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(54) **Device for separating solids from water**

(57) The device for separating solids from water comprises a series of fixed (1) and mobile (2) rings, arranged in alternate fashion, a worm screw (3) that traverses the centre of the rings, moved by driving means (5) and elements (4) that keep said fixed rings in a fixed position, and that the mobile rings have one extension (6) per mobile ring, with said extension being traversed by an ec-

centric driving shaft (7) parallel to worm screw, and that when said eccentric driving shaft moves it moves the extension of the respective mobile ring producing a reciprocating movement on mobile ring, also leaving worm screw free of contact with any of the rings, with said eccentric driving shaft having a sinusoidal external profile that produces a different reciprocating movement between one mobile ring and the one immediately following.

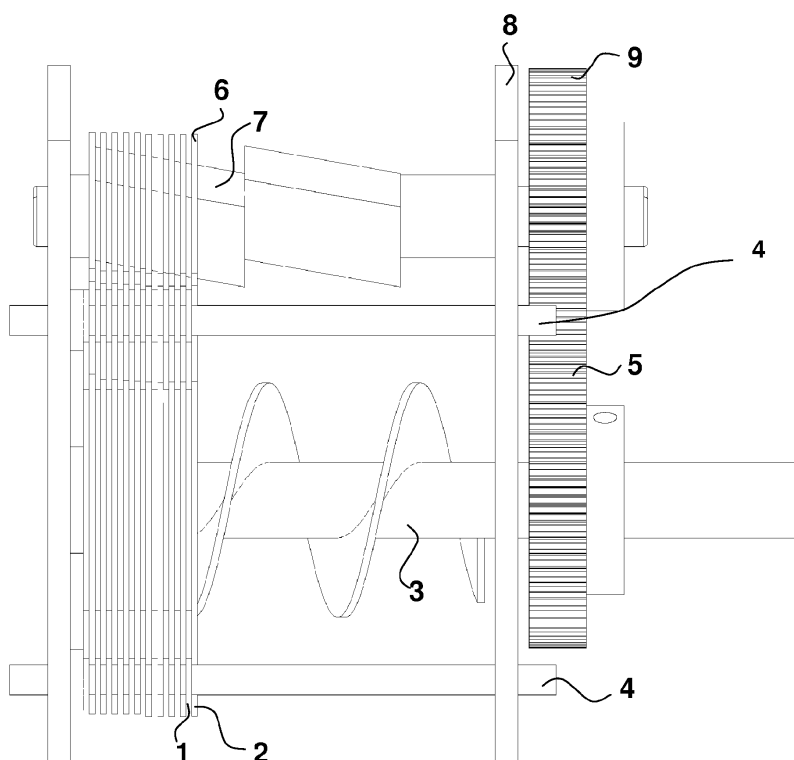


FIG. 1

Description

[0001] Device for separating solids, of the type comprising a series of fixed and mobile rings, arranged in alternate fashion, a worm screw that passes through the centre of the rings, driven by driving means and elements that keep said fixed rings in a fixed position, characterized in that the mobile rings have one extension per mobile ring, with said extension being traversed by an eccentric driving shaft parallel to said worm screw, and that when said eccentric driving shaft moves, it moves the extension of said mobile ring producing a reciprocating movement on the mobile ring, also leaving the worm screw free of contact with any of the rings, with said eccentric driving shaft having an external sinusoidal profile which produces a different reciprocating movement between one mobile ring and the one immediately following.

BACKGROUND TO THE INVENTION

[0002] Various devices are known in the state of the art that separate solids from water, by filtering through mobile rings.

[0003] French Patent No. 2892657 "Dispositif pour réduire le volume d'un matériau, et/ou le compacter et/ou séparer un solide et un liquide", 2005, in the name of SHINRYOKU TECHNOLOGIES, is part of the state of the art, and it relates to a device provided with mobile and fixed rings that define a central fixed opening. A worm screw rotates around a rotation axis that traverses the central opening of the fixed and mobile rings. Via driving means, the worm screw moves each mobile ring, via friction, and also touches the fixed rings which it does not move.

[0004] Also, European Patent No. 1112968 "SOIL WATER ACTIVATED SLUDGE TREATING SYSTEM AND METHOD THEREFOR", 2000, in the name of N S CONSULTANTS LTD, is known, which relates to a mixture of active sludge that is removed directly from a reaction tank and is dehydrated by means of a multi-disc dehydrating machine. In order to remove said active sludge mixture, a pump is controlled to maintain the SRT in the reaction tank at a predetermined value. Also the nitrification and denitrification processes are carried out, while the ASRT is controlled by regulating the aerobic time within a certain range.

