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Case Number: T 1143/13 - 3.3.05

Application Number: 03736252.2

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Title of invention:
WASTE WATER PURIFICATION APPARATUS AND WASTE WATER PURIFICATION METHOD INCLUDING THE REGENERATION OF USED COAGULANT

Applicant:
Hitachi, Ltd.

Headword:
SEAWATER PURIFICATION/HITACHI

Relevant legal provisions:
EPC Art. 84, 123(2)

Keyword:
Amendments - added subject-matter (no)
Claims - support by the description (yes)

Decisions cited:

Catchword:

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Boards of Appeal
Chambres de recours

European Patent Office
D-80298 MUNICH
GERMANY
Tel. +49 (0) 89 2399-0
Fax +49 (0) 89 2399-4465

Case Number: T 1143/13 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 10 April 2014

Appellant: (Applicant)	Hitachi, Ltd. 6-6, Marunouchi 1-chome, Chiyoda-ku Tokyo 100-8280 (JP)
Representative:	Calderbank, Thomas Roger Mewburn Ellis LLP 33 Gutter Lane London EC2V 8AS (GB)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 13 December 2012 refusing European patent application No. 03736252.2 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman: G. Raths
Members: J.-M. Schwaller
P. Guntz

Summary of Facts and Submissions

I. This appeal lies from the decision of the examining division refusing European patent application No. 03 736 252.2 because claim 1 of the main request then on file (submitted with letter of 9 October 2012), which read as follows:

"*1. A waste water purification system including a waste water purification apparatus, wherein the waste water purification apparatus comprises:*
purification means for purifying polluted seawater containing matter to be removed including particulate floating particles such as plankton, oil particles, and organic matter, and polluted salt-added soft water from factory effluent containing matter to be removed, generated from industrial production sites, including pollutant particles and phosphorus;
sludge recovery means for separating and collecting, from the waste water, sludge generated in purification treatment; and
means for discharging the purified water generated in the purification treatment; and
said purification means and said sludge recovery means comprising:
coagulation and separation means for forming flocs containing pollutant particles, phosphorus by infusing a coagulant, and for separating the flocs through at least a filtration process of filtering the flocs by a mesh to create purified saltwater;
floc disintegration means for generating an acidic solution and an alkaline solution by electrolysis part of the purified water and for disintegrating the flocs collected as sludge by use of acidic solution or alkaline solution generated;
coagulant regeneration means for regenerating the

coagulant from matter forming the disintegrated flocs, separating the melter (sic) to be removed and the regenerated coagulant in the disintegrated flocs, and extracting the coagulant; and
sludge recovery and discard means for recovering and discarding the matter to be removed.",

did not meet the requirements of Article 123(2) EPC.

II. In the contested decision, the examining division argued in particular that:

- the feature "*salt-added soft water from factory effluent*" was not directly and unambiguously derivable from the original application documents;

- the expression "*through at least a filtration process of filtering the flocs by a mesh to create purified saltwater*" represented an unallowable intermediate generalisation;

- the feature "*coagulant regeneration means for regenerating the coagulant from matter forming the disintegrated flocs*" extended beyond the original disclosure because the coagulant was regenerated from the matter forming the flocs, not from the matter forming the disintegrated flocs.

III. With the grounds of appeal dated 11 April 2013, the appellant filed a new main request with a claim 1 reading:

1. A waste water purification system including a waste water purification apparatus, wherein the waste water purification apparatus comprises:

