E. KÖPKE.

CENTRIFUGAL SEPARATOR.

APPLICATION FILED JUNE 21, 1912.

1,119,176. Patented Dec. 1, 1914.

Fig. 1.

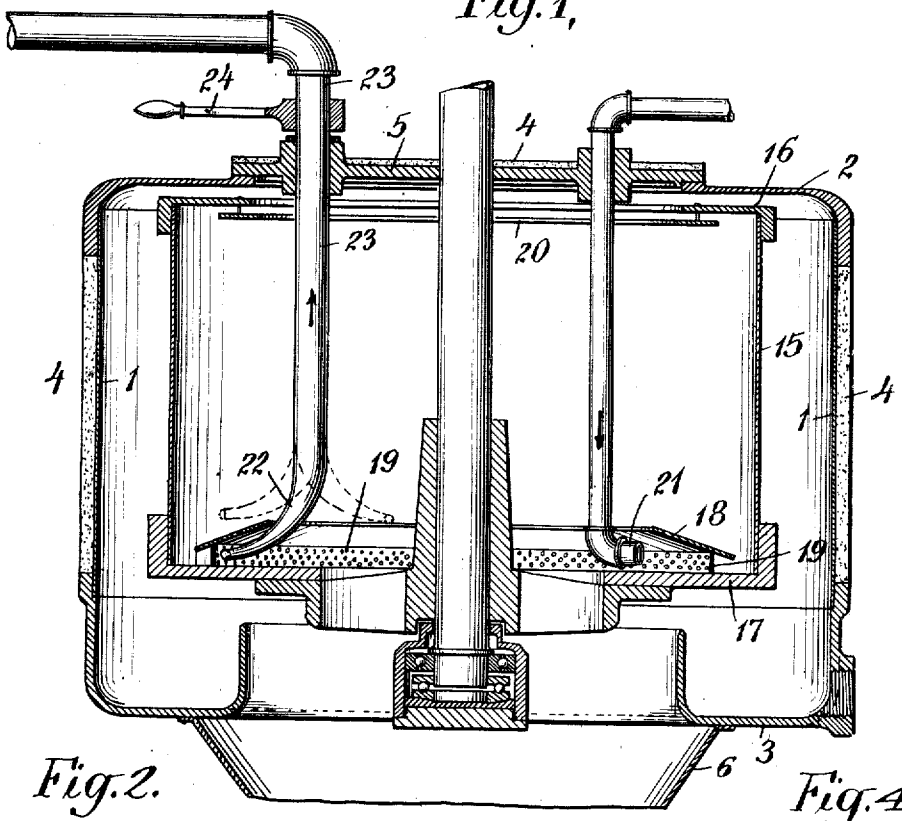


Fig. 2.

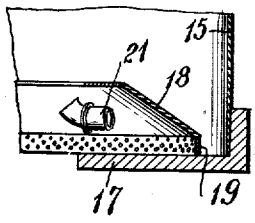


Fig. 3.

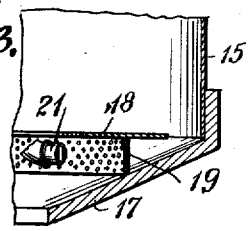


Fig. 4.

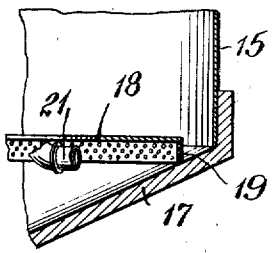


Fig. 5.

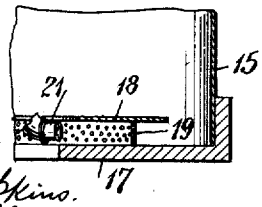
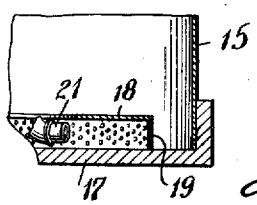


Fig. 6.



WITNESSES

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INVENTOR

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CENTRIFUGAL SEPARATOR.

1,119,176. Specification of Letters Patent. Patented Dec. 1, 1914.

Application filed June 21, 1912. Serial No. 704,946.

To all whom it may concern:

Be it known that I, ERNST KÖPKE, a citizen of the United States, residing at Honolulu, county of Honolulu, Territory of Hawaii, have invented certain new and useful Improvements in Centrifugal Separators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to centrifugal machines for clarifying solutions.

The object of the present invention is to provide means to equalize the distribution of the fluid introduced for treatment in the bowl and assist in its acceleration, and also to provide means for causing the introduced fluid to immediately pass nearer to the imperforate wall of the bowl and then with a more general and slower current through the bowl to the discharge, thereby giving it a more uniform exposure than heretofore to the influence of the centrifugal force.

The invention contemplates an annular imperforate guide plate within the bowl, and a screen or perforated plate between said guide plate and the nearest head of the bowl, the pipe or nozzle introducing the fluid onto the surface of the mass under treatment between said guide plate and said head. This imperforate guide plate is preferably arranged so as to form a constricted area or passage between its concentric outer edge and the adjacent head of the bowl, to cause a further equalization of the flow of the fluid through said area and over said concentric outer edge of this guide plate, for the purpose of avoiding stratification between the guide plate and this head of the bowl. The concentric edge of the guide plate has its position well within the fluid under treatment, so that the fluid passing this edge has to reverse its flow from the edge toward the center of the machine, thereby bringing about a rapid separation of the heavier mechanical impurities from the fluid. By means of these improvements the value and efficiency of centrifugal separators is greatly increased.