BRIEF DESCRIPTION OF THE INVENTION

[0005] This invention is an improvement on the solid separation devices in waste water cleansing machines.

[0006] French Patent No. FR2892657 and European Patent No. EP1112968 are known.

[0007] The inventor is known for owning various registrations that protect machinery associated with cleansing waste water.

[0008] In this case, the application is an improvement on the two previous patents. The inventor has developed

a third, different option, or via, because, as will be shown later, some limitations of said patents have been overcome.

[0009] It is an improvement over European Patent No. 1112968 because it does not use worm screw friction, with the subsequent wearing of parts, to activate the rings, which leaves some jammed because of the solids down trapped in them, and this blocks the machine. In this case, the worm screw is maintained without touching any of the rings, either the fixed or mobile ones. The rings move by virtue of a shaft that is parallel to the worm screw, thereby avoiding the friction and wear of the worm screw against the rings.

[0010] It is an improvement over French Patent No. 2892657 where all the mobile rings move at once, because in this application each mobile ring has an independent movement, whereby it falls by virtue of gravity and rises thanks to the eccentric driving shaft, thereby improving the cleansing of the solids, because it creates an additional current of water that increases the quality of the cleansing operation.

[0011] The object of this invention is a device for separating solids, of the type comprising a series of fixed and mobile rings, arranged in alternate fashion, a worm screw that passes through the centre of the rings, moved by driving means and elements that keep said fixed rings in a fixed position, characterized because the mobile rings have one extension per mobile ring, with said extension being traversed by an eccentric driving shaft that is parallel to the worm screw, and that when said eccentric driving shaft moves it moves the extension of the respective mobile ring producing a reciprocating movement on the mobile ring, also leaving the worm screw free of contact with any of the rings, with said eccentric driving shaft having an external sinusoidal profile that produces a different reciprocating movement between one mobile ring and the one immediately following.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] In order to facilitate the explanation, two sheets of drawings are attached to this invention, showing a practical embodiment thereof, which is provided as a non-limiting example of the scope of this invention:

- Figure 1 shows a side view of the object of this invention, and
- Figure 2 shows a perspective view without the frame

SPECIFIC EMBODIMENT OF THIS INVENTION

[0013] So Figure 1 shows a frame 8, fixed rings 1 with their attachment elements or rods 4, mobile rings 2 with their extensions 6, a worm screw 3 with its driving means 5 and an eccentric driving shaft 7 with its driving means 9.

[0014] Figure 2 shows fixed rings 1 with their attachment elements or rods 4, mobile rings 2 with their extensions 6, worm screw 3 and its driving means 5 and ec-

centric driving shaft 7 with its driving means 9.

[0015] This way, in a particular embodiment, when the device is started up in the frame 8, worm screw 3, thanks to its driving means 5, makes the liquids containing solids advance through the centre of rings 1, 2, without touching them. 5

[0016] Fixed rings 1 and mobile rings 2 are arranged in alternate fashion, so that one fixed ring 1 is placed between two mobile ones 2. Fixed rings 1 are immobilised or fixed by rods 4. Worm screw 3 passes through the centre of rings 1, 2, without touching them. 10

[0017] When the worm screw 3 starts up, in this embodiment, eccentric driving shaft 7 also starts up, because their respective driving means 5, 9 are meshed. Said shaft 7 traverses a hole formed in extensions 6 of each mobile ring 2. Said eccentric driving shaft 7 has a sinusoidal shape, so when one extension 6 moves upwards, the one immediately before moves upwards a little less and so on, and this way causing that the mobile rings 2 have a reciprocating movement when the current of dirty water passes from worm screw 3 trapping all the dirt, preventing worm screw 3 from wearing and also preventing said worm screw from becoming blocked, thereby creating an additional water current that contributes to cleaning. 15 20 25

[0018] In other words, when said eccentric driving shaft 7 moves, it moves extension 6 of the respective mobile ring 2 producing a reciprocating movement on mobile ring 2, also leaving worm screw 3 free of contact with any of the rings, with said eccentric driving shaft 7 having a sinusoidal external profile that produces a different reciprocating movement between one mobile ring and the one immediately following. 30

[0019] Also, said controlled reciprocating movement prevents mobile rings 2 from touching or knocking worm screw 3, whereby worm screw 3 can last longer, as it does not touch the rings. 35

[0020] This invention describes a new device for separating solids. The examples mentioned herein are non-limiting with respect to the invention, and therefore said invention can have different applications and/or adaptations, all included in the scope of the following claims. 40

