

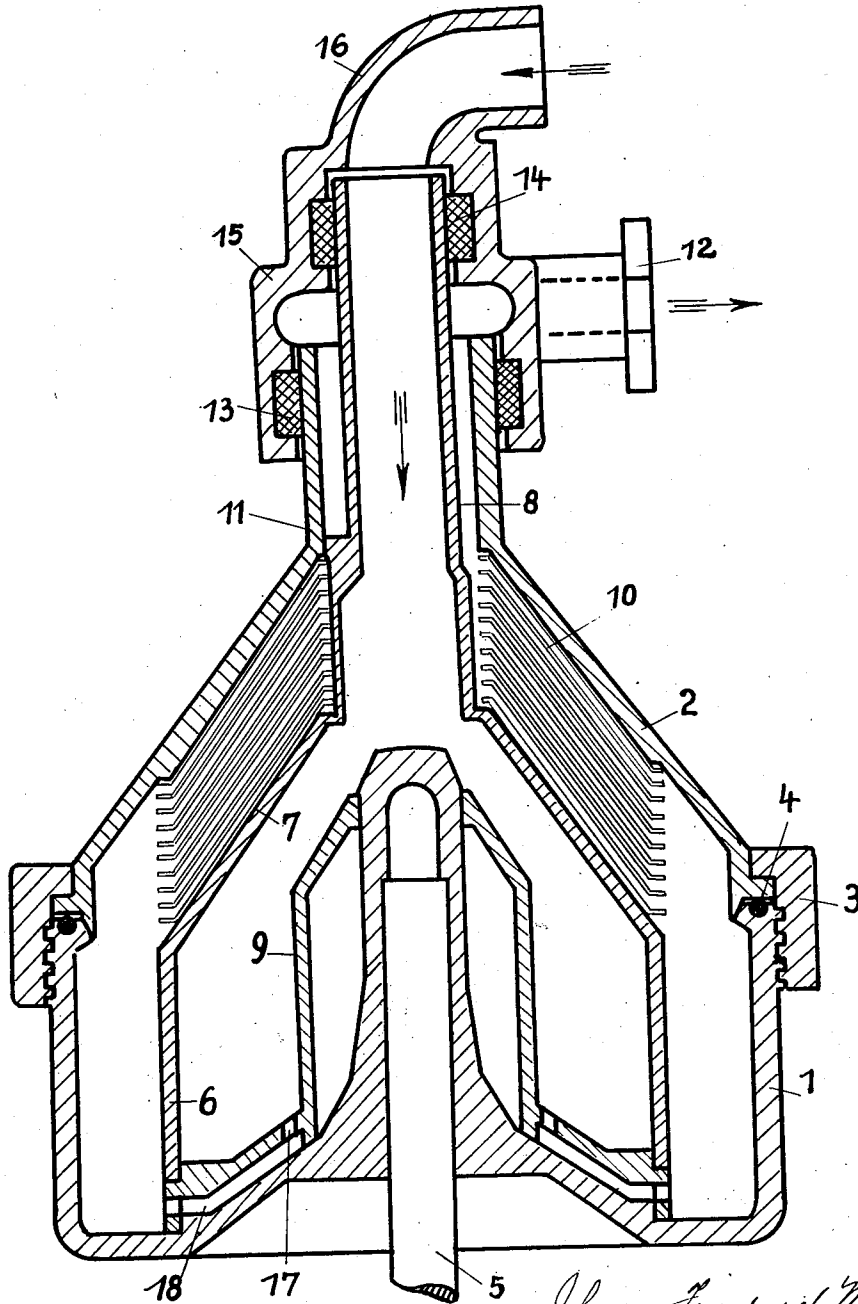
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CENTRIFUGAL MACHINE

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CENTRIFUGAL MACHINE.

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This invention refers broadly to a closed centrifugal drum for the clarification of liquids and for similar purposes, and it is intended to devise means for facilitating the operation thereof and preventing disturbance by clogging and otherwise. In the practical operation of centrifugal machines, particularly of those provided with insertion bodies comprising a plurality of spacedly superimposed plates or dishes, these are clogged, particularly in their lower portions, by the solid particles separated from the liquid to be clarified to such an extent as to necessitate the interruption of the operation and the most detailed cleaning of the insertion bodies. In view thereof, it has already been suggested to carry out the clarifying process in two stages, a preliminary clearing and a finishing or fine-clearing, these two stages being performed in two centrifugal drums, a preliminary clearing drum with coarse insertion and a fine-clearing drum with more delicately shaped and subdivided insertion bodies and by this means it was intended to separate out in the drum first-mentioned the coarser particles of the liquid by centrifugal action, while in the second drum the finer particles had to be separated. The employment of two drums, however, constitutes a serious complication of the entire arrangement and of the operation of the plant. Particularly in the case of the admission and discharge of the substances to be treated under pressure the duplication of the cleaning process entails a great many inconveniences, inasmuch as it is obvious that, among other drawbacks, the tightening of the drums by stuffing boxes will have to be duplicated.

In view thereof, this invention has for its object to perform the preliminary clearing and the finishing or fine-clearing in a very simple manner in a single centrifugal drum. This object is substantially accomplished by the fact that the lower portion of the insertion body which, in the case of drums provided for the entire vertical extension with insertion dishes or plates, is being clogged in a very short time is so shaped and arranged as to serve as a preliminary clearing chamber with ordinary simple insertion pieces, while the finely subdivided insertion pieces are only disposed in the upper portion of the drum. The insertion body in the closed preliminary clearing chamber may comprise a simple cylindrical body adapted to conduct the material under centrifugal treatment by direct action into a zone of higher, more intense centrifugal force, thereby effecting the separation of the coarse constituents on the walls of the preliminary clearing chamber. On the other hand, the insertion body of the fine clearing chamber may consist in the usual manner of a plurality of spacedly superimposed plates or dishes. It has been ascertained in the practical operation of the invention that by this arrangement a very efficient preliminary and fine-clearing combined may be obtained in a single centrifugal drum without requiring an increase of the circumference of the drum for the same output.

