R. D. JACKSON.

PULP CLASSIFIER.

APPLICATION FILED MAY 26, 1917.

1,316,038.

Patented Sept. 16, 1919.

Fig. 2

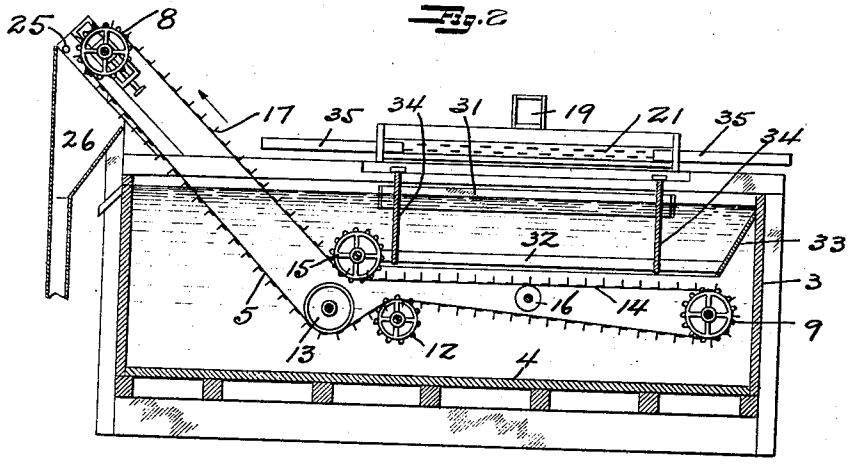
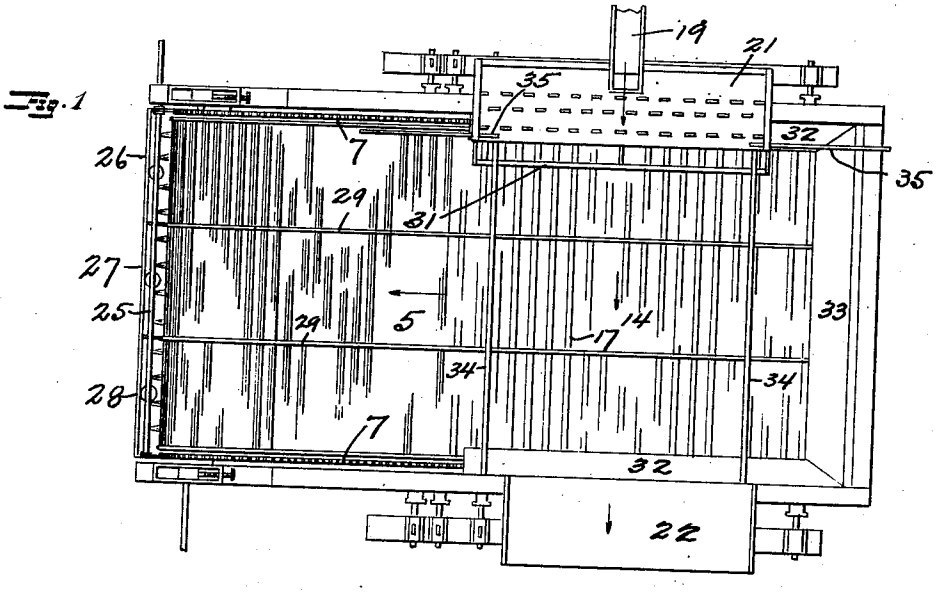


Fig. 1



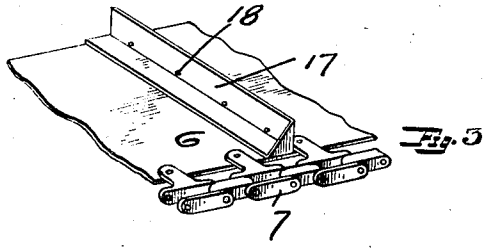


Fig. 3

WITNESS

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UNITED STATES PATENT OFFICE.

ROBERT D. JACKSON, OF SAN FRANCISCO, CALIFORNIA.

PULP-CLASSIFIER.

1,316,038. Specification of Letters Patent. Patented Sept. 16, 1919.

Application filed May 26, 1917. Serial No. 171,165.