While the following description contemplates the introduction of the solution near the bottom of the bowl and the discharge of the clarified solution over the upper flange of the bowl, it will be understood that the same results could be obtained by reversing this arrangement, the solution being introduced at the upper end of the bowl and the clarified solution being discharged at the bottom of the bowl.

In the accompanying drawings, forming a part of this specification, Figure 1 represents in sectional elevation a portion of a centrifugal separator embodying part of my improvements. Fig. 2 illustrates a modification of part of Fig. 1, the perforated plate being shown at the outer edge of the guide plate. Fig. 3 represents a modification in which the head of the bowl is inclined and the guide plate horizontal. Fig. 4 is a view similar to Fig. 3 with the perforated plate at the outer edge of the guide plate. Fig. 5 illustrates the guide plate parallel to the head of the bowl and overlapping the perforated plate. Fig. 6 is a view similar to Fig. 5 showing the perforated plate at the outer edge of the guide plate.

Referring to the drawings, 1 represents the wall of the casing, 2 its upper flange, and 3 its lower flange and curb. The wall 1 is preferably lagged or provided with a covering 4 of any suitable non-heat-conducting material. The opening in the upper flange 2 is provided with a cover 5 of wood or other material and preferably made in halves and removable. The cover 5 may also be provided with a non-heat-conducting covering 4.

15 represents the imperforate wall of the rotatable bowl, provided with the upper flange 16 and the lower flange 17. A conical imperforate guide plate 18 is supported above the lower flange 17 with a cylindrical perforated plate 19 interposed, both being concentrically located with respect to the bowl. Fig. 1. The guide plate 18 may be a flat annular plate as in Figs. 5, 6, instead of conical as in Figs. 1, and 2, and particularly so when the lower flange of the bowl is conical as in Figs. 3 and 4. While the perforated plate 19 forms a screen preferably approximately under the middle of the guide plate 18, it may however be located near the outer edge of the guide plate 18, as shown in Figs. 2, 4 and 6. The perforated plate 19 is preferably a vertical cylindrical ring, but of course, if desired, it could be made conical, as will be understood.

An annular plate 20 may be suspended

below the upper flange 16 for selective drainage of the clarified solution discharged over the inner edge of the flange 16.

The solution to be treated is introduced through the pipe or nozzle 21 passing through and supported by the cover 5, Fig. 1.

I provide an adjustable scoop to remove the liquid remaining in the bowl before the bowl is stopped and after the supply has been shut off. The scoop 22 is formed on the lower end of the pipe 23 passing vertically through the cover 5. The pipe 23 may be raised or lowered and the position of the scoop 22 in the bowl may be adjusted by means of the lever or handle 24. When not in use the scoop may be turned so as not to engage the liquid. The scoop may be operated below the guide plate 18, or anywhere between it and the annular plate 20, preferably in the upper position and particularly so when the plate 20 is not used.

I claim:

1. A centrifugal separator having a rotor providing a cylindrical stratifying chamber and having near one end an annular guide plate defining an antechamber, means for introducing the material to be treated into said antechamber, and a concentric perforated plate spanning the space between the guide plate and the adjacent head of the chamber, whereby the material passing from the antechamber and into the stratifying chamber is broken up by the perforated plate into a multitude of small streams.

2. A centrifugal separator having a rotor providing a cylindrical stratifying tor providing a cylindrical stratifying chamber and having near one end a conical for introducing the material to be treated into said antechamber, and a concentric perforated plate spanning the space between the guide plate and the adjacent head of the chamber, whereby the material passing from the antechamber and into the stratifying chamber is broken up by the perforated plate into a multitude of small streams.

3. In a centrifugal separator, a rotatable imperforate bowl, a guide plate within said bowl, a perforated plate extending from said guide plate to a head of the bowl, a casing inclosing said bowl, said casing having an opening in one of its heads, a removable closure for said opening in said casing, and a feed pipe passing through said closure, the discharge end of said feed pipe being directed within said bowl to discharge between said guide plate and the head of the bowl and toward said perforated plate; substantially as described.

4. In a centrifugal separator, a rotatable bowl, a guide plate within said bowl, a perforated plate extending between said guide plate and a head of the bowl, a casing inclosing said bowl, said casing having an opening in one of its heads, a removable closure for said opening, a feed pipe passing through said closure and having its discharge opening within the bowl directed into the space between said guide plate and the head of the bowl and toward said perforated plate, and a scoop mounted upon said closure and adjustable thereon for operation either in the space between said guide plate and the head of the bowl spanned by said perforated plate or in the space upon the opposite side of said guide plate, substantially as described.

In testimony whereof I affix my signature, in presence of two witnesses.

ERNST KÖPKE.

Witnesses:
THOS. C. W. GRAY,
LYDIA W. YOUNG.

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LYDIA W. YOUNG.

Corrections in Letters Patent No. 1,119,176.

It is hereby certified that in Letters Patent No. 1,119,176, granted December 1, 1914, upon the application of Ernst Köpke, of Honolulu, Territory of Hawaii, for an improvement in "Centrifugal Separators," errors appear in the printed specification requiring correction as follows: Page 2, strike out line 37; same page, line 39, as now numbered, after the word "conical" insert the words and comma, *guide plate defining an antechamber, means;* and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 5th day of January, A. D., 1915.

[SEAL.]

R. F. WHITEHEAD,

Acting Commissioner of Patents.

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R. F. WHITEHEAD,

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