

July 16, 1957

M. BOOGAARD
METHOD AND APPARATUS FOR THE SEPARATION OF SOLIDS
FROM LIQUID-SOLID MIXTURES
Filed Aug. 19, 1953

2,799,394

FIG.1

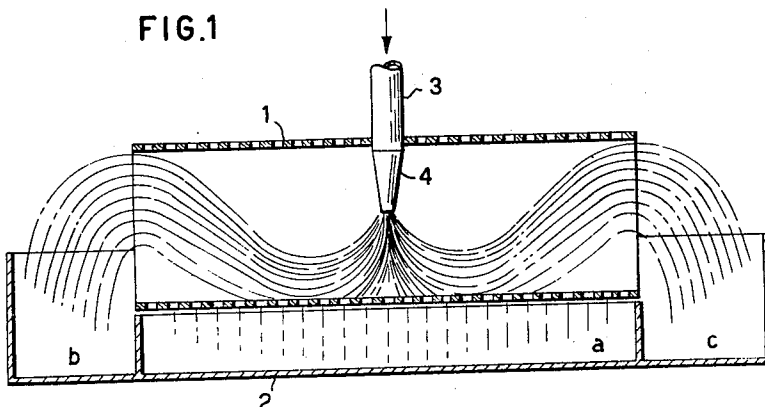


FIG.2

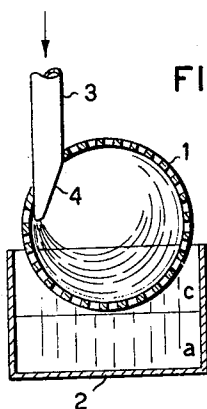
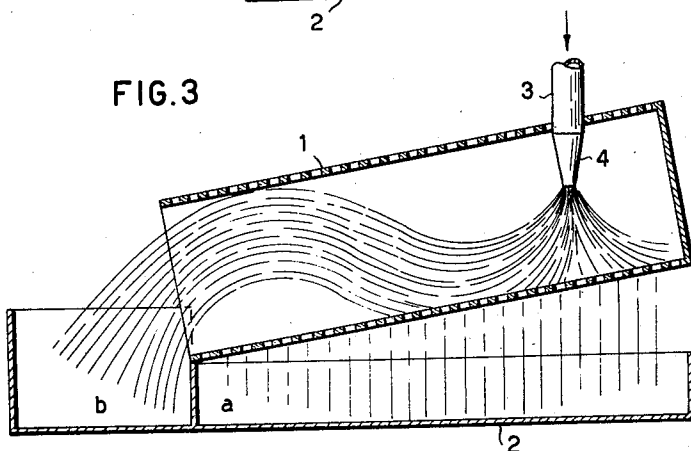


FIG.3



INVENTOR

MATTHIJS BOOGAARD

William J. Fox

BY

ATTORNEY

1

2,799,394

METHOD AND APPARATUS FOR THE SEPARATION OF SOLIDS FROM LIQUID-SOLID MIXTURES

Matthijs Boogaard, Smilde, Netherlands, assignor to
Dorr-Oliver Incorporated, Stamford, Conn., a corporation of Delaware

Application August 19, 1953, Serial No. 375,271

3 Claims. (Cl. 210-73)

The present invention relates to a method for the separation of fibres contained in slurries, pulps, ground or sliced material, from liquids and/or suspensions and also to apparatus for carrying this method into effect.

The main object of the invention is to provide simple means for efficiently separating fibres from liquids, suspensions and the like.

Another object of the invention is to provide means for such separation in which rotary parts are avoided.

According to the invention, said separation can be obtained by forcing the slurry, pulp, ground or sliced material, from a suitably located and shaped nozzle tangentially along the interior of a stationary perforated cylindrical wall.

The invention can be used advantageously for example in separating the slurry obtained by mashing potatoes into fibres and starch containing liquid, or else in eliminating the water contained in paper pulp, beet slicings and the like.

By way of example the drawings attached illustrate two possible embodiments of an apparatus for carrying the invention into effect. These drawings are purely diagrammatical.

In Fig. 1 a vertical section of the first embodiment is shown;

Fig. 2 is a corresponding cross section through the perforated cylindrical wall with a spray nozzle.

Fig. 3 is a vertical section of the second embodiment.

In the embodiment illustrated in Fig. 1, a stationary cylinder 1 with a perforated circumferential wall and without end walls is mounted in horizontal position above a collecting tank 2. This tank 2 is divided into three compartments in such a way that the central compartment *a* has a length which equals that of cylinder 1, so that the two outer compartments *b* and *c* extend at both sides.

The three compartments can be provided with an automatically operating discharge device. If this is not the case, they have to be emptied from time to time.

Into cylinder 1, in the middle of its length and in tangential direction, a feed pipe 3 extends provided with spray nozzle which, at 4, where it rests against the inside of a cylinder, has been flattened similar to the mouthpiece of an organ tube, with a view to direct the feed to the inside of the cylinder wall.

