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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte WISSAM RACHED

Appeal 2019-006238
Application 14/372,396
Technology Center 3700

Before JOHN C. KERINS, DANIEL S. SONG, and BRETT C. MARTIN, *Administrative Patent Judges*.

KERINS, *Administrative Patent Judge*.

DECISION ON APPEAL

Pursuant to 35 U.S.C. § 134(a), Appellant[1] appeals from the Examiner's decision to reject claims 1–3, 5, 6, 8–14, 16, 17, and 19–32, the only claims now pending in the application. We have jurisdiction under 35 U.S.C. § 6(b). A telephonic oral hearing was conducted on August 19, 2020, with Travis D. Boone, Esq., appearing on behalf of Appellant.

We REVERSE.

[1] The term "Appellant" is used herein to refer to "applicant" as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as ARKEMA FRANCE. Appeal Br. 2.

THE CLAIMED SUBJECT MATTER

Appellant's invention relates to a method and apparatus involving a cascade refrigeration system designed to operate optimally. Spec. 1. Claims 1 and 14 are illustrative, and are reproduced below:

> 1. A process for cooling a fluid or a body within an installation by means of at least one first vapor compression circuit comprising a first heat-transfer fluid and of at least one second vapor compression circuit comprising a second heat-transfer fluid, the process comprising:
>
> - in the first vapor compression circuit:
>
> at least partial evaporation of the first heat-transfer fluid by exchange of heat with said fluid or body;
>
> compression of the first heat-transfer fluid;
>
> at least partial condensation of the first heat-transfer fluid by exchange of heat with the second heat-transfer fluid;
>
> reduction in pressure of the first heat-transfer fluid;
>
> - in the second vapor compression circuit:
>
> at least partial evaporation of the second heat-transfer fluid by exchange of heat with the first heat-transfer fluid;
>
> compression of the second heat-transfer fluid;
>
> at least partial condensation of the second heat-transfer fluid by exchange of heat with an external medium;
>
> reduction in pressure of the second heat-transfer fluid;
>
> the process additionally comprising:
>
> - measurement of the temperature of the external medium; and
>
> - adjustment of the temperature of the second heat-transfer fluid at the evaporation, as a function of the temperature of the external medium,
>
> wherein the process comprises the calculation of an optimum evaporation temperature as a function of the measurement of the temperature of the external medium,

in which the optimum evaporation temperature is defined by the formula $T_{opt} = A \times T_{ext} + B$, in which T_{ext} is the temperature of the external medium in degrees Celsius, A is a dimensionless constant and B is a constant in degrees Celsius,

wherein A has a value from 0.3 to 0.6, and

wherein the external medium is external to the installation.

14. An installation for cooling a fluid or a body, comprising at least:

- a first vapor compression circuit comprising a first heat transfer fluid;

- a second vapor compression circuit comprising a second heat-transfer fluid;

- a cascade heat exchanger, configured for exchanging heat between the first heat-transfer fluid and the second heat transfer fluid;

the first vapor compression circuit comprising:

- a first evaporator configured for exchanging heat between the first heat-transfer fluid and said fluid or body;

- one or more first compressors;

- a first expansion device;

the second vapor compression circuit comprising:

- one or more second compressors;

- a second condenser configured for exchanging heat between the second heat-transfer fluid and an external medium;

- a second expansion device;

the installation also comprising:

- a device for measuring the temperature of the external medium;

> wherein the installation is configured to adjust the evaporation temperature in the cascade heat exchanger, as a function of the measurement of the temperature of the external medium,
>
> additionally comprising a module for calculating an optimum evaporation temperature as a function of the measurement of the temperature of the external medium, in which the optimum evaporation temperature is defined by the formula $T_{opt} = A \times T_{ext} + B$, in which T_{ext} is the temperature of the external medium in degrees Celsius, A is a dimensionless constant and B is a constant in degrees Celsius,
>
> wherein A has a value from 0.3 to 0.6, and
>
> wherein the external medium is external to the installation.