purification means for purifying polluted seawater containing matter to be removed including particulate floating particles such as plankton, oil particles, and organic matter;
sludge recovery means for separating and collecting, from the waste water, sludge generated in purification treatment; and means for discharging the purified water generated in the purification treatment; and said purification means and said sludge recovery means comprising:
coagulation and separation means for forming flocs containing pollutant particles, phosphorus by infusing a coagulant, and for separating the flocs through at least a filtration process of filtering the flocs by a mesh to create purified saltwater, the mesh being part of a membrane magnetic separation apparatus, the membrane magnetic separation apparatus comprising:
the mesh having a drum—like shape forming a membrane with openings ranging from a few microns to a few tens of microns in opening size;
shells without openings that are jointed to respective ends of the mesh;
a flange jointed in an integrated manner to one of the ends of the mesh,
a rod jointed to the center of the flange;
a motor driving the rod so as to cause the flange, the shells and the mesh to rotate;
a fixed flange integrated to one of the shells,
a nozzle integrated with the fixed flange; and a casing supporting the nozzle, and maintained in a watertight relationship with the nozzle by ring-shaped sliding bodies of a polymer material, the casing containing the mesh;
the purified polluted seawater being arranged to flow via a duct to the mesh so that magnetic flocs in the purified polluted seawater are trapped on the outer

surface of the mesh, to separate the magnetic flocs from the purified saltwater, there being a liquid level difference between the purified polluted seawater and the purified saltwater to cause the purified polluted seawater to pass through the mesh, the purified saltwater flowing to a purified water tank via the nozzle; floc disintegration means for generating an acidic solution and an alkaline solution by electrolysis part of the purified water and for disintegrating the flocs collected as sludge by use of acidic solution or alkaline solution generated; coagulant regeneration means for regenerating the coagulant from matter forming the flocs, extracting and separating the coagulant by separating the coagulant from the matter to be removed in the polluted seawater; and sludge recovery and discard means for recovering and discarding the matter to be removed."

IV. In a communication dated 10 October 2013, the board expressed the opinion that:

- the feature "*floc disintegration means for generating an acidic solution and an alkaline solution by electrolysis part of the purified water and for disintegrating the flocs collected as sludge by use of acidic solution or alkaline solution generated*" had no basis as such in the application as filed. Claim 1 thus did not meet the requirements of Article 123(2) EPC.

- claim 1 was not supported by the description (Article 84 EPC) in the sense that it did not include all the features essential for carrying out the invention, a magnetic powder being mandatorily added to the process with the coagulant.

V. With a letter dated 19 February 2014, the appellant filed a new set of three claims as an amended main request, with claim 1 reading as follows (differences to claim 1 as filed with the grounds of appeal emphasised by the board):

"1. A waste water purification system including a waste water purification apparatus, wherein the waste water purification apparatus comprises:

purification means for purifying polluted seawater containing matter to be removed including particulate floating particles such as plankton, oil particles, and organic matter;

sludge recovery means for separating and collecting, from the waste water, sludge generated in purification treatment; and

means for discharging the purified water generated in the purification treatment; and

said purification means and said sludge recovery means comprising:

coagulation and separation means for forming flocs containing pollutant particles, phosphorus by infusing a coagulant ***and a magnetic powder****, and for separating the flocs through at least a filtration process of filtering the flocs by a mesh to create purified saltwater, the mesh being part of a membrane magnetic separation apparatus, the membrane magnetic separation apparatus comprising:*

the mesh having a drum-like shape forming a membrane with openings ranging from a few microns to a few tens of microns in opening size;

shells without openings that are jointed to respective ends of the mesh;

a flange jointed in an integrated manner to one of the ends of the mesh,

a rod jointed to the center of the flange;

a motor driving the rod so as to cause the flange, the shells and the mesh to rotate;

a fixed flange integrated to one of the shells,

a nozzle integrated with the fixed flange; and

a casing supporting the nozzle, and maintained in a watertight relationship with the nozzle by ring-shaped sliding bodies of a polymer material, the casing containing the mesh;

the purified polluted seawater being arranged to flow via a duct to the mesh so that magnetic flocs in the purified polluted seawater are trapped on the outer surface of the mesh, to separate the magnetic flocs from the purified saltwater, there being a liquid level difference between the purified polluted seawater and the purified saltwater to cause the purified polluted seawater to pass through the mesh, the purified saltwater flowing to a purified water tank via the nozzle;

floc disintegration means for ~~generating an acidic solution and an alkaline solution by electrolysis part of the purified water and for~~ disintegrating the flocs collected as sludge by use of ***an*** *acidic solution or alkaline solution generated* ***from electrolysis of a liquid;***

coagulant regeneration means for regenerating the coagulan*t from matter forming the flocs, extracting and separating the coagulant by separating the coagulant from the matter to be removed in the polluted seawater; and*

sludge recovery and discard means for recovering and discarding the matter to be removed."

