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Datasheet for the decision of 29 January 2019

Case Number: T 2099/16 - 3.3.05

Application Number: 11194681.0

Publication Number: 2465824

IPC: C02F1/38, C02F3/12

Language of the proceedings: EN

Title of invention:
Membrane bioreactor (MBR) configurations for wastewater treatment

Applicant:
Palo Alto Research Center Incorporated

Headword:
Membrane bioreactor/PALO ALTO

Relevant legal provisions:
EPC Art. 123(2), 54(1), 54(2), 56

Keyword:
Amendments of application - allowable (yes)
Novelty - (yes)
Inventive step - (yes)

Decisions cited:

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

Boards of Appeal

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Case Number: T 2099/16 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 29 January 2019

Appellant: (Applicant)	Palo Alto Research Center Incorporated 3333 Coyote Hill Road Palo Alto, California 94304 (US)
Representative:	Gill Jennings & Every LLP The Broadgate Tower 20 Primrose Street London EC2A 2ES (GB)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 30 March 2016 refusing European patent application No. 11194681.0 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	E. Bendl
Members:	A. Haderlein
	O. Loizou

Summary of Facts and Submissions

I. The appellant (applicant) lodged an appeal against the decision of the examining division to refuse application No. 11 194 681.0.

II. The examining division refused the application on the grounds that the subject-matter of claims 1 and 9 of the request underlying the impugned decision lacked an inventive step in view of

D1: US 2008/0006571 A1

as the closest prior art in combination with

D4: EP 2 127 752 A2.

In particular, it held that the system according to independent claim 1 and the method according to independent claim 9 of the request underlying the impugned decision differed from the disclosure of D1 by a hydrodynamic separator comprised of a plurality of curved hydrodynamic devices stacked in a parallel manner. Moreover, the subject-matter of independent claim 1 also differed from the system known from D1 by a pretreatment suitable for initial separation of particles form source water.

III. With its grounds of appeal, the appellant filed, *inter alia*, three auxiliary requests.

IV. In a communication pursuant to Article 15(1) RPBA, the board informed the appellant of its preliminary opinion.

V. In response to the communication of the board, the appellant filed a new main request.

VI. A telephone conversation took place between the rapporteur and the appellant's representative.

VII. By letter dated 9 January 2019, the appellant filed an amended main request.

VIII. The wording of the two independent claims of this request is as follows:

"1. A membrane-based bio-reactor water treatment system comprising:
a water in-take (102) for receiving source water into the system;
a solids removal module configured to receive the source water from the water in-take (106);
a pretreatment module configured to receive the source water from the solids removal module (108), suitable for initial separation of particles from source water;
an aeration zone configured to receive the source water from the pretreatment module (114);
a membrane module configured to receive the source water from the aeration zone (122);
a hydrodynamic separator (1400) configured within the system to receive the source water prior to the source water being received by the membrane module, the hydrodynamic separator configured to remove total suspended solids (TSS) from the source water prior to the source water being received by the membrane module; and
a line (112) configured to receive the particles from the pretreatment module in the form of sludge and receive the TSS from the hydrodynamic separator in the form of sludge, and remove the particles and the TSS

from the system in the form of sludge;
said hydrodynamic separator being comprised of a plurality of curved hydrodynamic devices (1300) stacked in a parallel manner;
wherein said plurality of curved hydrodynamic devices comprises an inlet coupler (1402) and/or at least one outlet coupler (1404/1406)."

"9. A method of treating water by removing total suspended solids (TSS) from source water, comprising continuously supplying source water in series to the following modules of a membrane based bio-reactor:
a water in-take (102) for receiving source water into the system;
a solids removal module configured to receive the source water from the water in-take (106);
a pretreatment module configured to receive the source water from the solids removal module (108), suitable for initial separation of particles from source water;
an aeration zone configured to receive the source water from the pretreatment module (114);
a membrane module configured to receive the source water from the aeration zone (122);
a hydrodynamic separator (1400) configured within the system to receive the source water prior to the source water being received by the membrane module, the hydrodynamic separator configured to remove total suspended solids (TSS) from the source water prior to the source water being received by the membrane module; and
a line (112) configured to receive the particles from the pretreatment module in the form of sludge and receive the TSS from the hydrodynamic separator in the form of sludge, and remove the particles and the TSS from the system in the form of sludge;
said hydrodynamic separator being comprised of a

plurality of curved hydrodynamic devices (1300) stacked in a parallel manner;
wherein said plurality of curved hydrodynamic devices comprises an inlet coupler (1402) and/or at least one outlet coupler (1404/1406)."

Dependent claims 2 to 8 concern preferred embodiments of the water treatment system of claim 1.

