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Datasheet for the decision of 18 March 2022

Case Number: T 1971/19 - 3.2.04

Application Number: 11827097.4

Publication Number: 2619511

IPC: A47J27/21

Language of the proceedings: EN

Title of invention:
SYSTEM FOR PRECISE TEMPERATURE CONTROL OF LIQUIDS IN CONSUMER PRODUCTS

Patent Proprietor:
Behm, Joseph

Opponent:
Strix Ltd

Headword:

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

Keyword:
Novelty - (no)
Inventive step - (no)
Amendments - extension beyond the content of the application as filed (yes)

Decisions cited:
T 1500/07

Catchword:

Europäisches Patentamt
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Beschwerdekammern

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Case Number: T 1971/19 - 3.2.04

D E C I S I O N
of Technical Board of Appeal 3.2.04
of 18 March 2022

Appellant: (Patent Proprietor)	Behm, Joseph 6457 Dwane Avenue San Diego, CA 92120 (US)
Representative:	CSY London 10 Fetter Lane London EC4A 1BR (GB)
Respondent: (Opponent)	Strix Ltd Forrest House, Ronaldsway Isle of Man IM9 2RG (GB)
Representative:	Dehns St. Bride's House 10 Salisbury Square London EC4Y 8JD (GB)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 10 May 2019 revoking European patent No. 2619511 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman	A. de Vries
Members:	J. Wright
	K. Kerber-Zubrzycka

Summary of Facts and Submissions

I. The appeal was filed by the appellant (patent proprietor) against the decision of the opposition division to revoke the patent in suit.

II. During the opposition proceedings, the opponent raised the grounds for opposition under Article 100(a) EPC (lack of novelty and lack of inventive step) amongst others.

III. The opposition division decided that the subject-matter of the claims as granted was not novel and that the subject matter of auxiliary requests either lacked novelty or inventive step or extended beyond the content of the application as filed.

IV. The Board duly summoned the parties to oral proceedings that were scheduled for 18 March 2022. In a communication in preparation for the oral proceedings dated 19 November 2021 the Board made observations on the relevant issues and gave its provisional opinion that the appellant-proprietor's appeal should be dismissed. With a letter dated 15 March 2022 the appellant-proprietor informed the Board that it would not attend the scheduled oral proceedings. The Board decided to cancel them and decide the case in written proceedings.

V. The appellant-proprietor requests that the decision under appeal be set aside and the patent be maintained as granted (main request) or in amended form according to one of auxiliary requests 1 to 7 all refiled with its grounds of appeal.

The respondent-opponent requests that the appeal be dismissed.

VI. Claim 1 of the main requests reads as follows:

"A system for improving the precise and accurate temperature control of a water heating consumer appliance comprising:
a reservoir for holding a liquid;
at least one heating element located to heat said liquid;
at least one temperature sensor that generates a signal representative of a sensed temperature located to sense the temperature of said liquid;
at least one control component;
said at least one control component connected to said at least one temperature sensor to receive said signal;
means to indicate to said at least one control component that said signal represents a reference signal; and
said at least one control component being capable of comparing future signals from said at least one temperature sensor with said reference signal,
characterized in that a calibration feature is adapted to account for the variation in the boiling temperature of water due to a variation in ambient pressure or altitude".

Claim 1 of auxiliary request 1 reads as follows:

"A system for improving the precise and accurate temperature control of a water heating consumer appliance comprising: a reservoir for holding a liquid; at least one heating element located to heat said liquid; at least one temperature sensor that generates a signal representative of a sensed temperature located

to sense the temperature of said liquid; means to enable a user to input a target temperature; at least one control component; said at least one control component connected to said at least one temperature sensor to receive said signal; means to indicate to said at least one control component that said signal represents a reference signal; and characterized in that said at least one control component; is capable of comparing future signals from said at least one temperature sensor with said reference signal and a user input target temperature, and in that a calibration feature is adapted to account for the variation in the boiling temperature of water due to a variation in ambient pressure or altitude".

