



DEVICE FOR REMOVING RAKED-OFF OR SCREENED MATERIAL
FROM LIQUID FLOWING THROUGH A CHANNEL

The invention relates to a device for removing raked-off or screened material from liquid flowing through a channel, particularly in sewage treatment, the device having a fixed interceptor, a conveyor means allocated to the interceptor, and
5 a driven clearing means for removing the raked-off or screened material from the interceptor.

Such a device can be used particularly in sewage works, but also in other areas, for example, in textile factories, textile mills, slaughter-houses, poultry farms, tanneries, and so on.

10 It is the main problem of the invention to provide an advanced device for removing raked-off or screened material from liquid flowing through a channel for reliably achieving a high degree of removal of the material dispersed in the liquid.

This problem is solved in that the interceptor is shaped like a
15 hollow cylinder having an axis, is sloped with regard to the axis of the cylinder, is partly immersed in the liquid, and consists of bars extending tangentially around the axis of the cylinder, wherein between the bars slots are left open, and in that the conveyor means leads to an discarding point, and
20 comprises a conveyor screw, a housing and an intake funnel for the screened or sifted material, wherein the intake funnel is located in the vicinity of the interceptor.



The interceptor may have a radial opening in its upper region, the radial opening being arranged above the intake funnel of the conveyor means. But in this case the clearing means has no contact to the bars of interceptor when intaking the raked-off or screened material into the intake funnel. Accordingly, getting the clearing means in contact with the bars again is difficult, if there is a tight arrangement of the clearing means and the bars of the interceptor. Such a tight arrangement is necessary for ensuring the clearing any kind of raked-off or screened material off the interceptor. Further, the correct fixing of the free ends of the bars of the interceptor beside the radial opening is difficult.

Therefore, it is a further problem of the invention to provide a device in which the clearing means cooperates reliably with the interceptor, and which is easy to manufacture.

This problem is solved in that the bars of the interceptor are constructed continuously around the axis of the cylinder and do not leave a radial opening. The invention is based on the concept to provide a interceptor having a continuous and uninterrupted raking or screening surface being arranged stationary. At first, this makes it easier to manufacture the interceptor and to arrange and fix the individual bars at the desired intervals. At second, the cooperation of the clearing means and the raking or screening surface is enhanced as the clearing means is steadily in contact with the bars of the interceptor, even if being above the intake funnel or standing still.

The axis of the conveyor means and the axis of the cylinder may be arranged concentrically. In this case the clearing means can be easily connected to the conveyor screw of the conveyor means so that the clearing means is indirectly driven by means of the conveyor means. It is possible to drive the clearing means both continuously and discontinuously.



The clearing means may also be driven by a separate actuation means. This actuation means can be activated discontinuously responsive to the amount of the raked-off or screened material. Independently on this the conveyor means can be activated.

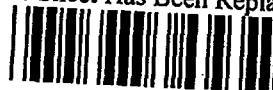
- 5 The device may further comprise a separator means allocated to the clearing means for separating the raked-off or screened material from the clearing means. The separator means can be located in the upper region of the interceptor. Advantageously,
10 the separator means is constructed as a spray beam provided with nozzles.

- The clearing means may be constructed as a rotating clearing arm being mounted at the flow-in opening of the interceptor. At the flow-in opening of the interceptor there is sufficient space for
15 mounting the clearing arm, even if taking into account the slope of the device with regard to the bottom of the channel. Naturally, the clearing parts of the clearing arm are located in the region of the raking or screening surface of the interceptor and strip the bars of the interceptor again and again.

- 20 The clearing arm may be provided with finger-like extensions extending into the slots left open between the bars of the interceptor. The extensions can be adapted to closely fit between the bars of the interceptor.

- 25 Instead, the clearing arm may be provided with a brush having a pitch against the inner surface of the interceptor. By this brush the raked-off or screened material is also removed from the raking or screening surface of the interceptor.

- The clearing means may be driven discontinuously, and may have
30 a stop position in the upper region of the interceptor. In this upper stop position of the clearing means the raked-off or



screened material collected by the clearing means is certainly lifted above the liquid level in the channel so that a first step of dewatering may take place.

5 The clearing means may be driven in opposite directions with regard to one or several parts of the inner surface of the interceptor. Advantageously, the changing of direction takes place when the clearing means is starting again from its stop position. This enhances the separation of the collected raked-off or screened material from the clearing means.

10 The driving of the clearing means in opposite directions includes one short reverse motion as well as as several successive reversed motions by which the collected material is virtually shaken-off the clearing means above the intake funnel in the upper region of the interceptor. To further enhance the
15 separation of the collected material from the clearing means there may be provided an additional stripper or any other kind of separator.