Claims

1. Device for separating solids, of the type comprising a series of fixed rings (1) and mobile rings (2), arranged in alternate fashion, a worm screw (3) that traverses the centre of the rings, moved by driving means (5) and elements (4) that keep said fixed rings (1) in a fixed position, **characterized in that** mobile rings (2) have one extension (6) per mobile ring (2), with said extension being traversed by an eccentric driving shaft (7) parallel to worm screw (3), and that when said eccentric driving shaft (7) moves it moves extension (6) of the respective mobile ring (2) producing a reciprocating movement on mobile ring (2), 45 50 55

also leaving worm screw (3) free of contact with any of the rings (1, 2), with said eccentric driving shaft (7) having a sinusoidal external profile that produces a different reciprocating movement between one mobile ring and the one immediately following.

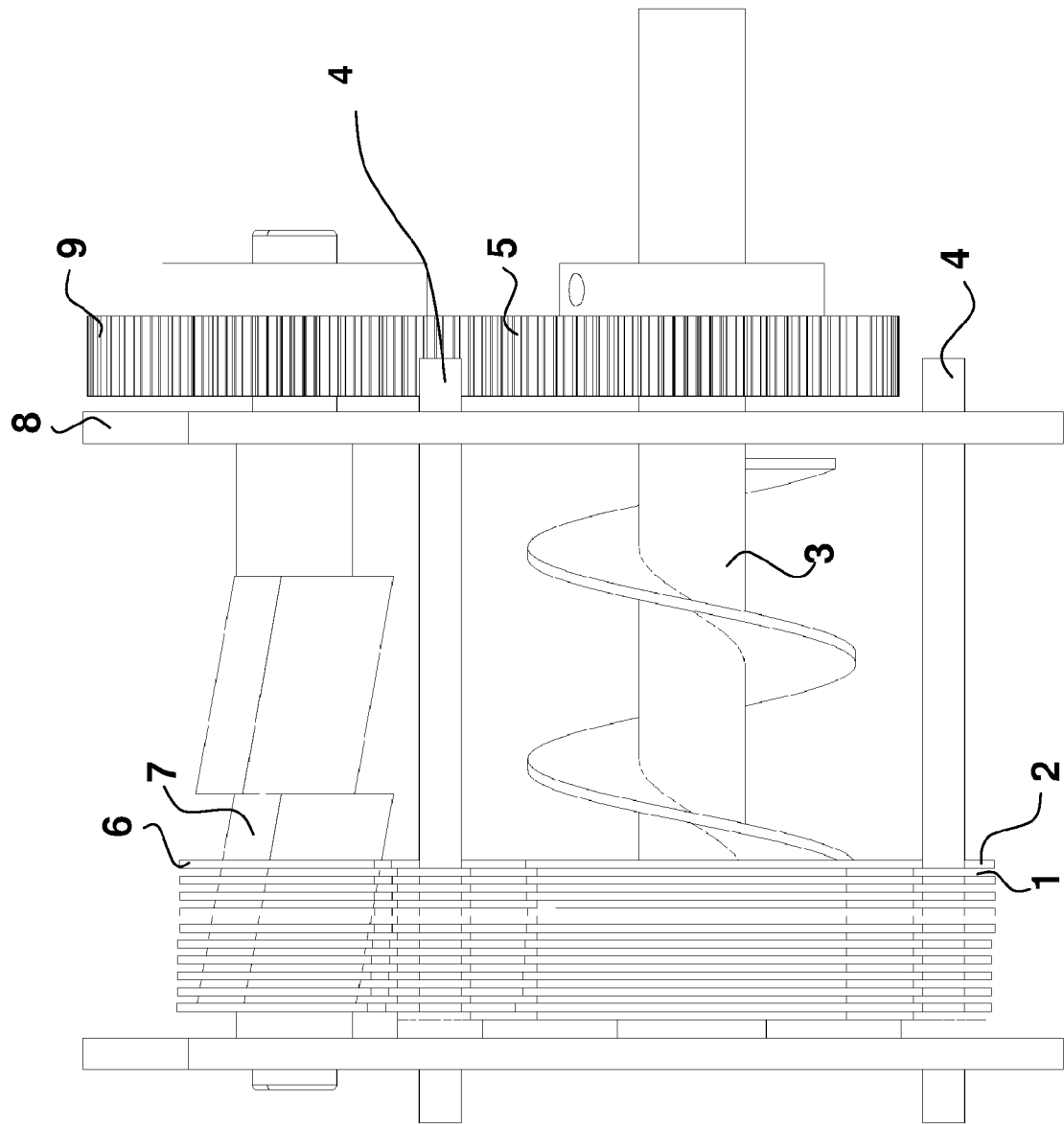


FIG. 1