Claim 1 of auxiliary request 2 reads as for auxiliary request 1 except that it adds the following wording to the end of the claim:

"and in that said at least one control component is connected to said at least one heating element to control the rate at which said at least one heating element heats a liquid; and said at least one control component interacting with said at least one heating element to reduce the rate at which a liquid is heated as said signal approaches a predetermined level indicative of the user input target temperature".

Claim 1 of auxiliary request 3 reads as for auxiliary request 2 except that after the wording "a calibration feature is adapted to", the following wording is inserted: "allow maunual [sic] input of the altitude or ambient air pressure to"

Claim 1 of auxiliary request 4 reads as follows:

"A system for improving the precise and accurate temperature control of a water heating consumer appliance comprising: a reservoir for holding a liquid; at least one heating element located to heat said liquid; at least one temperature sensor that generates a signal representative of a sensed temperature located to sense the temperature of said liquid; means to enable a user to input a target temperature; at least one control component; said at least one control component connected to said at least one temperature sensor to receive said signal; means to indicate to said at least one control component that said signal represents a reference signal; and characterized in that the system further comprises a calibration feature which is adapted to allow maunual [sic] input of the altitude or ambient air pressure to calibrate the reference signal to provide a calibrated reference signal which accounts for the variation in the boiling temperature of water due to a variation in ambient pressure or altitude, and in that said at least one control component is capable of comparing future signals from said at least one temperature sensor with said calibrated reference signal and a user input target temperature, and in that said at least one control component is connected to said at least one heating element to control the rate at which said at least one heating element heats a liquid; and said at least one control component interacting with said at least one heating element to reduce the rate at which a liquid is heated as said signal approaches a predetermined level indicative of the user input target temperature".

Claim 1 of auxiliary request 5 reads as for auxiliary request 4 except that it adds to the end of the claim the following wording:

"and said at least one control component is adapted to repeat the reduction of the rate at which the liquid is heated as said signal approaches the predetermined level indicative of the user input target temperature, to maintain the water at the user input target temperature".

Claim 1 of auxiliary request 6 reads as follows:

"A system for improving the precise and accurate temperature control of a water heating consumer appliance comprising: a reservoir for holding a liquid; at least one heating element located to heat said liquid; at least one temperature sensor that generates a signal representative of a sensed temperature located to sense the temperature of said liquid; means to enable a user to input a target temperature; at least one control component; said at least one control component connected to said at least one temperature sensor to receive said signal; means to indicate to said at least one control component that said signal represents a reference signal; and characterized in that the system further comprises a calibration feature which is adapted to allow maunual [sic] input of the altitude or ambient air pressure to calibrate the reference signal to provide a calibrated reference signal which accounts for the variation in the boiling temperature of water due to a variation in ambient pressure or altitude, and in that said at least one control component is capable of comparing future signals from said at least one temperature sensor with said calibrated reference signal and a user input target temperature, and in that said at least one control component is connected to said at least one heating element to control the rate at which said at least one heating element heats a liquid; and said at

least one control component interacting with said at least one heating element to reduce the rate at which a liquid is heated as said signal approaches a predetermined level indicative of the user input target temperature, and said at least one control component is adapted to repeat the reduction of the rate at which the liquid is heated as said signal approaches the predetermined level indicative of the user input target temperature, to maintain the water at the predetermined temperature".