The bars forming the interceptor may have a cross section having an effect on the liquid flowing through the Interceptor. In one
20 embodiment the cross section may be constructed to change the direction of the liquid when flowing through the slots between the bars. By this change of direction the flow resistance of the interceptor is increased and the liquid is banked-up in the channel. This can be intended to use a larger part of the raking
25 or screening surface of the interceptor. Instead, the cross section of the bars may be constructed in such a way that the direction of the liquid flowing through the slots between the bars is especially not changed so that the flow resistance of the interceptor is as low as possible.

30 The invention is further explained and described by means of preferred embodiments, wherein

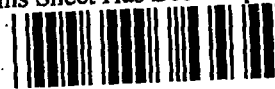


Figure 1 shows einen schematized vertical cross section through a channel and a view of the device,

Figure 2 shows a view of the device in direction II indicated in Figure 1,

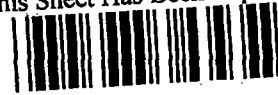
5 Figure 3 shows a view corresponding to Figure 2 but of another embodiment of the device,

Figure 4 shows a schematized cross section through the
10 interceptor according to a first possibility of construction of the cross section of its bars,

Figure 5 shows a second possibility of construction of the cross section of the bars of the interceptor, and

Figure 6 shows a third possibility of construction of the cross
15 section of the bars of the interceptor from flat bar steel.

Figure 1 shows a channel 1 having a bottom 2. A liquid is flowing through channel 1 in direction of an arrow 3. The device 4 is placed into the channel 1, the device 4 being sloped with regard to its axis 5. As its main part the device 4 comprises a
20 fixed, i.e. stationary, interceptor 6 made from bars 7. Between the bars 7 slots 8 are left open. Each bar 7 extends over the whole circumference of the interceptor 6, the interceptor 6 being shaped like a hollow cylinder. The bars 7 may be supported by cross bars 9. In so far as impinged by the liquid the inner
25 surface of the cylinder-shaped interceptor 6 forms a raking and screening surface 10. The interceptor 6 is open at its face 11 directed downwardly. There, the liquid charged with material to be raked-off or screened flows into the interceptor according to arrow 3. A clearing means 12 cooperates with the inner surface



of the interceptor 6, the clearing means 12 comprising an clearing arm 13. At its free end the clearing arm 13 is provided with finger-like extensions 14, the free end forming an axial surface line of the cylinder-shaped interceptor 6. The finger-like extensions 14 extend into the slots 8 between the bars 7. While the interceptor 6 is fixed, the clearing means 12 is driven rotatingly either continuously or discontinuously. For this purpose the clearing arm 13 with the extensions 14 can be driven indirectly by means of a conveyor means 15. In conveying direction the conveyor means begins with an intake funnel 16, the intake funnel 16 grading into a housing 17, out of the interceptor 6 the housing 17 extending slantwisely upwardly. A conveyor screw 18 is arranged in the housing 17, the conveyor screw 18 being indicated schematically and leading to a discarding point 19. The conveyor screw 18 is mounted on a shaft which is not shown here and which is driven by a motor 20. The clearing arm 13 of the clearing means 12 is connected to the conveyor means 15, for example, to the conveyor screw 18 or its shaft, in a rotatingly fixed manner so that the clearing arm 13 is indirectly driven by the motor 20. The raked-off or screened material transported slantwisely upwardly by the conveyor means 15 is discarded into a container 21 at the discarding point 19.

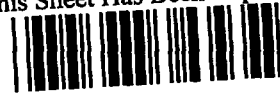
A separator means 22 may be arranged in the upper region of the cylinder-shaped interceptor 6, the separator means 22 having, for example, the form of a spray beam 24 provided with nozzles 23. The raked-off or screened material taken up from the interceptor 6 by the extensions 14 of the clearing means 12 can be separated from the clearing means 12 and discarded into the intake funnel 16 exclusively by means of gravitation or additionally with the aid of the separator means 22. It is also possible to provide a stripper 25 (Figure 2) swivelling mounted outside the interceptor 6 as a separator means 22, the stripper 25 cooperating with the finger-like extensions 14 of the



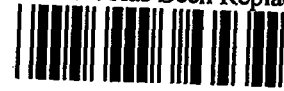
clearing means 12 and in this way mechanically discarding the raked-off or screened material from the clearing means 12 or at least supporting the discarding. The stripper 25 may extend partially through the slots 8 of the interceptor 6.