THE REJECTIONS

The Examiner rejects:

(i) claims 14, 19, 20–24, and 29–32 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement;

(ii) claims 14, 19, 20–24, and 29–32 under 35 U.S.C. § 112, second paragraph, as being indefinite;

(iii) claims 1–3, 5, 8, 9, 11–14, 16, 19, 20, 22–26, 29, and 30, under 35 U.S.C. § 103(a) as being unpatentable over Wang (US 2011/0072836 A1, published Mar. 31, 2011) in view of Yamasaki (US 2004/0244407 A1, published Dec. 9, 2004);

(iv) claims 6 and 17 under 35 U.S.C. § 103(a) as being unpatentable over Wang in view of Yamasaki and Hara (JP 2007278666 (A), published Oct. 25, 2007);

(v) claims 10 and 21 under 35 U.S.C. § 103(a) as being unpatentable over Wang in view of Yamasaki and Takemasa (JP 2003279181 (A), published Oct. 2, 2003); and

(vi) claims 27, 28, 31, and 32 under 35 U.S.C. § 103(a) as being unpatentable over Wang in view of Yamasaki and Minor (WO 2011/056824 A2, published May 12, 2011).

Rejections of claims 16 and 17 under the first and second paragraphs of 35 U.S.C. § 112, were withdrawn in the Answer, in that those claims depend from independent claim 1, and not from independent claim 14, which is subject to those rejections. Ans. 3; Appeal Br. 9.

ANALYSIS

Claims 14, 19, 20–24, and 29–32--§ 112 Written Description

The Examiner finds that the limitations, "expansion device," "a device for measuring the temperature of the external medium," and "a module for calculating an optimum evaporation temperature," are not disclosed in sufficient detail such that a person of ordinary skill in the art could reasonably conclude that Appellant was in possession of an invention including those elements at the time the original application was filed. Final Act. 2–3. Appellant identifies portions of the Specification and drawings evidencing that these elements were present and identified in the application as filed. Appeal Br. 10–12. In response, the Examiner acknowledges that the terms used in the claims appear in the application as filed, but maintains that the Specification "do[es] not impart to one so skilled in the art exactly what structure the Appellant is actually claiming," and asserts that the claims therefore do not comply with 35 U.S.C. § 112(f) or pre-AIA § 112, sixth

paragraph, nor the written description requirement of § 112, first paragraph. Ans. 14–15.

The Examiner's position conflates the written description requirement with an indefiniteness analysis of "means-plus-function" limitations permitted by 35 U.S.C. § 112(f)/pre-AIA § 112, sixth paragraph, which limitations, for indefiniteness purposes, require identification of some specific structure for performing the recited function. The same does not necessarily apply to an analysis directed to the written description requirement.

Here, the Examiner does not maintain that persons of ordinary skill in the art would not understand what function an expansion device, a temperature measuring device, or a calculation module, would perform. The Examiner additionally does not maintain that such devices or modules were generally not known to exist by persons skilled in the art. To the contrary, the Examiner, in the analysis of the indefiniteness rejection directed to the same claim elements, indicates that persons of ordinary skill in the art would recognize, for example, that either a valve or capillary tube could be used as an expansion device; that a temperature detector or sensor could be used as a temperature measurement device; and that a controller or microprocessor could be used as a calculating module. Final Act. 4–5. The Examiner does not establish absence of possession of the objected-to claim limitations in the context of the claimed invention.

The rejection of claims 14, 19, 20–24, and 29–32 as failing to comply with the written description requirement of 35 U.S.C. § 112 is not sustained.

Claims 14, 19, 20–24, and 29–32--§ 112 Indefiniteness

The Examiner finds that the limitations, "expansion device," "a device for measuring the temperature of the external medium," and "a module for calculating an optimum evaporation temperature," are indefinite because, the terms "device" and "module" do not recite particular or adequate structure for performing the attendant functions identified in the modifying language. Final Act. 4–5. The Examiner, as discussed in the preceding section, proffers that there are many ways of effecting the functions, as would be recognized by persons of ordinary skill in the art, and gives examples for each of the three limitations. *Id.* As also noted in the preceding section, in the Answer, the Examiner raises the issue as to whether these claim limitations comport with the requirement, related to indefiniteness but discussed in the Answer in the context of written description, that a claim term set forth in "means-plus-function" format must clearly link or associate disclosed structure(s) with the claimed function. *In re Donaldson Co.*, 16 F.3d 1189, 1195 (Fed. Cir. 1994) (*en banc*).

