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**Datasheet for the decision
of 26 September 2012**

Case Number: T 1446/11 - 3.2.03

Application Number: 03789644.6

Publication Number: 1585923

IPC: F24H 1/00, F24H 1/20

Language of the proceedings: EN

Title of invention:

Device for heating liquids and assembly for use in such a device

Applicant:

Ferro Techniek Holding B.V.

Opponent:

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Headword:

-

Relevant legal provisions:

EPC Art. 84, 54, 56

Keyword:

-

Decisions cited:

-

Catchword:

-



Case Number: T 1446/11 - 3.2.03

D E C I S I O N
of the Technical Board of Appeal 3.2.03
of 26 September 2012

Appellant:
(Applicant)

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Representative:

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Decision under appeal:

Decision of the Examining Division of the
European Patent Office posted 11 February 2011
refusing European application No. 03789644.6
pursuant to Article 97(2) EPC.

Composition of the Board:

Chairman: G. Ashley
Y. Jest
E. Kossonakou

Summary of Facts and Submissions

I. On 14 April 2011 the applicant (appellant) lodged an appeal against the decision of the examining division refusing European patent application Nr. 03789644.6 (based on International application PCT/NL2003/000879 published with the International Publication WO2004/063637); the appeal fee was paid on the same day.

By its decision dated 11 February 2011 the examining division refused the European application, citing the following grounds:

- a lack of clarity (article 84 EPC) and novelty (article 54(1) EPC) in respect of the state of the art disclosed in D1: US-A- 4 803 343 (for the main and first auxiliary requests);
- an unallowable extension of claimed subject-matter (article 123(2) EPC) for the second and third auxiliary requests.

II. On 2 June 2011 the appellant filed the grounds of appeal and requested that the contested decision be set aside and a patent be granted on the basis of one of the amended sets of claims, filed as the main request and auxiliary requests 1 to 4.

The appellant also requested oral proceedings on an auxiliary basis.

III. Independent claims 1 and 13 of the five requests submitted by the appellant read as follows:

(a) Main request

1. "Device for heating liquids, comprising:

a first liquid container (3) for liquid for heating (4), a second liquid container (6), which second liquid container is at least partially filled with an intermediary liquid (7), and a heating element (5) coupled to the second liquid container (6), wherein heat transfer from the heating element (5) to the liquid for heating (4) takes place at least substantially via the intermediary liquid (7), and wherein the intermediary liquid (7) is formed at least substantially by water,

characterized in that:

an underpressure is present in the second liquid container (6) at room temperature and under atmospheric conditions, such that the boiling point of the intermediary liquid is reduced."

13. "Assembly of a heating element and a second liquid container for use in a device as claimed in any of the claims 1-12."

(b) Auxiliary request 1

1. "Device for heating liquids, comprising:
a first liquid container (3) for liquid for heating (4), a second liquid container (6), which second liquid container is at least partially filled with an intermediary liquid (7), and a heating element (5) coupled to the second liquid container (6), wherein heat transfer from the heating element (5) to the liquid for heating (4) takes place at least substantially via the intermediary liquid (7), and wherein the intermediary liquid (7) is formed at least substantially by water,

characterized in that:

the second liquid container (6) is a sealed container with an underpressure therein, whereby said second liquid is below atmospheric pressure at room temperature, such that the boiling point of the intermediary liquid is reduced."

13. "Assembly of a heating element and a second liquid container for use in a device as claimed in any of the claims 1-12."

(c) Auxiliary request 2

1. "Device for heating liquids, comprising:
a first liquid container (3) for liquid for heating (4),
a second liquid container (6), which second liquid container is at least partially filled with an intermediary liquid (7), and a heating element (5) coupled to the second liquid container (6),
wherein heat transfer from the heating element (5) to the liquid for heating (4) takes place at least substantially via the intermediary liquid (7), and
wherein the intermediary liquid (7) is formed at least substantially by water,

characterized in that:

the second liquid container (6) comprises a fully closed housing with an underpressure therein, whereby said second liquid is below atmospheric pressure at room temperature, such that the boiling point of the intermediary liquid is reduced."

13. "Assembly of a heating element and a second liquid container for use in a device as claimed in any of the claims 1-12."

(d) Auxiliary request 3

1. "Device for heating liquids comprising:
a first liquid container (11) for liquid for heating,
a second liquid container (16), which second liquid
container is at least partially filled with an
intermediary liquid (17), and a heating element (15)
coupled to the second liquid container (16), wherein
heat transfer from the heating element (15) to the
liquid for heating (14) takes place at least
substantially via the intermediary liquid (17), and
wherein the intermediary liquid (17) is formed at least
substantially by water, and the heating element (15)
and second liquid container (16) form a heating device
(13) positioned in an opening of the first liquid
container (11);

characterized in that:

a seal (14) is provided in the opening between the
heating device (13) and the first liquid container (11),
at a distance from the heating element (15), wherein
the heating element is positioned at a distance from
the first liquid container."

13. "Assembly of a heating element and a second liquid
container for use in a device as claimed in any of the
claims 1-12."