Claim 1 of auxiliary request 7 reads as follows:

"A system for improving the precise and accurate temperature control of a water heating consumer appliance comprising: a reservoir for holding a liquid; at least one heating element located to heat said liquid; at least one temperature sensor that generates a signal representative of a sensed temperature located to sense the temperature of said liquid; at least one control component; said at least one control component connected to said at least one temperature sensor to receive said signal; means to indicate to said at least one control component that said signal represents a reference signal; and characterized in that the system further comprises a calibration feature which is adapted to allow manual input of the altitude or ambient air pressure to calibrate the reference signal to provide a calibrated reference signal which accounts for the variation in the boiling temperature of water due to a variation in ambient pressure or altitude, and in that said at least one control component is capable of comparing future signals from said at least one temperature sensor with said calibrated reference signal, and in that said at least one control component is connected to said at least one heating element to

control the rate at which said at least one heating element heats a liquid; and said at least one control component interacting with said at least one heating element to reduce the rate at which a liquid is heated as said signal approaches a predetermined level indicative of a predetermined sub-boil temperature".

VII. In the present decision, reference is made to the following documents:

D1: WO 2008/155538 A2
D2: WO 01/56436 A2

VIII. The appellant-proprietor's arguments can be summarised as follows:

The subject matter of claim 1 of the main and first auxiliary requests is new with respect to D1. The subject matter of auxiliary requests 2 and 3 is inventive over the combination of D1 with D2. The subject matter of auxiliary requests 4 to 6 is inventive starting from D1. Auxiliary requests 5 and 6 do not add subject matter extending beyond the application as filed. Auxiliary request 7 is similar to auxiliary request 2 except for the fact that it lacks the features "means to enable a user to input a target temperature". It has also been made clear that the control component is adapted to reduce the rate of heating as the signal approaches a level which corresponds to a 'sub-boil' temperature, by amendment of the last line of claim 1. This amendment emphasises the distinction over D1.

IX. The respondent-opponent's arguments can be summarised as follows:

The subject matter of the main request and auxiliary request 1 lacks novelty. The subject matter of auxiliary requests 2 to 6 lacks inventive step. Auxiliary requests 5 and 6 also add subject matter. The opposition correctly found the subject matter of auxiliary request 7 to lack inventive step. The Appellant has not offered any reasoning as to why the Decision was wrong in this respect, other than to refer to the 'sub-boil' point which was addressed fully in respect of the Main Request.

Reasons for the Decision

1. The appeal is admissible.

2. Background

The invention relates to systems for precisely and accurately controlling the temperature of liquids in consumer products such as tea and coffee makers and electric kettles (see published patent specification, paragraphs [0001], [0002] and [0007]). Such devices may heat water to boiling or to a sub-boiling target temperature. To precisely control when to turn off a heater at the boiling point, a calibration feature can account for the variation in the boiling point (around 100°C at sea level) due to variations in ambient air pressure or altitude (see paragraph [0010] and figure 1). Whereas boiling water holds its temperature because any additional heat input causes the water to turn to steam, this is not true for sub-boiling target temperatures. According to one aspect of the patent (see paragraph [0011] and figure 2), when heating to sub-boil target temperatures, heating is reduced then stopped as the target temperature nears so that the

temperature of the water "glides" to its target, that is, reaches it without overshooting.

3. In its communication in preparation for the oral proceedings, the Board gave its preliminary opinion on the appellant-proprietor's main and auxiliary requests and concluded that the appeal should be dismissed. The parts of the communication that are relevant for this decision read as follows:

"1. Main request, claim 1, novelty with respect to D1

D1 discloses a water heating consumer appliance [system] (see page 1, lines 1 to 4). D1 aims to improve precision and accuracy of boil detection (see for example page 4, lines 4 to 5, page 29, lines 15 to 16): "providing the adjusted reference boil temperature is an accurate predictor of the onset of boiling"; "Hence, this [boil detection] algorithm may provide accurate boil detection without determination of liquid volume". Since, for given pressure conditions, water boils at the same predictable temperature, accurately and precisely heating to boiling point requires that the system is suitable for achieving accurate and precise temperature control. Therefore, the Board does not agree with the appellant-proprietor's argument (see appeal grounds, pages 3 and 4) that this feature is missing in D1.

