A solid-wall screw centrifuge with overflow weir

The invention relates to a solid-wall screw centrifuge according to the preamble of claim 1.

Solid-wall screw centrifuges are known in a large variety of embodiments.

DE 102 03 652 B4 discloses a solid-wall screw centrifuge comprising a device for discharging clarified fluid from a drum having a drum cover with a passage, which is associated with a throttle device, especially an orifice gauge, the distance of which to the passage is variable. The passage is further associated with nozzles for the discharge of the clarified fluid, which nozzles are aligned obliquely in relation to the radial direction through the drum axis for saving energy.

Nozzles on solid-wall screw centrifuges and their effect of energy saving in a respective alignment obliquely in relation to the drum axis are further known from DE 39 004 151 A1.

The publication of "Patent Abstracts of Japan", No. 11179236A, discloses that guide plates can be associated with passage openings in the drum cover which are respectively partly sealed by a weir plate forming an overflow weir, which guide plates provide fluid exiting the drum with a twist, wherein the occurring repulsion effect is to be used for energy saving. The guide plates are attached to the outside of the overflow weir on the weir plates for example. They are arranged as flat plates for example which are aligned parallel to the rotational axis of the drum, wherein the plane in which the flat plates are disposed does not intersect the drum axis and encloses an angle of approximately 45° with the radially extending straight line which respectively extends through the rotational axis of the drum and the respective passage opening.

Embodiments~~It is the object~~ of the invention seek~~on the basis of the aforementioned state of the art~~ to provide a solid-wall screw centrifuge which is further optimized with respect to energy saving.

~~This object is achieved by the invention by the subject matter of claim 1.~~

The deflecting device is accordingly arranged in such a way (preferably on the weir plate) that by maintaining the overflow weir an exiting fluid flow is subjected to a twist in the circumferential direction at the overflow edge in the axial extension of the passage opening.

This can be achieved according to an especially preferred embodiment in such a way for example that the deflecting wall is disposed in any case partly directly in axial extension of the region of the passage opening not covered by the respective weir plate axially outside before the passage opening, and axially partly or fully covers said opening.

It is also known (e.g. from US 2004/0072668 A1 or WO 2008/138345 A1) to arrange a housing instead of an overflow weir on the weir plate of the passage opening, with the overflow weir or a nozzle being then arranged in an oblique side of the housing on the passage opening. These constructions are disadvantageous however in that co-rotating fluid chambers are formed on the outside of the drum cover, which fluid chambers form a part of the rotating system, so that the clarification or separation process can still continue in the fluid chambers. This separation process may lead to undesirable deposits in the chambers which lead to cleaning problems.

According to an aspect of the present invention, there is provided a solid-wall screw centrifuge, comprising at least one discharge for discharging clarified fluid from a drum which comprises at least one or several passages in a drum cover, which is or are respectively associated with a weir plate, which respectively form an overflow weir on their radial inner edge, with further at least one deflecting device being arranged on the outside on the drum cover, which deflecting device is arranged in such a way that an exiting fluid flow is deflected in the circumferential direction or subjected to a twist in the circumferential direction, characterized in that the at least one deflecting device is arranged in such a way that by maintaining the overflow weir the escaping fluid flow is deflected in the circumferential direction at the overflow edge of the at least one weir plate, directly in the axial extension of the region of the passage opening which is not covered by the respective weir plate.

It is therefore advantageous that embodiments of the present invention leaves the overflow weir directly on the weir plates on the drum cover, and only the fluid which has already left the rotating system via the overflow weir will be deflected in the circumferential direction. After the exit from the drum no clarification effect can occur any more. Instead, the entire exiting fluid jet will rather be deflected by the deflecting device in the circumferential direction.

Further advantageous embodiments are provided in the remaining dependent claims.

The invention will be described in closer detail below by reference to the drawings, wherein:

Fig. 1 shows a schematically illustrated drum cover of a solid-wall screw centrifuge in accordance with the invention, and

CLAIMS:

1. A solid-wall screw centrifuge, comprising at least one discharge for discharging clarified fluid from a drum (3) which comprises at least one or several passages (15) in a drum cover (17), which is or are respectively associated with a weir plate (19), which respectively form an overflow weir (21) on their radial inner edge, with further at least one deflecting device (23) being arranged on the outside on the drum cover (17), which deflecting device is arranged in such a way that an exiting fluid flow is deflected in the circumferential direction or subjected to a twist in the circumferential direction, characterized in that the at least one deflecting device (23) is arranged in such a way that by maintaining the overflow weir (21) the escaping fluid flow is deflected in the circumferential direction at the overflow edge of the at least one weir plate (19), directly in the axial extension of the region of the passage opening (15) which is not covered by the respective weir plate.

2. A solid-wall screw centrifuge according to claim 1, characterized in that the deflecting device (23) is disposed in any case partly directly in axial extension on the outside before the passage opening on its radius and axially fully or partly covers said opening directly in axial extension of the region not covered by the respective weir plate.

3. A solid-wall screw centrifuge according to claim 1, characterized in that one deflecting device (23) is respectively attached to several, preferably all, of the weir plates (19).

4. A solid-wall screw centrifuge according to claim 1 or 2, characterized in that the at least one deflecting device (23) respectively comprises a support wall (25) and a deflecting wall (27) which is aligned angularly in relation to said support wall.

5. A solid-wall screw centrifuge according to claim 3, characterized in that the support wall (25) is arranged as an axial wall section, and that the deflecting wall (27) is arranged at a right angle to the support wall (25).

6. A solid-wall screw centrifuge according to one of the preceding claims, characterized in that the support wall ~~(25)~~ is in alignment with the overflow edge on the radius R_k of the weir plate ~~(19)~~ forming the overflow weir ~~(21)~~.

7. A solid-wall screw centrifuge according to one of the preceding claims, characterized in that the deflecting wall ~~(27)~~ comprises an arc-shaped wall section ~~(27a)~~.

8. A solid-wall screw centrifuge according to claim 7, characterized in that the deflecting wall ~~(27)~~ further comprises a flat wall section ~~(27b)~~ adjacent to the arc-shaped wall section ~~(27a)~~.

9. A solid-wall screw centrifuge according to claim 8, characterized in that the arc-shaped section ~~(27a)~~ is arranged in such a way that it produces a deflection of the fluid phase flowing in the axial direction X from the drum 3 substantially into the circumferential direction.

10. A solid-wall screw centrifuge according to one of the claims 7 or 8, characterized in that the arc-shaped section ~~(27a)~~ is dimensioned in such a way that a deflection of the product flow occurs from the axial direction X against the rotational direction U about a deflecting angle α which is smaller than 90° or equal to 90°, and is preferably approx. 70 to 85°.