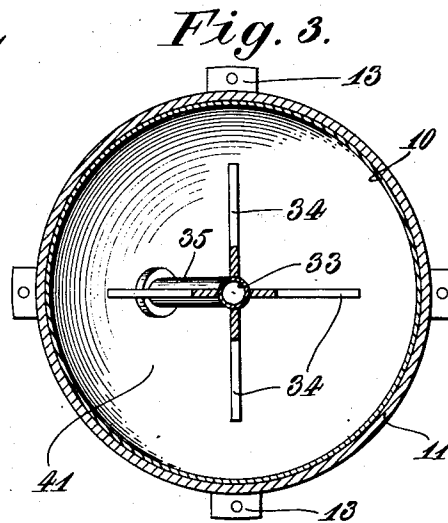
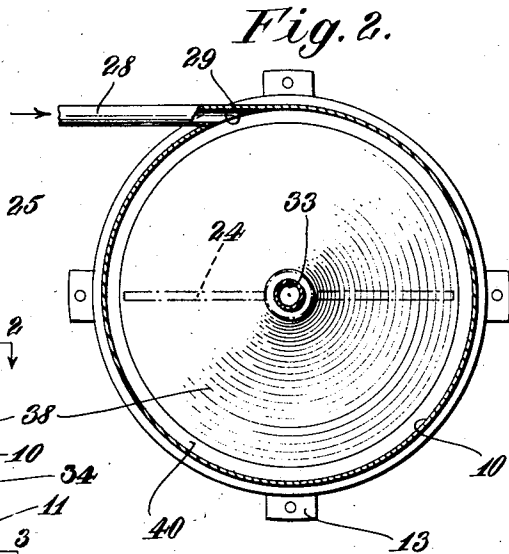
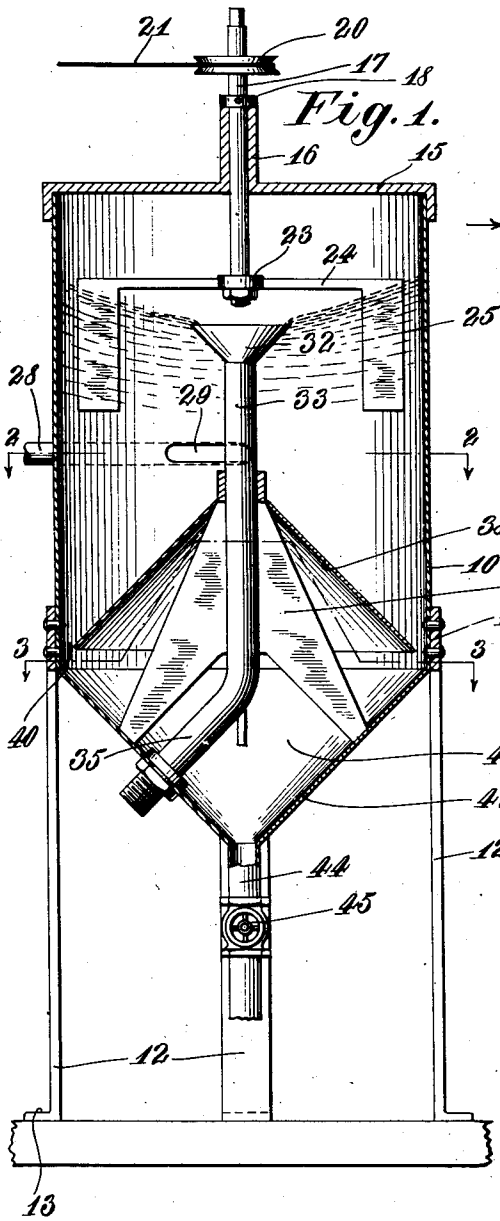


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GYROSCOPIC SEDIMENTATION APPARATUS.
APPLICATION FILED MAY 6, 1918.

1,301,544.

Patented Apr. 22, 1919.



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GYROSCOPIC SEDIMENTATION APPARATUS.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, BENJAMIN B. CROMBIE, a citizen of the Dominion of Canada, residing at Port Chester, in the county of Westchester and State of New York, have invented new and useful Improvements in Gyroscopic Sedimentation Apparatus, of which the following is a specification.

This invention relates to improvements in apparatus for separating liquids into portions according to their respective specific gravity.

The main object of the invention is to provide an apparatus in which the liquid or liquids are caused to whirl or rotate gyroscopically, within a cylindrical tank, so that the lighter portions, due to the whirling effect, or circumvolution imparted, separate and rise above the heavier portions and, being received in a suitable conveyer, pass outwardly from the apparatus, while the lower portions, by reason of their greater specific gravity, pass out through another conveyer.

Another object is to provide means whereby the entering current of liquid is so directed as to ordinarily cause such rotary effect to take place in the body of the liquid within the tank, additional mechanical means being employed when necessary.

Still another object is to provide means whereby the solid, if any, together with the heavier portions may be withdrawn without ceasing the operation of the apparatus, which is substantially continuous.

These and other like objects, such as compactness, efficiency of operation and ready control, are attained by the novel construction and combination of elements, principles and processes hereinafter described and shown in the accompanying drawing, forming a component part of this disclosure, and in which:—

Figure 1 is a vertical sectional view taken substantially on the center line of an embodiment of the apparatus.