Dependent claims 2 and 3 represent specific embodiments of the subject-matter of claim 1.

VI. The appellant requested that the contested decision be set aside and that the case be remitted to the examining division for further prosecution on the basis of the set of claims filed with letter of 19 February 2014.

Reasons for the Decision

1. *Admissibility of the amendments under Article 123(2) EPC*

1.1 The subject-matter of amended claims 1 to 3 has a basis as follows in the application as originally filed:

- claim 1: in claims 1 and 4 and in the passage at page 13, line 27, to page 15, line 9;

- claim 2: in claim 8;

- claim 3: in claim 13.

1.2 The amendments that the appellant made to claim 1 remedy the objections of the department of first instance since the feature "*salt-added soft water from factory effluent*" has been deleted, and the feature "*coagulant regeneration means for regenerating the coagulant from matter forming the disintegrated flocs*" has been replaced by the feature "*coagulant regeneration means for regenerating the coagulant from matter forming the flocs*", which has a literal basis in claim 1 as originally filed.

Furthermore, the feature *"through at least a filtration process of filtering the flocs by a mesh to create purified saltwater"* that the examining division held to be an unallowable intermediate generalisation has been completed with the features which were inextricably linked with the mesh in the specific embodiment defined at page 13, line 27, to page 15, line 9, namely that the mesh is part of a membrane magnetic separation apparatus which comprises:
- the mesh having a drum—like shape forming a membrane with openings ranging from a few microns to a few tens of microns in opening size;
- shells without openings that are jointed to respective ends of the mesh;
- a flange jointed in an integrated manner to one of the ends of the mesh;
- a rod jointed to the centre of the flange;
- a motor driving the rod so as to cause the flange, the shells and the mesh to rotate;
- a fixed flange integrated with one of the shells;
- a nozzle integrated with the fixed flange; and
- a casing supporting the nozzle, and maintained in a watertight relationship with the nozzle by ring-shaped sliding bodies of a polymer material, the casing containing the mesh;
and the purified polluted seawater being arranged to flow via a duct to the mesh so that magnetic flocs in the purified polluted seawater are trapped on the outer surface of the mesh, to separate the magnetic flocs from the purified saltwater, there being a liquid level difference between the purified polluted seawater and the purified saltwater to cause the purified polluted seawater to pass through the mesh, the purified saltwater flowing to a purified water tank via the nozzle.

1.3 The amendments to claim 1 further remedy the objection raised in the board's communication of 10 October 2013, since the feature "*floc disintegration means for generating an acidic solution and an alkaline solution by electrolysis part of the purified water and for disintegrating the flocs collected as sludge by use of acidic solution or alkaline solution generated*" has been replaced by the feature "floc disintegration means for disintegrating the flocs collected as sludge by use of acidic solution or alkaline solution generated from electrolysis of a liquid", which has a litteral basis in claim 1 of the application as filed.

1.4 It follows from the above considerations that amended claims 1 to 3 of the sole request on file meet the requirements of Article 123(2) EPC.

2. *Support by the description*

The insertion in claim 1 of the feature "and a magnetic powder" - that the board held to be mandatory for forming flocs in the coagulation and separation means - overcomes the board's objection that this feature was essential for carrying out the invention, in particular the magnetic separation of the flocs. It follows that the claims are supported by the description as required by Article 84 EPC.

3. The objections of the department of first instance have been removed by the proposed amendments. Some major issues are still pending, in particular the assessment of the novelty and inventive step of the claims. Therefore, the case is remitted to the department of first instance with the order to further examine the application.

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 for further prosecution on the basis of the set of claims filed with letter dated 19 February 2014.

The Registrar: The Chairman:

C. Vodz G. Raths

Decision electronically authenticated