To all whom it may concern:

Be it known that I, ROBERT D. JACKSON, a citizen of the United States, and a resident of the city and county of San Francisco and State of California, have invented certain new and useful Pulp-Classifiers, of which the following is a specification.

The invention relates to classifiers for separating particles of material of different sizes and is particularly adapted to be used in metallurgical operations for classifying pulp or for separating sands from slimes.

An object of the invention is to provide a classifier in which the larger particles of the pulp settle directly on a conveyer by which they are removed from the settling tank.

Another object of the invention is to provide a classifier in which a plurality of classifications may be accomplished at one time.

A further object of the invention is to provide a classifier which is adjustable to produce a given classification for variations in the feed.

The invention possesses other advantageous features, some of which, with the foregoing, will be set forth at length in the following description where I shall outline in full that form of the invention which I have selected for illustration in the drawings accompanying and forming part of the present specification. In said drawings I have shown one specific form of my invention, but it is to be understood that I do not limit myself to such form, since the invention as expressed in the claims may be embodied in a plurality of forms.

Referring to said drawings:

Figure 1 is a top or plan view of one form of classifier of my invention.

Fig. 2 is a longitudinal vertical section of the classifier shown in Fig. 1.

Fig. 3 is a perspective view of a fragment of the conveyer.

In the classifier of my invention I employ a movable conveyer upon which the oversize or heavier particles settle directly and by which they are carried from the settling tank. The smaller particles or fines are carried out by the current of water or solution. The classifying current flows transversely of or across the conveyer so that the oversize particles thereon are graded into different sizes and means are provided for removing and maintaining the separation of these grades.

The classifier of my invention comprises a tank 3 into which the pulp or other material to be classified, is fed. Arranged in the tank above the bottom 4 is an endless conveyer 5 which moves longitudinally of the tank and which is substantially as wide as the tank. The conveyer consists preferably of a belt 6, supported at the edges and driven by chains 7, which engage in suitable sprockets 8 and 9 at the opposite ends of its run, sprockets 8 preferably serving as the driving sprockets and being adjustable, so that the tension on the chains may be varied. The lower run of the belt is held taut and prevented from slapping by the sprockets 12 and the holding-down idler drum 13. A portion 14 of the upper run conveyer is arranged horizontally and is maintained in that position by the sprockets 15 and the supporting drum 16, and the remainder of the upper run is inclined upwardly to the sprockets 8, this inclined portion extending above the level of the liquid in the tank and preferably over the edge of the tank. Secured to the belt are a plurality of transversely disposed buckets 17 preferably formed of sheet metal bent into an angle shape and closed on the ends. The buckets are provided at the lower portion of their upstanding walls with a plurality of small holes 18 through which the liquid drains from the buckets as they move up along the inclined path of the conveyer. These holes also serve to release the air from the buckets after they enter the solution on the lower run of the conveyer.

The material to be classified flows from the launder 19 onto the spreading board 21 and thence into the tank. The liquid carrying the fines passes over the discharge apron 22. The spreading board is arranged at one side of the tank and the discharge board at the opposite side, so that the classifying current travels transversely of the conveyer, and the horizontal portion 14 of the conveyer is arranged within the zone defined by the width of the spreading board or the discharge apron, so that the distance between the surface of the liquid and the underlying conveyer is the same at all points in the classifying current. This arrangement insures similar classification at all points in a strip taken longitudinally of the conveyer.

Since the classifying current flows trans-

versely of the conveyer, a graded classification of the material is produced, the larger and heavier particles depositing along the edge of the conveyer adjacent the feed side of the tank and the successively lighter particles depositing at successive zones across the belt. The graded material is preferably removed from the conveyer in selected grades and each grade discharged into a separate hopper, by jets of water discharging from the pipe 25 arranged adjacent the driving sprockets 8. In the present construction I have shown three hoppers 26, 27 and 28 for receiving three grades of the classified material, but any number of hoppers may be used and any desired grading may be obtained. When a definite grading is desirable, I prefer to divide the conveyer surface longitudinally into fixed zones by ridges 29, but these may be omitted, when desired.