Appellant argues only that, for the same reasons that the claim limitations are supported by adequate written description, the limitations are also sufficiently definite to pass muster under the second paragraph of 35 U.S.C. § 112. Appeal Br. 8–12. The Reply Brief does not respond to the Examiner's attempt to invoke 35 U.S.C. § 112, sixth paragraph, in the analysis of the claim limitations at issue.

With respect to the Examiner's position as laid out in the Final Action, Appellant's Appeal Brief arguments suffice in identifying Examiner error. The arguments do not directly address the Examiner's position that persons skilled in the art would recognize that many devices or modules

could perform the recited functions, but that is not a fatal flaw, in that the Examiner's position is plainly directed to possible overbreadth of the claim limitations, which is not a factor in an indefiniteness analysis. *SmithKline Beecham Corp. v. Apotex Corp*., 403 F.3d 1331, 1341 (Fed. Cir. 2005) (breadth is not indefiniteness); *see also, In re Gardner*, 427 F.2d 786, 788 (CCPA 1970).

As to the suggestion that the indefiniteness of the claim limitations at issue involves their being interpreted as "means-plus-function" limitations subject to the requirements of 35 U.S.C. § 112, sixth paragraph (now § 112(f)), even in the absence of particular arguments on Appellant's part, we are not in a position to support the Examiner, not only because the issue was explicitly identified for the first time in the Answer on appeal, but also because the Examiner does not fully and adequately step through the 3-prong analysis required by MPEP § 2181(I) to establish that the terms must be interpreted as "means-plus-function" limitations.

The rejection of claims 14, 19, 20–24, and 29–32 as being indefinite under 35 U.S.C. § 112 is not sustained.

Claims 1–3, 5, 8, 9, 11–14, 16, 19, 20, 22–26, 29, and 30--§ 103(a)--Wang/Yamasaki

The process of independent claim 1 requires a step of calculating an optimum evaporation temperature, as a function of the temperature of the medium that is external to a cooling installation, with the optimum temperature being defined by the formula "$T_{opt} = A \times T_{ext} + B$".[2] Appeal Br.,

[2] Claim 1 recites that a temperature of a second heat-transfer fluid at the evaporation is adjusted as a function of the external medium, but does not

Claims Appendix. According to claim 1, "T_{ext}" is the temperature of the external medium, in degrees Celsius, "A" is a dimensionless constant, and "B" is a constant with degrees Celsius as its unit.

The Examiner relies on Wang as disclosing most of the limitations in claim 1, including that Wang measures the temperature of the medium external to the cooling installation and employs that measurement in the control of components in the installation, but acknowledges that Wang does not disclose calculating an optimum evaporation temperature as a function of the temperature of the external medium by way of the equation recited in claim 1. Final Act. 6–7. The Examiner turns to Yamasaki as disclosing "calculating an target evaporation temperature as a function of the measurement of an internal medium, i.e., the temperature of a chamber that is cooled by the installation, with the target temperature being one that achieves improved efficiency." *Id.* at 7.

The Examiner additionally takes the position that, in Yamasaki, the target evaporation temperature is defined by the formula $T_{yc} = T_x * 0.2 – 6 + z$. *Id.*, citing Yamasaki, ¶ 87.[3] Having in mind that the variable in the claimed equation, T_{ext}, is a temperature external to the installation, the Examiner acknowledges that T_x in the Yamasaki equation is a temperature internal to the installation, but takes the position that T_x "can correspond to the external temperature where one skilled in the art could substitute an

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explicitly state that that temperature *must* be adjusted to the optimum temperature determined by the recited equation.

[3] We understand paragraph 87 of Yamasaki to disclose that the target evaporation temperature is selected as the lower (in numerical value) of variables T_{ya} and T_{yc}, resulting from calculation by two different equations, however, Appellant does not appear to contest the Examiner's finding that Yamasaki determines the target evaporation temperature by T_{yc} alone.

external temperature value." *Id.* The Examiner then reduces the Yamasaki equation to eliminate the variable "z" in an effort to obtain an equation in similar form to that in claim 1, again noting that T_x in Yamasaki is an internal temperature, but "one skilled in the art could substitute an external temperature value as measured by the sensor of Wang into the formula of Yamasaki." *Id.* at 15. The Examiner selects, for the variable "z," which, by Yamasaki's teaching represents the temperature external to the installation, the example of 41º C, and ends up with the equation $T_{yc} = 0.2 * T_x + 3$. *Id.* The Examiner maintains that the dimensionless constant, 0.2, in this form of the Yamazaki equation, corresponds to "A" in the claim 1 equation (which is recited as having a value between 0.3 and 0.6), is a known result effective variable, and concludes that it would have been obvious to use a dimensionless constant within the claimed range as a matter of routine skill in the art. *Id.* at 8.