IX. The appellant's arguments, as far as relevant to the present decision, may be summarised as follows:

The main request complies with the requirements of the EPC. In particular, the feature "and a line (112)... sludge" is based on page 5, lines 7 to 14; page 6, lines 6 to 11; and page 7, lines 6 to 16, of the application as filed.

X. Requests

The appellant requested that the decision under appeal be set aside and that a patent be granted based on the main request filed by letter dated 9 January 2019 or one of the three auxiliary requests filed with the grounds of appeal.

Reasons for the Decision

1. Main request - amendments

1.1 Claims 1 and 9 are respectively based on claims 1 and 12 as originally filed with the additional features finding their respective basis as follows:

- pretreatment module suitable for initial separation

of particles: page 5, lines 10 to 12;
- line configured to receive the particles in the form of sludge: page 5, line 14; page 6, lines 10 and 11; page 7, lines 13 to 16;
- hydrodynamic separator comprised of a plurality of curved hydrodynamic devices stacked in a parallel manner comprising an inlet and/or outlet coupler: claims 9 to 11.

1.2 Dependent claims 2 to 8 are based on their originally filed counterparts.

1.3 The claims thus comply with the requirement of Article 123(2) EPC.

2. Main request - novelty

In the decision under appeal, the examining division did not raise an objection for lack of novelty. The board also considers the requirement of novelty to be met. The subject-matter of independent claims 1 and 9 differs from the disclosure of D1 by (i) a solids removal module upstream of the pretreatment module suitable for initial separation of particles from source water, (ii) a plurality of curved hydrodynamic devices stacked in a parallel manner and comprising an inlet coupler and/or an outlet coupler and (iii) a line configured to receive the particles from the pretreatment module in the form of sludge and receive the TSS from the hydrodynamic separator in the form of sludge and to remove the particles and the TSS from the system in the form of sludge.

The requirement of Article 54(1),(2) EPC is therefore met.

3. Main request - inventive step

3.1 The invention concerns a membrane-based bio-reactor water treatment system.

3.2 In line with the view taken by the examining division the board considers D1 as a suitable starting point for assessing inventive step, i.e. D1 represents the closest prior art.

3.2.1 According to the application, the problem resided in improving maintenance or extending the life of the membrane module (see page 3, line 15 and following).

3.2.2 According to independent claim 1 of the main request, it is proposed to solve the above problem by a membrane-based bio-reactor water treatment system characterised by (i) a solids removal module upstream of the pretreatment module suitable for initial separation of particles from source water, (ii) a plurality of curved hydrodynamic devices stacked in a parallel manner and comprising an inlet coupler and/or an outlet coupler, and (iii) a line configured to receive the particles from the pretreatment module in the form of sludge and receive the TSS from the hydrodynamic separator in the form of sludge and to remove the particles and the TSS from the system in the form of sludge.

3.3 As to the success of the solution, the board is satisfied that the proposed solution indeed solves the problem posed. In particular, the solids removal module and the line for removing particles and the TSS from the system can be used for reducing the stress on the membrane module, i.e. the solids load on the membrane filtration in the water treatment system is lightened

(see page 3, line 15 and following, of the application)

Hence, the problem does not need reformulation.

3.4 As to obviousness, the board observes that in D1 a line for withdrawing sludge is disclosed (see Fig. 1, numeral 34, paragraph [0069]; Fig. 10, numeral 213, paragraph [0106]; Fig. 11, numeral 251, paragraph [0134]). This line is however not configured to receive sludge from the pretreatment module or from the hydrodynamic separator, i.e. the "cyclone filter" (numeral 59 in Fig. 1) used in D1.

Moreover, none of the other documents cited in the proceedings before the examining division teach to solve the problem posed by using the line and the solids removal module according to claims 1 and 9. In particular, while D2 (US 2010/072131 A1) teaches to remove waste sludge, the removal takes place downstream of the membrane module (see Figs. 6 and 8 to 11 and paragraphs [0086] and [0093]), whereas, according to claims 1 and 9 of the request in question, the line is configured to receive the sludge from a position upstream of the membrane module.

D3 (EP 2 060 312 A2) and D4 at most teach to use a hydrodynamic separator as recited in claims 1 and 9 but are silent about sludge removal and the solids load on membranes of a membrane-based bio-reactor.

It follows that the subject-matter of independent claims 1 and 9 is not obvious in view of the cited prior art. The requirement of Article 56 EPC is therefore met. The same applies to the subject-matter of dependent claims 2 to 8.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the department of first instance with the order to grant a patent based on the claims of the main request filed by letter dated 9 January 2019 and a description to be adapted, where necessary.

The Registrar: The Chairman:

C. Vodz E. Bendl

Decision electronically authenticated