(e) Auxiliary request 4

1. "Device for heating liquids, comprising:
a first liquid container (11) for liquid for heating,
a second liquid container (16), which second liquid
container is at least partially filled with an

intermediary liquid (17), and a heating element (15) coupled to the second liquid container (16), wherein heat transfer from the heating element (15) to the liquid for heating (14) takes place at least substantially via the intermediary liquid (17), and wherein the intermediary liquid (17) is formed at least substantially by water, and the heating element (15) and second liquid container (16) form a heating device (13) positioned in an opening of the first liquid container (11);

characterized in that:

an underpressure is present in the second liquid container (6) at room temperature and under atmospheric conditions, such that the boiling point of the intermediary liquid is reduced; and a seal (14) is provided in the opening between the heating device (13) and the first liquid container (11), at a distance from the heating element (15), wherein the heating element is positioned at a distance from the first liquid container."

13. "Assembly of a heating element and a second liquid container for use in a device as claimed in any of the claims 1-12."

IV. The substantive arguments advanced by the appellant in the statements setting out the grounds of appeal can be summarised as follows:

The reasoning of the examining division relating to the issue of lack of novelty of the device according to the main and first auxiliary requests was erroneous, because the mere fact that a degassing pipe was provided in the device of D1 did not mean that this document anticipated the essential feature of the

invention defining the presence of underpressure in the second liquid container. The claimed device was therefore new and involved an inventive step. The feature defining an underpressure in the second container was, contrary to the objection of lack of clarity raised by the examining division, a constructional feature defining the device in the sense that it characterised the content of said container, which has been even emphasized by the amendments made to the wording of claim 1 according to the first and second auxiliary requests.

Auxiliary requests three and four, which corresponded in substance to the second and third auxiliary requests refused by the examining division, were amended in order to meet the objection according to article 123(2) EPC.

V. Relevant prior art:

- D1: US-A- 4 803 343
- D2: US-A- 3 934 643
- D3: US-A- 5 850 503
- D4: DE-C- 0 559 201

VI. Oral proceedings were appointed, as had been requested by the appellant on an auxiliary basis. In a communication pursuant to Article 15(1) of the Rules of Procedure of the Boards of Appeal (RPBA), annexed to the summons to attend oral proceedings, the Board gave a preliminary assessment of the case. The Board explained in detail why the subject-matter defined in claims 1 and 13 of the sets of claims

according to the main and four auxiliary requests were considered not allowable.

More particularly, the Board commented as follows:

"2. Independent claim 13

The set of claims according to the main as well as the four auxiliary requests comprises a claim 13 directed to an assembly made of a heating element and a second container for use in a device according to claim 1.

2.1 Claim 13 is unclear in the meaning of Article 84 EPC since it lacks the technical features which are essential for defining the different components of the said assembly. The mere reference "for use in a device as claimed" is no substitute for a detailed definition since the assembly, being only part of the device of claim 1, defines the broadest scope for which protection is sought.

2.2 Furthermore, an assembly made exclusively of a container (the second container in the meaning of claim 1) and a heating device is quite obviously known from the state of the art. An assembly verifying the broad definition given by the wording of claim 13 can be read on each of documents D1 (figure 1), D2 (figure), D3 (figure 1) and D4 (figure 1).

These known devices would be perfectly suitable for a use along the lines of claim 1; the containers disclosed in these documents of the

state of the art appear to be closed, in fact tightly sealed, so as to be suitable for receiving a medium in both liquid and vapour phases at pressure below atmospheric pressure.

Claim 1 would thus not meet the requirements of articles 52(1) and 54(1) EPC either.

3. Independent claim 1 of the main request

3.1 Feature relating to an underpressure.

The board agrees with the appellant that the characterising feature:

"an underpressure is present in the second liquid container (6) at room temperature and under atmospheric conditions, such that the boiling point of the intermediary liquid is reduced", defines a characteristic of the claimed device, namely that the pressure inside the second container must be below atmospheric pressure at room temperature.

3.2 Novelty as compared to D1

The argumentation provided by the examining division would not appear to be sufficiently based on the disclosure of D1. It may be agreed that the degassing pipe 6 of D1 enables over-pressure to be vented from the second container 1 by opening the degassing valve 61 and extracting excess vaporous medium accumulated therein (column 3, lines 38 to 48). However D1 remains silent on any details for operating said degassing valve, as for instance at

which pressure threshold said degassing valve should be opened for venting accumulated gas, and, in fact, whether the working pressure inside the container 1 should at normal and constant operating conditions be under the atmospheric pressure at room temperature.

However, the text bridging columns 2 and 3 of D1 refers to water as working fluid to be used in the second container and which is heated to achieve a working temperature at which it evaporates. The working temperature of said water is said to be selected between 50°C and 150°C. This range of working temperatures corresponds to a pressure range from underpressure to overpressure.

The features of claim 1 would then appear to be disclosed by D1.

3.3 Inventive step

Nevertheless, if the underpressure in the second container was to be considered as a distinguishing feature of claim 1 over D1, it would not involve an inventive step.

The boiling temperature of the medium contained in the second container is reduced due to the underpressure.

