

The invention relates to a disc filter for mechanical purification of biologically treated waste water having filter discs, arranged on a rotatably mounted, drivable support tube and each having two filter surfaces which can be cleaned by suction, the suction apparatuses extending radially up to the support tube.

DE-C-22 61 203 discloses such an apparatus. The construction of this apparatus is relatively complicated, so that the assembly and disassembly of the disc-shaped filter bodies can only be carried out laboriously and in a time-consuming manner.

Highly diverse types of filter construction are also known which are either unsuitable for purifying wastewater or have complex constructions (DE-A-20 02 858, 28 08 537, 22 57 357, DE-C-568 537, US-A-3.331.512, US-A-2.591.720).

The object underlying the invention is to create a disc filter for the purification of waste water which has an easy-to-handle construction in which the cleaning by suction is matched to the amount arising to be removed by suction.

This object is achieved according to the invention in that the support tube has a polygonal cross-section, in that on the planar side surfaces thereof are directly attached individual detachable frames covered by a filter cloth, which together form a polygonal filter body and in that the suction apparatuses have suction nozzles which are subdivided into a plurality of chambers, each assigned to different radial sections of the filter body, and in that the chambers are constructed decreasing in suction cross-section from the inside towards the outside.

According to a further embodiment of the invention, it is provided that a support tube, hexagonal in cross-section, is provided and the frames attached on the support tube are constructed pentagonally seen from the side, so that a dodecagonal disk-shaped filter body results.

Another embodiment of the invention is that the frames attached to the hexagonal support tube are quadrilaterally constructed as seen from the side, so that a hexagonal disc-shaped filter body results.

5 According to a further embodiment, the frames each have two tubes for receiving bolts for bolting frames and support tube.

 According to a further embodiment, the frames have at the periphery a surrounding trapezoidal recess,
10 to which are assigned appropriately configured strips for attaching the filter cloth.

 According to a further embodiment, the frames have a grid-like support framework on both sides.

 According to a further embodiment, three chambers
15 are provided, the inner chamber having the largest suction cross-section, the outer chamber having the smallest suction cross-section and the middle chamber having a suction cross-section between the suction cross-sections.

20 According to a further embodiment, the filter cloth is configured as a bag which can be pulled over the frames.

 The advantages achieved by the invention are, in particular, that a disc filter having a large filter area
25 has been created which is inexpensive to manufacture and is convenient to assemble, and, if required, to disassemble. The particular construction of the suction apparatuses also makes possible optimal cleaning by suction and very good conveying away of the dirt particles removed by suction.
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 The invention is described in more detail with reference to the drawings.

 In the figures,

Fig. 1

35 and

Fig. 2 show an apparatus according to the invention for the purification of waste water in two views,

Fig. 3 shows the section D-D from Fig. 2,

Fig. 4 shows the section E-E from Fig. 2,

Fig. 5 shows a frame according to the invention in side view,

Fig. 6 shows the section A-A of Fig. 5,

Fig. 7 shows the section B-B from Fig. 5,

5 Fig. 8 shows a suction nozzle,

Fig. 9 shows the section A-A of Fig. 8,

Fig. 10 shows the side view to Fig. 8,

Fig. 11 shows the section B-B to Fig. 9,

Fig. 12

10 and

Fig. 13 show in two views the suction plate belonging to the suction nozzle, and

Fig. 14 shows a different shape of the frame according to the invention.

15 Figs. 1 and 2 show an apparatus 1 for mechanical purification of waste water which is conventionally biologically treated (not depicted) and then mechanically purified with, for example, a disc filter 2. The pretreated waste water passes into the tank 4 via a feed 3,
20 passes the filter surfaces 6 present on the sides of the disc-shaped filter bodies 5 and flows away, purified, through the rotating support tube 7 and the outlet 8. The disc filter 2 is constructed to be rotatable as a single unit, for which purpose a drive 9 is connected for
25 example via a chain 10 to a pinion 11 arranged on the rotatably mounted support tube 7.