What the Examiner fails to recognize, and which Appellant points out, is that the variable "z" in the Yamazaki equation, per paragraph 87 thereof, already represents the external temperature ("z denotes a value ($z = T_r$ (outside air temperature) – 32)"). Appeal Br. 16. As such, Appellant maintains, and we agree, that the Examiner presents no basis for alleging that it would have been obvious, in the Yamasaki equation, to further substitute an external temperature for the internal temperature T_x, which is the temperature measured at the chamber being cooled in the Yamasaki structure. Reply Br. 5. Tellingly, the Examiner does not address, in the Answer, why it would have been obvious to substitute an external temperature for an internal one as the variable T_x, in view of Appellant's

highlighting that the Yamasaki equation already, in a different part of its equation, factors in the external temperature in the variable "z".

The rejection of claim 1 as being unpatentable over Wang and Yamasaki is therefore not sustained.

We note that independent claim 14 recites an installation, or system, and not a process. In terms of the limitation at issue involving an optimum temperature being defined by, and calculated in accordance with, the same equation as is present in claim 1, claim 14 recites "a module for calculating an optimum evaporation temperature," without actually requiring that the calculation be performed. Also in this regard, claim 14 recites that the installation is configured to adjust the evaporation temperature as a function of the measurement of the external medium temperature, but does not require that the functional relationship be that of the optimum evaporation temperature equation. Because neither the Examiner nor Appellant draws any distinction between claims 1 and 14, we construe claim 14 as requiring a module particularly configured to be able to perform the calculation of optimum evaporation temperature in accordance with the recited equation. On that basis, we also do not sustain the rejection of claim 14 as being unpatentable over Wang and Yamasaki.

Claims 2, 3, 5, 8, 9, 11–13, 16, 19, 20, 22–26, 29, and 30, each depend from one of claims 1 and 14, and the rejection of those claims as being unpatentable over Wang and Yamasaki is not sustained for the same reasons discussed above.

Claims 6 and 17--§ 103(a)--Wang/Yamasaki/Hara

The Examiner does not rely on Hara in any manner that cures the deficiencies in the combination of Wang and Yamasaki. The rejection of claims 6 and 17 is therefore not sustained.

Claims 10 and 21--§ 103(a)--Wang/Yamasaki/Takemasa

The Examiner does not rely on Takemasa in any manner that cures the deficiencies in the combination of Wang and Yamasaki. The rejection of claims 10 and 21 is therefore not sustained.

Claims 27, 28, 31, and 32--§ 103(a)--Wang/Yamasaki/Minor

The Examiner does not rely on Minor in any manner that cures the deficiencies in the combination of Wang and Yamasaki. The rejection of claims 27, 28, 31, and 32 is therefore not sustained.

DECISION

The rejection of claims 14, 19, 20–24, and 29–32 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement, is reversed.

The rejection of claims 14, 19, 20–24, and 29–32 under 35 U.S.C. § 112, second paragraph, as being indefinite, is reversed.

The rejections of claims 1–3, 5, 6, 8–16, 16, 17, and 19–32 under 35 U.S.C. § 103(a) are reversed.

CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
14, 19, 20–24, 29–32	112, first paragraph	Written Description		14, 19, 20–24, 29–32
14, 19, 20–24, and 29–32	112, second paragraph	Indefiniteness		14, 19, 20–24, and 29–32
1–3, 5, 8, 9, 11–14, 16, 19, 20, 22–26, 29, 30	103(a)	Wang, Yamasaki		1–3, 5, 8, 9, 11–14, 16, 19, 20, 22–26, 29, 30
6, 17	103(a)	Wang, Yamasaki, Hara		6, 17
10, 21	103(a)	Wang, Yamasaki, Takemasa		10, 21
27, 28, 31, 32	103(a)	Wang, Yamasaki, Minor		27, 28, 31, 32
Overall Outcome				1–3, 5, 6, 8–14, 16, 17, 19–32

REVERSED