B and E must be reduced. This is done by the use of a reduction ring L, which is of the required diameter to obtain the desired results. The upper edge M of the ring may be level with the top of the tank, below it or above it, depending upon the character of work to be done by the rising current in the annular space. As shown herein the ring L is resting upon and supported by the sides of the cone E. The bottom of the ring L should fit close enough to the sides of the tank to prevent solid particles carried over the upper edge M from again entering the tank by passing between said ring and tank. This fit may or may not require packing or calking depending upon the shape and finish of the parts.

Various changes in the construction and arrangement of the several parts herein shown and described may be employed without departing from the spirit of my invention as disclosed in the appended claims.

I have shown in dotted lines in Fig. 2 the positions which larger and smaller rings would occupy to illustrate the manner of varying the effective working area of the tank.

Having thus described my invention what I claim and desire to secure by Letters Patent is:

1. In a separating and settling device, a container wherein a liquid and solid particles carried thereby overflow the rim thereof, a centrally disposed nozzle extend-

ing into said container and having an open mouth below the normal level of the contents of the container, and interchangeable means adapted to be positioned around the nozzle and within the container to control the overflow velocity of the liquid from the container by varying the diameter of the container at the overflow level.

2. In a separating and settling device employing an inverted cone-shaped settling tank wherein the finer particles overflow the rim of the tank, a nozzle for the introduction of material extending below the normal level of the contents of the tank and means independent of the supply nozzle for varying the area of the annular space between the nozzle and the tank whereby to vary the velocity of the upward flow of material from the bottom of the nozzle to the top of the tank by changing the overflow periphery.

3. In a separating and settling device employing an inverted cone-shaped settling tank wherein the finer particles overflow the rim of the tank, a twyer for the introduction of material extending below the normal level of the contents of the tank and means for varying the working area of the annular space between the twyer and the tank whereby to vary the velocity of the upward flow of material from the bottom of the twyer to the top of the tank, said means comprising a band freely resting on the sides of the cone-shaped tank and surrounding the twyer.

4. A method of varying the size of the particles overflowing the top of the tank in a settling device which consists in reducing the cross sectional area available for classification by introducing an overflow periphery positioned within the overflow periphery of the tank.

5. A method of varying the upward movement of a liquid carrying solid particles overflowing the top of the tank in a settling device by varying the length of the overflow periphery, whereby the velocity of the overflow of the liquid over the overflow lip is controlled.

6. A method of varying the size of the particles overflowing the top of a settling tank, in a settling device, which consists in altering the position of the overflow lip by varying the distance between the overflow lip and the center of the tank.

7. In a settling apparatus, the combination of an inverted cone-shaped settling tank having a rim overflow, of means providing an inlet for the introduction of material below the normal level of the tank contents, and a removable ring adjacent to the walls of the container and coöperating with the latter for varying the overflow area of the apparatus.

8. In a settling apparatus, the combination of an inverted cone-shaped settling tank having a rim overflow, of means providing an inlet for the introduction of material extending below the normal level of the tank contents, and an interchangeable ring interposed between the inlet and the walls of the container and resting freely upon the latter to exclude from the effective working area of the apparatus the space outside of said ring.

9. A separating and settling device comprising a container with which the liquid and solid particles carried thereby overflow the rim thereof, a centrally disposed nozzle extending into the container and below the level of the overflow of the contents of the container, and interchangeable means whereby the velocity of overflow of the liquid may be determined.

10. A separating and settling device comprising an inverted cone-shaped settling tank having a rim overflow, a centrally disposed feed nozzle extending into the tank and below the overflow level, and means disposed between the feed nozzle and the rim overflow for varying the velocity of overflow of the liquid.

11. A separating and settling device comprising an inverted cone-shaped settling tank having a rim overflow, a centrally disposed feed nozzle extending into the tank and below the overflow level, means disposed between the feed nozzle and the rim overflow for varying the velocity of overflow of the liquid, said last named means comprising removable, interchangeable rings of different diameters adapted freely to rest and be supported on the interior of the tank.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

CHARLES ALLEN.

Witnesses:
ELDRED V. ANSPACH,
W. O. MOORE.