A special feature of the invention is that individual detachable frames 12 are provided, which are covered with a filter cloth and in their entirety form a
30 disc-shaped filter body 5, which frames are firmly attached to the rotating support tube. The support tube 7 can in principle have any cross-section, but is preferably constructed to be polygonal in cross-section, as shown, for example, in Fig. 2. In this example, the
35 support tube 7 is hexagonal and has planar side surfaces 13. To these side surfaces 13 are attached six detachable frames 12 which are covered with a filter cloth and which in their entirety form a polygonal, disc-shaped filter body 5. Details of the attachment of the frames 12 on the

support tube 7 are shown in Fig. 3: bolts 15 are provided in two tubes 14 per frame 12, by the aid of which bolts the frames 12 are bolted to the support tube 7. Details of a frame 12 are depicted in Figs. 5, 6 and 7. The in
5 this case pentagonal frame 12 exhibits the said two tubes 14 for receiving the bolts 15. In the bottom region, the frame has an orifice 16, via which the purified waste water can enter into the support tube 7 in the direction of the arrow 17. The frame 12 has at the periphery a
10 surrounding trapezoidal recess 18, to which are assigned appropriately configured strips 19 for attaching the filter cloth 20.

Compare in this context Figs. 3 to 7. The filter cloth 20 is preferably configured as a bag which can be
15 pulled over the frames 12 and is attached (Fig. 7) to the frame 12 by the strips 19 and the bolts (not depicted) assigned to threaded bushes 21.

Grid-like support frameworks 22 can be arranged on the frames 12 on each side, as indicated in Fig. 5.
20 This measure has the purpose of holding the filter cloth 20 optimally stretched in order to achieve a high cleaning effect.

In Figs. 8 to 11, a suction nozzle 23 is shown in different views, which suction nozzle is part of a
25 suction apparatus 24 (Figs. 1, 2). The suction nozzle 23 according to the invention is characterized in that a plurality of chambers 25, 26 and 27 are present. Owing to the different peripheral velocity at the filter body 5 or the filter surfaces 6, the inner chamber 25 of the
30 suction nozzle 23 is constructed in such a way that it is larger in suction cross-section 28 than the suction cross-sections 29 and 30 of the chambers 26 and 27. That is, depending on the amount arising of particles to be removed by suction, the suction cross-section 28, 29 and
35 30 is constructed decreasing from the inside towards the outside. Compare in this context, in particular, Figs. 9 and 11.

The suction plate 31, arranged between suction nozzle and filter cloth, is depicted in two views in

Figs. 12 and 13.

Fig. 14 shows diagrammatically that the frames 12 can be constructed quadrilaterally seen from the side, so that a hexagonal disc-shaped filter body 5 results, for
5 a support tube hexagonal in cross-section.



Patent claims

1. Disc filter (1) for mechanical purification of biologically treated waste water having filter discs, arranged on a rotatably mounted, drivable support tube
5 (7) and each having two filter surfaces (6) which can be cleaned by suction, the suction apparatuses (24) extending radially up to the support tube (7), characterized in that the support tube (7) has a polygonal cross-section, in that on the planar side surfaces (13) thereof are
10 directly attached individual detachable frames (12) covered by a filter cloth, which together form a polygonal filter body (5) and in that the suction apparatuses (24) have suction nozzles (23) which are subdivided into a plurality of chambers (25, 26, 27),
15 each assigned to different radial sections of the filter body (5), and in that the chambers (25, 26, 27) are constructed decreasing in suction cross-section (28, 29, 30) from the inside towards the outside.
2. Apparatus according to Claim 1, characterized in
20 that a support tube (7), hexagonal in cross-section, is provided and the frames (12) attached on the support tube (7) are constructed pentagonally seen from the side, so that a dodecagonal disc-shaped filter body (5) results.
3. Apparatus according to Claim 1, characterized in
25 that a support tube (7) hexagonal in cross-section is provided and the frames (12) attached to the support tube (7) are quadrilaterally constructed seen from the side, so that a hexagonal disc-shaped filter body (5) results.
4. Apparatus according to one or more of the
30 preceding claims, characterized in that the frames (12) each have two radially running tubes (14) for receiving bolts (15) for bolting frames (12) and support tube (7).
5. Apparatus according to one or more of the preceding claims, characterized in that the frames (12)
35 have at the periphery a surrounding trapezoidal recess (18), to which are assigned appropriately configured strips (19) for attaching the filter cloth (20).
6. Apparatus according to one or more of the preceding claims, characterized in that the frames (12)



have a grid-like support framework (22) on both sides.

7. Apparatus according to Claim 1, characterized in that three chambers (25, 26, 27) are provided.

8. Apparatus according to one or more of the
5 preceding claims, characterized in that the filter cloth (20) is configured as a bag which can be pulled over the frames (12).