When pressing the slurry, pulp or slicings by means of a pump through the feed pipe 3, the flow leaving the nozzle will be forced to follow circular and spiral trajectories. As a result of the thus created centrifugal force, all the liquid or the suspension, as the case may be, will be pressed through the perforations of the cylindrical wall to be collected in the central compartment *a*, from which it is discharged, whereas the fibres, which could not escape through the perforated cylindrical wall, are discharged through the two cylindrical ends in form of thick clots, falling into the compartments *b* and *c* of the collecting tank 2, from where these fibres are transported off.

Figure 3 shows a second embodiment in which the

2

cylinder 1 is mounted in inclined position. The lower end of the cylinder is open, the upper end is closed. The vertically arranged nozzle 3 is mounted in tangential direction at the upper half of the cylinder wall, so that right from the beginning the flow is directed somewhat to the lower cylinder wall. The compartment *a* of the collecting tank 2, destined to receive the liquid or the suspension, has about the same length as the horizontal projection of cylinder 1. The compartment *b*, destined to receive the fibres, connects at the lower end of the cylinder against the compartment *a*. In this case the compartment *b* must have larger dimensions than each of the compartments *b* and *c* in Fig. 1, because now all the fibres have to be collected into only one single compartment.

Having now described my invention and the objects thereof, what I claim is:

1. A continuous method for separating a liquid fraction from a fibrous pulp, which comprises the steps of passing said pulp through a stationary, hollow cylinder having a peripheral portion permeable to a liquid fraction of said pulp but substantially impermeable to the fibrous fraction of said pulp by tangentially introducing said pulp to the inside periphery of said cylinder at such velocity that the kinetic energy of the influent stream comprises a sufficient energy source to bring about the movement of pulp in a spiral path adjacent said permeable peripheral portion while said liquid fraction in said layer passes from said fibrous fraction through said permeable peripheral portion; said kinetic energy being additionally sufficient to result in the self-discharge of said fibrous fraction of the pulp from the cylinder; removing the liquid fraction immediately after it passes through said permeable peripheral portion discharging fibrous fraction from the cylinder; said method being further characterized in that the center line of the cylinder is horizontally disposed, said pulp is introduced into the upper half of said cylinder about midway of the ends thereof; and the fibrous fraction of said pulp is discharged from both ends of said cylinder.

2. An apparatus for separating a liquid fraction from a fibrous pulp, comprised solely of stationary elements including a cylinder having a wall portion permeable to said liquid fraction of the pulp but substantially impermeable to the fibrous fraction of said pulp, and having a discharge outlet adapted for continuous discharge or fibrous fraction from one end thereof; a peripheral inlet means which comprises a stationary conduit tangentially disposed to the inside circumferential surface of said cylinder, arranged transversely to the center line of said cylinder, but spaced from said discharge outlet, said conduit being adapted with a flattened discharge nozzle to introduce the pulp under pressure as a thin layer adjacent said surface; means for receiving said liquid fraction passing through said permeable wall portion; means for receiving the fibrous fraction discharged through said outlet; said apparatus being further characterized in that the center line of said cylinder is horizontally disposed and said cylinder has an outlet at the other end thereof, with said feed conduit disposed substantially midway of the outlets.

3. An apparatus for separating a liquid fraction from a fibrous pulp, comprised solely of stationary elements including a cylinder having a wall portion permeable to said liquid fraction of the pulp but substantially impermeable to the fibrous fraction of said pulp, and having a discharge outlet adapted for continuous discharge of fibrous fraction from one end thereof; a peripheral inlet means which comprises a stationary conduit tangentially disposed to the inside circumferential surface of said cylinder, arranged transversely to the center line of said

cylinder, but spaced from said discharge outlet, said conduit being adapted with a flattened discharge nozzle to introduce the pulp under pressure as a thin layer adjacent said surface; means for receiving said liquid fraction passing through said permeable wall portion; means for receiving the fibrous fraction discharged through said outlet; said apparatus being characterized in that the center line of said cylinder is horizontally disposed and said cylinder has an outlet at the other end thereof, and in which said feed conduit is disposed substantially midway of the outlets with said nozzle opening into the upper portion of said cylinder.

References Cited in the file of this patent

UNITED STATES PATENTS

1,563,904 Kerckhoff et al. ----- Dec. 1, 1925

1,926,546
1,993,214
2,005,770
2,056,310
2,463,814
2,631,728
2,661,096
2,661,664

5

10

15

Lampen ----- Sept. 12, 1933
Hass ----- Mar. 5, 1935
Bleser ----- June 25, 1935
Palmer ----- Oct. 6, 1936
Skinner ----- Mar. 8, 1949
Popp ----- Mar. 17, 1953
Tinker ----- Dec. 1, 1953
Baxter ----- Dec. 8, 1953

FOREIGN PATENTS

Germany ----- Aug. 29, 1902
Germany ----- Sept. 8, 1910
Germany ----- Sept. 6, 1923