For completeness, the Board notes that it does not consider the feature "precise and accurate temperature control" to imply that the temperature is a sub-boil temperature as the appellant has argued. The feature says nothing more than that temperature is controlled. In any case, D1 also discloses accurately heating to

such sub-boil temperatures (see for example page 30, lines 3 to 11).

In more detail, D1's system comprises:

A reservoir for holding a liquid and at least one heating element that heats the liquid (see page 1, line 1 - electrically powered heating vessel);

a temperature sensor that generates a signal representative of a sensed temperature located to sense the temperature of the liquid (see page 15, lines 6 to 10); at least one control component (see page 15, line 1) which is connected to the temperature sensor to receive the sensed temperature signal (see page 17, last 4 lines with figure 9c).

The system also comprises means to indicate to the control component that a signal represents a reference signal (see page 26, lines 15 to 30 - boil reference temperature T_{BR} and figure 14). In the Board's view, the control component compares future temperature signals to the reference (T_{BR}). In particular, (see pages 27 and 28 with figure 14) a target temperature T_T is calculated as a function of the boil reference temperature and actual temperature T is compared to T_T.

The Board considers that this amounts to a comparison of actual temperature to the reference temperature T_{BR}, albeit taking into account a calibration factor for compensating certain thermal inertia effects (see page 26, lines 4 to 14 with figure 15).

Lastly, the calibration factor is adapted to account for the variations in the boiling temperature of water with ambient pressure or altitude (see page 27, line 23

to page 28, line 6 - T_{BR} is adjusted either automatically or based on manually input altitude data).

2. Therefore, the Board agrees with the finding of the opposition division (see impugned decision, 2.2.3.3), that D1 takes away novelty of granted claim 1.

[...]

4. Auxiliary request 1, claim 1, novelty with respect to D1

The Board agrees with the opposition division's finding that the subject matter of claim 1 lacks novelty over D1 (see impugned decision grounds, 2.3.2).

The request adds to the main request that there are means to enable a user to input a target temperature and that the control component is capable of comparing future signals from the temperature sensor with a user input target temperature.

D1's general description of the invention (see page 6, lines 1 to 7) discloses that, after boiling, water may be cooled to a desired sub-boil temperature and kept warm. In the Board's view, a desired temperature implies one selected by the user.

In D1's kettle embodiment (see pages 14 and 15) a temperature sensor 14 detects water temperature (see page 15, lines 6 to 12). A user can input a sub-boil temperature (either to which boiled water is cooled or to which it is heated up - see page 15, lines 16 to 25).

The detailed description of how sub-boil temperatures are detected (see page 29, line 18 to page 30, line 18) explains that the signal from the sensor 14 is compared to a target temperature (page 30, lines 7 to 11), adjusted by an offset accounting for the amount of water.

Therefore, D1 also discloses the features added to claim 1 and thus renders it not new.

In its grounds of appeal (see pages 3 to 6), the appellant-proprietor's mainly argues that claim 1 is new because D1 neither discloses a 3-way real time comparison between a user input (sub-boil) temperature, a reference signal and the sensed temperature, nor the control of sub-boil temperatures and the calibration feature for taking into account variations of boiling with altitude in the same embodiment.

Regarding to the first of these arguments, the claim only requires that the control component is capable of comparing sensed signals with the reference signal and a user input temperature, but not that this comparison is a "three way" comparison happening simultaneously. Nor would the latter appear to be a realistic interpretation of the claim, since heating to boiling and heating to a sub-boil temperature are different processes. Therefore, the argument is moot.

As to the second argument (aspects taken from different embodiments), the Board agrees with the respondent proprietor that D1 discloses control of sub-boil temperatures and taking into account variations of boiling with altitude in the same embodiment.