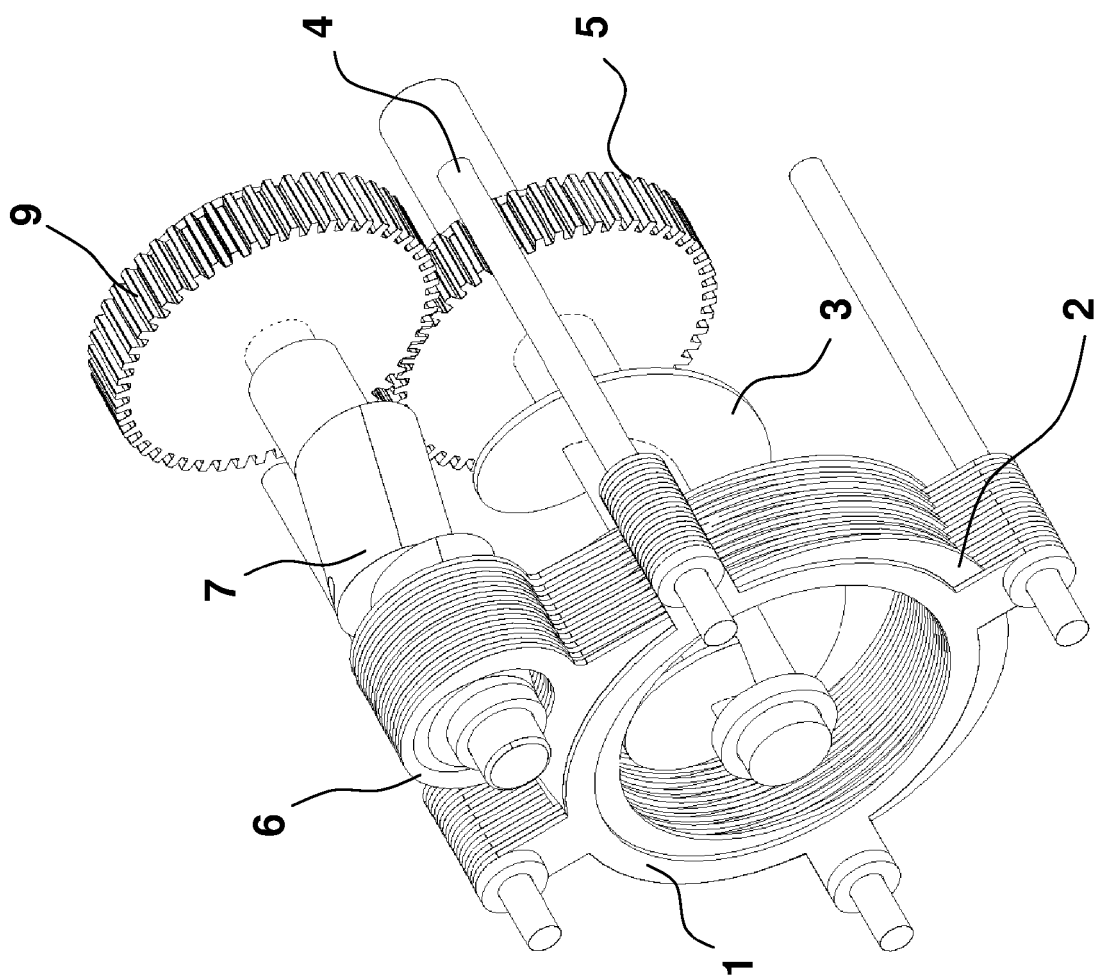


FIG. 2



EUROPEAN SEARCH REPORT

Application Number
EP 10 16 2062

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A,D	FR 2 892 657 A1 (SHINRYOKU TECHNOLOGIES [FR]) 4 May 2007 (2007-05-04) * page 9, line 9 - line 21 * * figures 1-5 * -----	1	INV. B30B9/26
A	JP 7 057287 B (TSURUMI MFG) 21 June 1995 (1995-06-21) * abstract; figure 3 * -----	1	
A	EP 1 052 007 A1 (KATABE TOYOKAZU [JP]) 15 November 2000 (2000-11-15) * abstract; figures 1,2 * -----	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			B30B B01D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 24 May 2011	Examiner Appelt, Lothar
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 10 16 2062

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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24-05-2011

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Patent documents cited in the description

- FR 2892657 [0003] [0006] [0010]
- EP 1112968 A [0004] [0006] [0009]