5 While according to the embodiment of Figure 2 the axis 5 of the device 4 is at the same time the common axis of the conveyor means 15 and of the interceptor 6, according to the embodiment of Figure 3 the conveyor means 15 is arranged excentrically and shifted upwardly with regard to the axis 5 of the interceptor 6.
10 This arrangement has the advantage that the intake funnel 16 has not to extend so far out of the face 11 of the interceptor 6 so that on the whole the intake funnel 16 is in most parts arranged above the liquid level, whereby larger parts of the inner surface of the interceptor 6 can be used as the aktive
15 raking and screening surface 10. This means that higher liquid levels are acceptable which may involve a banking-up of the liquid. The excentrical arrangement of the conveyor means 15 with regard to the rotating axis of the clearing arm 13 of the clearing means 12 makes it necessary that the clearing means 12
20 is provided with a separate actuation, for example in form of a motor. This must not be a disadvantage as by this way the rotational movement of the clearing means 12 can be controlled or switched independently on the rotational movement of the conveyor screw 18 of the conveyor means 15. Instead of finger-
25 like extensions 14 the free end of the clearing arm 13 which cooperates with the raking and screening surface 10 of the interceptor 6 can be provided with a brush 27 (Figure 3).

Figures 4 to 6 show a detail of the interceptor 6 in case of three different embodiments with regard to the cross section of
30 the bars 7. Besides their cross section the arrangement of the bars 7 relative to each other and the slots 8 formed between the bars 7 are of interest. Figure 4 explains the performance of



bars 7 having a kind of pentagonal cross section. A flow path 28 is indicated which runs straight, without a bend and parallel to the direction of the flow in the channel 1 according to arrow 3. Hence, the flow is not deviated here at least in the region of the flow path 28 so that the interceptor 6 has a relatively low flow resistance. The same applies to the embodiment shown in Figure 5 and having bars 7 with a kind polygonal cross section. Here too, an undeviated and unbended flow path is indicated. In constrast to this, the bars 7 in the embodiment according to Figure 6 consist of flat bar steel arranged in the way as shown. Here, a flow path 29 is indicated which runs bended. Therefore, the interceptor 6 has a higher flow resistance resulting in a kind of banking-up in the channel 1 so that the liquid level in front of the interceptor 6 is higher than behind the interceptor 6.

BEZUGSZEICHENLISTE

1	-	Channel
2	-	Bottom
3	-	Arrow
4	-	Device
5	-	Axis
6	-	Interceptor
7	-	Bars
8	-	Slots
9	-	Crossbar
10	-	Raking-off or screening surface
11	-	Face
12	-	Clearing means
13	-	Clearing arm
14	-	Extensions
15	-	Conveyor means
16	-	Intake funnel
17	-	Housing
18	-	Conveyor screw
19	-	Discarding point
20	-	Motor
21	-	Container
22	-	Separator means
23	-	Nozzles
24	-	Spray beam
25	-	Stripper
26	-	Actuation
27	-	Brush
28	-	Flow path
29	-	Flow path



C L A I M S

1. Device for removing raked-off or screened material from liquid flowing through a channel, particularly in sewage treatment, the device

- having a fixed interceptor,
5 the interceptor being shaped like a hollow cylinder having an axis,
the interceptor being sloped with regard to the axis of the cylinder,
the interceptor being partly immersed in the liquid, and
10 the interceptor consisting of bars extending tangentially around the axis of the cylinder, between the bars slots being left open,
- having a conveyor means allocated to the interceptor,
the conveyor means leading to an discarding point,
15 the conveyor means comprising a conveyor screw, a housing and an intake funnel for the raked-off or screened or material, the intake funnel being located in the vicinity of the interceptor,
- and having a driven clearing means for removing the raked-off or screened material from the interceptor.
20

2. Device according to claim 1, wherein the bars of the interceptor are constructed continuously around the axis of the cylinder.



3. Device according to claim 1, wherein the axis of the conveyor means and the axis of the cylinder are arranged concentrically and wherein the clearing means is connected to and driven by the conveyor screw of the conveyor means.

5 4. Device according to claim 1, wherein the clearing means is driven by a separate actuation means.

10 5. Device according to claim 1, and further comprising a separator means allocated to the clearing means for separating the raked-off or screened material from the clearing means, the separator means being located in the upper region of the interceptor, and, particularly, the separator means being constructed as a spray beam provided with nozzles.

15 6. Device according to claim 1, wherein the clearing means is constructed as a rotating clearing arm being mounted at the flow-in opening of the interceptor.

7. Device according to claim 6, wherein the clearing arm is provided with finger-like extensions extending into the slots left open between the bars of the interceptor.

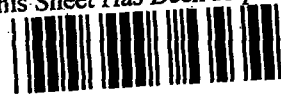
20 8. Device according to claim 6, wherein the clearing arm is provided with a brush having a pitch against the inner surface of the interceptor.

9. Device according to claim 1, wherein the clearing means is driven discontinuously, and has a stop position in the upper region of the interceptor.

25 10. Device according to claim 9, wherein the clearing means is driven in opposite directions with regard to a section of the inner surface of the interceptor, particularly, when starting again from its stop position.



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11. Device according to claim 1, wherein the bars forming the interceptor have a cross section constructed not to change the direction of the liquid flowing through the slots between the bars.