The general description of D1's invention (pages 3 to 6) first explains how to accurately detect boiling, including taking into account changes in atmospheric pressure by resetting a reference value (see page 4, lines 21 to 26). This description continues (see page 6, lines 9 to 13) by discussing another aspect of the present invention - determining a sub-boil temperature. Therefore, the skilled person understands that accurately detecting boiling and sub-boil temperatures are part of the same invention and will be incorporated into the same device. This is confirmed in the overview of the kettle embodiment (starting on page 14), both boiling and sub-boil temperatures are accurately detected (see for example page 15, lines 6 to 10 and 22 to 25). Therefore, although D1 is structured so that boil and sub-boil detection are separately discussed (starting on pages 25 and 29 respectively), the skilled person will understand that these are simply different aspects of the same device that can boil as well as heat to a sub-boil temperature, rather than unrelated devices respectively dedicated to boiling and heating to sub-boil temperatures as the appellant has argued.

5. Auxiliary request 2, inventive step starting from D1 with D2

5.1 Claim 1 adds to auxiliary request 1 a feature similarly worded to granted claim 2, according to which the control component reduces the heating rate as the sensed temperature approaches a level indicative of the user input target temperature. It appears not to be in dispute (cf. impugned decision, grounds, point 2.4.2.1), that D1 does not disclose this feature. Until the sub-boil temperature is reached, D1's heating element appears to be fully on and, at most only runs at reduced power after reaching the target temperature

or a modified version that takes into account the amount of water (see for example, page 15, lines 22 to 25 and page 30, lines 7 to 11).

5.2 According to the patent, the technical effect of this differing feature (see published patent specification, paragraphs [0006] and [0011]) is more accurate temperature control. The Board finds this plausible. In D1, the modified target temperature goes some way to improving accuracy by considering the amount of water to be heated. However, a temperature overshoot would appear to be inevitable because water is still being heated at full power when the target temperature is reached. An earlier reduction in heating power as claimed would at least reduce this overshoot. Therefore, the objective technical problem can be formulated as how to modify D1 to further improve the accuracy of sub-boil temperature control.

5.3 The skilled person would be aware of document D2 which relates to electric heaters for liquids (see page 1, lines 5 to 7). It identifies the same problem (page 25, lines 23 to 36) and discloses the claimed solution (see in particular, page 26, lines 5 to 9, lines 17 to 20 and 25 to 26), namely reducing power to the heater on approaching the target temperature. Therefore, the Board agrees with the opposition division's finding (see reasons, point 2.4.2.3) that it would be obvious for the skilled person to incorporate this power reducing feature into D1's kettle. In so doing the skilled person would arrive at the subject matter of claim 1 in an obvious manner.

6. Auxiliary request 3, inventive step starting from D1 with D2

Claim 1 adds the feature of manually entering information on altitude or ambient pressure. This is known from D1 (see page 28, lines 3 to 6), therefore it cannot contribute inventive step and the claim lacks inventive step for the same reasons as apply to auxiliary request 2.

7. Auxiliary request 4, inventive step starting from D1 with D2

Claim 1 adds to auxiliary request 3 that the user input altitude/pressure information has a calibrating function. As explained for the main request, D1 also uses altitude/pressure information (however obtained) to calibrate the boil reference temperature - T_{BR} (see page 27, last 4 lines). Therefore, the subject matter of claim 1 lacks inventive step for the same reasons as apply to auxiliary request 3.

8. Auxiliary requests 5 and 6, claim 1, inventive step starting from D1 with D2

Claim 1 of these requests adds to auxiliary request 4 the feature of (as summarised by the Board) repeatedly reducing the heating rate on approaching the target temperature. This feature appears to further improve accuracy by matching power reduction steps to the difference between actual and target temperature. The Board agrees with the respondent-opponent, that the added feature is known from D2 (see page 26, lines 32 to 37) - reduce power in a series of smaller steps. Moreover, because this amounts to a feed-back loop control, the skilled person would immediately realise that this offers a more accurate temperature control. Starting from D1 and faced with the objective technical problem (improve temperature accuracy), the skilled

person would thus modify D1's heater by adding D2's repeating feature. Therefore, they would arrive at the subject matter of claim 1 as a matter of obviousness.