Arranged adjacent the spreading board 21 and extending below the level of the liquid in the tank is a diving board 31 under which all of the pulp fed into the tank must pass, thereby insuring submergence of all of the particles and preventing a surface velocity of the current which is in excess of its normal velocity. In order to cause all of the settling material to fall onto the conveyer and to pervent it from passing into the bottom of the tank, through the spaces between the conveyer and the sides of the tank, I arrange the deflecting aprons 32 along the sides of the tank directly above the chains and the deflecting apron 33 along the edge of the tank directly over the sprockets 9.

In order to insure the same classification of the material regardless of the quantity of the feed, or to vary the classification while maintaining the same feed, I have provided means for varying the width of the classifying current so that with a varying feed its speed may be maintained constant or with a constant feed, its speed may be varied. Mounted on the frame of the tank and depending into the liquid therein and extending to adjacent the conveyer are movable channel boards 34, between which the classifying current passes from the spreading board to the discharge apron. These channel boards are supported on beams, the ends of which rest on shelves on the sides of the tank, so that the channel boards are readily movable longitudinally of the tank to vary the width of the classifying current, whereby the density of the pulp may be kept constant with a different feed. Deflecting blocks 35 are arranged on the spreading broad to direct the incoming pulp between the channel boards and these blocks are slidable over the spreading board, so that the width of the feed stream may be readily varied.

I claim:

1. In a pulp classifier, a settling tank adapted to receive the pulp to be classified, an imperforate conveyer arranged to move longitudinally in said tank, and extending from side to side of said tank substantially throughout the length of said tank, longitudinal ridges on said conveyer dividing it into transverse zones and means for producing a classifying current transversely of said conveyer.

2. In a pulp classifier, a settling tank adapted to receive the pulp to be classified, an imperforate conveyer of substantially the same width as said tank arranged to move longitudinally in said tank, and having a horizontal portion, deflecting aprons overlying the edges of said horizontal portion, a feed inlet arranged at one longitudinal side of the tank over the horizontal portion and a discharge outlet arranged on the other side of the tank opposite the feed inlet.

3. In a classifier, a settling tank adapted to receive the material to be classified, a horizontal movable conveyer in said tank arranged to directly receive the settled material, means for producing a classifying current across said tank and means for confining said current above the horizontal conveyer.

4. In a classifier, a settling tank adapted to receive the material to be classified, a flat horizontally disposed conveyer arranged to move longitudinally in said tank, a feed inlet at one longitudinal side of the tank, a discharge outlet at the opposite side and channel boards extending across the tank for directing the current of material directly across the tank.

5. In a classifier, a settling tank adapted to receive the material to be classified, a conveyer arranged to move longitudinally in said tank, a feed inlet at one longitudinal side of the tank, a discharge outlet at the opposite side, and channel boards movable longitudinally of the tank arranged transversely of the tank above the conveyer and adapted to be moved to vary the width of the classifying current.

6. In a classifier, a settling tank adapted to receive the material to be classified, a conveyer arranged to move longitudinally in said tank, a feed inlet at one longitudinal side of the tank, a discharge outlet at the opposite side, channel boards movable longitudinally of the tank arranged transversely of the tank, and means for directing the material from the feed inlet between said channel boards.

7. In a classifier, a settling tank adapted to receive the material to be classified, a conveyer arranged to move longitudinally in said tank and having a horizontal portion, a feed spreading board arranged at one

longitudinal side of the tank, a discharge apron arranged at the opposite side of the tank, and channel boards for confining the cross current above the horizontal portion of the conveyer.

8. In a classifier, a settling tank adapted to receive the material to be classified, a conveyer arranged to move longitudinally in said tank, a feed spreading board arranged at one longitudinal side of the tank, a discharge apron arranged at the opposite side of the tank, movable channel boards arranged across the tank between the spreading board and the discharge apron and adjustable means for varying the effective width of the spreading board so that the material is introduced between said channel boards.

9. In a classifier, a settling tank adapted to receive the material to be classified, a conveyer arranged to move longitudinally in said tank and to directly receive the settled material and deflecting aprons secured to the sides of the tank above the conveyer and overlying the edges thereof.

In testimony whereof, I have hereunto set my hand at San Francisco, California, this 18th day of May 1917.

ROBERT D. JACKSON.

In presence of—
H. G. PROST.