Fig. 2 is a transverse sectional view taken on line 2—2 of Fig. 1, and

Fig. 3 is a similar sectional view taken on line 3—3 of Fig. 1.

In the drawings, the numeral 10 designates the body of the apparatus consisting of a cylindrical tubular casing, having at its bottom a reinforcing band 11, from which extend supports 12, flanged outwardly at their lower ends 13, so as to be secured

firmly upon any desired, relatively level foundation.

At the top of the tank 10, is a tightly fitted cover 15, having an upwardly extending rigid hub 16, at its center and rotatably mounted in the hub is a vertical shaft 17, provided with a fixed collar 18, resting on top of the hub and supporting the weight of the shaft and attached parts.

Secured to the shaft, above the collar 18 is a grooved pulley 20, driven by any convenient source of power by the belt 21. Also secured to the shaft 17, below the cover 15, is a hub 23 formed with horizontal arms 24, having at their ends downwardly extending vanes or paddle blades 25, adapted to enter the body of liquid in the tank and cause the same to rotate therewithin at a high speed when required.

The liquid to be separated is entered into the tank through a pipe 28, the same being positioned tangentially to its inner surface, the inlet 29 being elongated so that the current meets with no obstruction except the body of liquid in the tank which is thereby caused to rotate at a high velocity, sufficient to present a conical upper surface.

Engaged centrally in the tank is an open funnel 32, adapted to receive the whirling liquid and convey the same downward through the support tube 33, held by braces 34, and having an angularly disposed outlet 35, to which other pipe connections may be made.

The braces 34 extend below an inverted cone 38, between the peripheral edges of which and the inner circumference of the tank 10 is an annular space 40, permitting the heavier portions of the liquid, together with the sediment, to enter the sedimenting compartment 41.

The braces 38, are fixed upon the bottom 42, of this compartment or chamber, which is formed in the manner of a cone, and has engaged at its center, a pipe 44, controlled by a valve 45, by means of which the residue may be removed at any time, this forming a novel, complete and positive type of centrifugal separator, in which the liquid or any combination of liquids or semi-liquids are acted upon by the well known natural forces of gravity, centrifugal action and mechanically imparted rotation, in an efficient manner.

It will be obvious that the construction of the apparatus is such that it can be con-

tinuously operated and that it contains no delicate parts liable to disarrangement, hence is applicable for use with the heaviest of liquids or semi-liquids and can be safely operated by inexperienced labor without danger of injuring the mechanism or the operator.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is—

1. In a gyroscopic separator, the combination with a vertical cylindrical tank and fixed supports upon which said tank is mounted, of an inlet arranged tangentially to the interior of said tank, a funnel centrally within said tank at a point above said inlet, an outlet connected with said funnel, a sedimentary chamber in the base of said tank, means in said chamber for separating the sediment from the effluents and means for withdrawing the sediment.

2. In a gyroscopic separator, the combination with a vertically mounted cylindrical tank, of an inlet pipe entering said tank in such manner as to cause the contents to gyrate therewithin, a funnel in said tank adapted to receive the upper stratum of liquid within said tank when in rapid gyratory motion, means for delivering liquid entering said funnel outwardly of said tank, and means for separating the sedimentary matter from the lighter liquid contents of said tank.

3. In a gyroscopic sedimentation apparatus, the combination with a cylindrical tank having a conical bottom, of an inverted conical partition secured contiguous to said bottom, the periphery of said partition being spaced from the interior of said tank, means for extracting sedimentary matter from said conical bottom, an open funnel secured centrally of said tank above said inverted cone, a tube connected with said funnel extending angularly outward from said tank, a control means for said tube, means for supporting said funnel and tube, and an

inlet to said tank, said inlet discharging tangentially below said funnel and adapted to cause the contents of said tank to rotate at a high speed.

4. In a gyroscopic separator, the combination with a vertically mounted cylindrical tank, of an inlet pipe entering said tank at a tangent, a collecting funnel having a discharge connection leading outward from said tank, means for the separation of sediment from the liquids entered by said inlet, and mechanical means adapted to cause the liquid contents of said tank to rapidly gyrate so that the lighter portions are received in said funnel.

5. In a gyroscopic separator, the combination with a vertically mounted cylindrical tank, of an inlet pipe entering said tank in such manner as to cause the contents to gyrate therewithin, two or more paddle blades extending downwardly into the matter entered by said inlet pipe, means for supporting said blades, means for rotating said blades, an open funnel in said tank, a discharge pipe connected with said funnel leading outwardly from said tank, means for separating sediment from the liquids in said tank, and means for discharging the sediment therefrom.

6. In a gyroscopic separator, the combination with a vertically mounted cylindrical tank, having an inlet and a tight fitted cover, of a vertical shaft journaled centrally in said cover, means for rotating said shaft, a horizontal bar carried by said shaft within said tank, paddles fixed to the ends of said bar, an open funnel axially mounted in said tank in the plane of said paddles, a discharge pipe connected with said funnel leading outwardly from said tank, and means for separating sediment from the liquids in said tank.

In testimony whereof, I have signed my name to this specification.

BENJAMIN B. CROMBIE.