[...]

10. First auxiliary request, claim 1, added subject matter

10.1 According to established jurisprudence (see CLBA, II.E.1.9 and for example T1500/07, reasons 2.1 and 2.2), newly claimed subject-matter based on the extraction of features in isolation from a set of features originally disclosed in combination (e.g. in a specific embodiment in the description) is only directly and unambiguously disclosed if there is no clearly recognisable functional or structural relationship between the features. That is, when, in their original context, the extracted features were not inextricably linked to the non-claimed features.

[...]

11. Auxiliary requests 5 and 6, further added subject matter considerations

Claim 1 (which is the same for both requests) adds the feature of repeating the reduction in heating rate to maintain the water at the target temperature. The appellant-proprietor cites as a basis for this the glide-in feature (see the application as filed, page 5, middle and last paragraph). The glide-in feature involves reaching an initial glide-in temperature, reducing power, reaching a final glide in temperature, completely shutting off power to the heater and waiting to reach the target temperature. Moreover, the initial

and final glide-in temperatures are only disclosed set as a function of the amount of water in the reservoir.

To maintain the water at the target temperature as claimed (see published application, page 5, last paragraph), water is released and the glide-in process repeated. Whilst the Board tends to agree with the appellant-proprietor that the claimed temperature maintaining feature, including repeatedly reducing heating rate, is not functionally related to releasing water (any amount of water can be kept hot), maintaining the water at the target temperature is only originally disclosed in conjunction with repeating the glide-in process. In the Board's view, this involves functionally related steps which have not been claimed: for example the initial and final glide-in temperatures that are set as a function of water quantity, shutting power off and waiting to reach the target temperature.

Applying the approach explained above in the discussion of the first auxiliary request [section 10.1]*, by claiming only to repeatedly reduce heating rate isolated from its original glide-in process context, the Board agrees with the opposition division (cf.* [impugned decision] *reasons 2.7 and 2.8) that claim 1 represents an inadmissible intermediate generalisation.*

12. Auxiliary request 7, claim 1

The impugned decision found that claim 1 lacked inventive step over the combination of D1 and D2 [see section 2.9]*. In its grounds (see page 10) the appellant-proprietor has not explained why this finding might be wrong. Therefore, in this respect, the request has not been sufficiently substantiated as part of a complete case. Therefore, the Board intends not to take*

auxiliary request 7 into account, Articles 12(2) and (4) RPBA 2007.

13. From all of the above, the Board is of the opinion that the proprietor's appeal should be dismissed".

4. With letter of 15 March 2022 the appellant-proprietor informed the Board that it would not attend the scheduled oral proceedings. Following established jurisprudence, this is equivalent to a withdrawal of the request for oral proceedings (see CLBA III.C. 4.3.2). Moreover, the Board made the appellant-proprietor aware of the reasons why it considered its appeal should be dismissed in its communication, so the appellant-proprietor had sufficient opportunity to take a position thereon, which it did not. The Board is thus satisfied that the requirements of Article 113(1) EPC have been met.

5. In the absence of any argument from the appellant-proprietor, the Board sees no reason to deviate from the opinion expressed in its communication that the subject matter of the main and first auxiliary requests lacks novelty, the subject matter of auxiliary requests 2 to 6 lacks inventive step and that auxiliary requests 5 and 6 add subject matter extending beyond the application as filed. Moreover, as was also explained in the communication, auxiliary request 7 has not been sufficiently substantiated in the appellant-proprietor's appeal grounds so the Board confirms its preliminary intention not to take this request into account in accordance with Articles 12(2) and (4) RPBA 2007.

From all of the above, the Board confirms the provisional opinion expressed in its communication that the appeal should be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed

The Registrar: The Chairman:

G. Magouliotis A. de Vries

Decision electronically authenticated