This technical measure enhances the heat transfer from the intermediary fluid to the fluid contained in the first container.

It is general knowledge in the field of thermodynamics that a reduction of the boiling temperature of a fluid present in both liquid and

vapour phases enables a saturated vapour phase which provides an optimal heat-transfer capacity for a selected heat-transfer fluid.

In this context, the text bridging columns 2 and 3 of D1 would lead the skilled person in this direction.

Furthermore, the concept of an inside pressure below atmospheric pressure for a container filled with a heat-transfer fluid at both liquid and vapour phases is already known and applied with a view to the same objective in the heat-transfer device disclosed in D2, see column 2, lines 15 to 37, and in particular lines 28 and 29.

The person skilled in the art would thus have applied the knowledge illustrated by D2 to the second container of the heat-transfer device known from D1 in order to achieve an enhanced heat-transfer from the second container to the fluid contained in the first container.

The device of claim 1 of the main request would thus lack inventive step in the meaning of article 56 EPC.

4. Auxiliary requests

4.1 ...

4.2 The claimed subject-matter of the first and second auxiliary requests mainly differs from the main request by the added feature relating to a closed or sealed second container. Such a feature is however known from D1 and D2 and appears to be

unavoidable if an underpressure is to be maintained in the container. The devices defined in the first and second auxiliary requests would therefore involve no inventive step as compared to D1 alone or at least to the device resulting from the combination D1 with D2.

- 4.3 The first characterising feature of claim 1 of the third auxiliary request, in combination with the features of the preamble, would appear to be known or at least rendered obvious by D1. The thermosiphon 1 is positioned in an aperture 92 of the tank 9 (column 4, lines 15 to 27, figure 1); since the fluid of the first container cannot be allowed to leak into this passage, the mounting area must obviously be sealed by any suitable means. The selection of one particular sealing means remains within the field of normal practice.

The distance claimed between the heating element and the first container is in itself known from D4 and even from D1 (see figures 4, 8 and 10) seems to be a straightforward solution when the opening in the first container for receiving the second container is located in the bottom wall.

The device of the third auxiliary request would not involve an inventive step either when taking into consideration the combination of D1 with D2 and D4.

It may be noted that the added features defining a seal and a heating element distant from the first container are not in a functional relationship

with the feature of claim 1 defining an underpressure but consist merely in an aggregation of unlinked features, some being known from D2, others from D4.

Additionally it is noted that, because the feature relating to the underpressure in claim 1 of the third auxiliary request is missing, there seems to be a lack of a single general inventive concept linking the claims of the main and first or second auxiliary requests on one hand with those of the third auxiliary request on the other hand. In particular, the feature of the underpressure relates to the problem of enhancing vapour bubble formation and heat transfer (page 3, lines 12 to 15 of the application), whereas the position of the seal addresses the problem of degeneration of the seal (page 4, lines 6 to 11). These problems seem to be unrelated.

4.4 Claim 1 of the fourth auxiliary request appears to contain all the features contained in claims 1 of the main and third auxiliary requests.

By analogy with the findings on the merits of the two groups of features as indicated above, the device of the fourth auxiliary request would also be obviously derivable from the state of the art disclosed in D1 combined with D2 and D4 and therefore lack inventive step."

VII. In response to the summons to attend oral proceedings, the appellant - without submitting any amendment or substantive argument in reply to the objections noted

by the Board - indicated by letter dated 14 August 2012 that it withdrew its request for oral proceedings.

VIII. The board held the oral proceedings on 26 September 2012 in absence of the appellant and announced its decision at the end of the proceedings.

Reasons for the Decision

1. The appeal is admissible.

In the detailed communication pursuant to Article 15(1) RPBA annexed to the summons to oral proceedings the Board notified in its preliminary opinion to the appellant that it considered none of the set of claims on file allowable because of the following deficiencies:

- a lack of clarity and novelty (articles 84, 52(1) and 54(1) EPC) of the subject-matter of claim 13, which is present in all the requests;

- a lack of novelty and inventive step (articles 52(1), 54(1) and 56 EPC) of the device of claim 13 according to the main request [*NB. The last sentence of item 2.2 of the board's communication quoted above contained a clerical error in referring to claim 1; obviously it should read "claim 13"*];

- a lack of inventive step (articles 52(1) and 56 EPC) of the device of claim 1 according to any of the four auxiliary requests.

2. In the course of the proceedings the appellant made no substantive submissions in reply to the detailed objections raised by the Board in its communication and, in addition, withdrew the request for oral proceedings.

After consideration of the issues addressed in the aforementioned communication, the Board sees no reason to depart from the preliminary opinion expressed in the aforementioned communication.

Accordingly, noting that the appellant has had, and has failed to use, the opportunity to present comments on the objections raised by the Board (Article 113(1) EPC), the Board concludes that the sets of claims on file at least do not comply with the substantive requirements of Articles 52(1), 54 and 56 EPC, and that consequently none of the main and auxiliary requests of the appellant is allowable.

The appeal must therefore be dismissed for the reasons already communicated to the appellant and reproduced in point VI above (Rule 102(g) EPC).

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

D. Hampe

G. Ashley