The invention will be more specifically described with reference to the accompanying drawing showing by way of example a form of embodiment of the principles of the invention in a vertical section through a centrifugal drum.

As appears from the drawing, the centrifugal drum illustrated by way of exemplification comprises the drum casing 1 and the cover 2 of the drum with a screw-threaded ring 3 connecting the two parts with the intermediary of a tightening or packing member 4. The operation of the drum is effected by means of a vertical shaft 5 which is suitably journaled and connected to a driving source, motor or the like. Within the drum 1, 2 a cylindrical insertion body 6 is disposed the outer wall of which merges into a conical part 7 which is connected to the admission pipe 8. The hollow insertion body 6 constitutes the preliminary clearing chamber and contains the displacement body or member 9 concentrically arranged with relation to the shaft 5 and of cylindrical upwardly conical shape. Upon the conical wall 7 of the preliminary clearing chamber a plurality of plates or dishes 10 likewise substantially conical are disposed which are kept in

spaced relation to each other by suitable projections. The admission pipe 8 is surrounded by a tubular extension 11 of the cover 2 of the drum, so that an annular space is provided serving for the escape of the material under treatment and communicating with the discharge pipe 12. The pipes 8 and 11 are each respectively guided in stuffing boxes 13 and 14, which stuffing boxes are arranged in a common casing 15 which merges into the admission pipe 16 and may be supported on a stationary point in any suitable manner. The entire centrifugal drum may be spacedly surrounded in the usual manner by a stationary casing which at the same time may be employed to retain the casing 15 of the stuffing boxes in its proper position, thus, for instance, by means of vertical stays or supports.

The substance to be submitted to centrifugal action and admitted through the opening 16 flows in the direction of the arrows into the preliminary clearing chamber 6 in which by means of the insertion body 9 the first separation of solid constituents is effected which collect on the wall of the preliminary clearing chamber 6. The liquid is then forcibly conducted through the openings 17 and the ports 18 at the bottom of the preliminary clearing chamber 6 into the casing 1 of the drum, where by the increased centrifugal force of the outer wall of the preliminary clearing chamber a further separation of solid particles is effected which are deposited at the wall of the drum casing. The liquid will then be delivered onto the subdivided insertion piece 7 where the final clearing is effected, and thence it is conducted through the pipe 11 and to the eduction pipe 12. As appears therefrom, the liquid upon its entire path is submitted to a clarifying operation in several stages by which means the coarse and the finer admixtures are separated out, without any liability of clogging or choking up of the insertion pieces of the drum.

The device according to this invention may, of course, be used for the clarification of different liquids, such for instance, of beer, oil, or of similar substances to be adapted for centrifugal operation. Particularly in the case of the clarification of beer and of similar liquids it has been found to be highly efficient, inasmuch as the otherwise very soon occurring clogging up of the insertion bodies by the separated yeast is entirely avoided.

The invention in its several details may, of course, be carried out and arranged in various ways different from the embodiment shown by way of exemplification in the drawing. Thus, the fine-clearing chamber, instead of being provided with plates, dishes or the like, may also be furnished with filtering substances or instrumentalities or

with other cleaning, clearing or purifying insertions and other changes and modifications may be made in the construction and arrangement of the parts and details of our invention, without deviating from the spirit thereof, except as stated in the claims hereinafter appended.

We claim:—

1. In a cylindrical centrifugal clarifier drum provided with a conical cover and subdivided into an interior annular preliminary clarifying chamber and an outer annular final clarifying chamber by means of an apertured partition coaxial to the walls of the drum and the cover, the arrangement of a substantially un-indented abutment member in said interior chamber and of subdivided abutting members in said external chamber parallelly super-imposed upon the conical part of said partition.

2. A cylindrical centrifugal clarifier drum subdivided in three clarifying chambers working in series, the first chamber being constituted by an apertured partition coaxial to the wall of the drum and enclosing an unindented central abutment member for preliminary clarification, the second chamber comprising the space between this partition and the cylindrical wall of the drum and serving for further clarification, the third chamber containing a plurality of spaced and parallelly superimposed dish-shaped abutting members for final clarification.

3. A centrifugal clarifier consisting of a cylindrical drum and a conical cover and subdivided in three clarifying chambers working in series and communicating one to the other, the first chamber being limited by a cylindrical and partly conical apertured partition spacedly and coaxially disposed in the interior of the drum and enclosing a substantially cylindrical and partly conical abutment member centrally arranged in the drum, the second chamber being constituted by the space between the cylindrical walls of the drum and the partition and communicating at its bottom with the first chamber, the third chamber comprising the space between the conical walls of the cover and the partition and containing a plurality of spacedly and parallelly superimposed conical dish-shaped abutting members.

4. In a cylindrical centrifugal clarifier in combination a cylindrical drum, a conical cover connected to said drum, a cylindrical and partly conical apertured dividing partition in the interior of drum and cover, a substantially cylindrical and partly conical member centrally disposed in the drum, a plurality of subdivided conical dish-shaped abutting members placed upon the conical partition wall, a central admission pipe connected to the conical partition wall, an educting pipe spacedly surrounding the admis-

sion pipe and connected to the conical cover, stuffing boxes for these two pipes, a housing common for both the stuffing boxes and containing between these boxes an intermediate chamber communicating with the educting pipe, and inlet and outlet means provided on this housing and communicating with the admission pipe and the intermediate chamber of this housing respectively.

In testimony whereof we affix our signatures.

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