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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Mexichem Amanco Holding S.A. de C.V.
Requester and Respondent

v.

Patent of
Honeywell International Inc.
Patent Owner and Appellant

Appeal 2014-007990
Reexamination Control 95/000,574
Patent 7,524,805 B2
Technology Center 3900

Before ROMULO H. DELMENDO, RICHARD M. LEBOVITZ, and JEFFREY B. ROBERTSON, *Administrative Patent Judges*.

ROBERTSON, *Administrative Patent Judge*.

DECISION ON APPEAL

Honeywell International Inc. ("Patent Owner") appeals under 35 U.S.C. §§ 134(b) and 315(a) (Pre-AIA) the Examiner's decision to reject claims 1-11, 13, 15-25 and 30-32.[1] Claims 26-29 have been confirmed. (RAN 16.) Claims 12 and 14 have been cancelled. (Ans., noting that Patent Owner's amendment filed January 17, 2014 was entered.) Third-Party Requester Mexichem Amanco Holding S.A. de C.V. (hereinafter "Requester") urges that the Examiner's decision must be affirmed.[2] We have jurisdiction under 35 U.S.C. §§ 134(b) and 315(a) (Pre-AIA). We reverse the Examiner's decision to reject claims 1-11, 13, 15-25 and 30-32.

STATEMENT OF THE CASE

United States Patent 7,524,805 B2 (hereinafter the "'805 Patent"), which is the subject of the current *inter partes* reexamination, issued to Rajiv R. Singh et al. on April 28, 2009. The '805 Patent is related to U.S. Patent 7,825,081 B2, which in turn is the subject of Reexamination Control. No. 95/000,630 and is also on appeal. (Appeal No. 2015-001235.) The appeal of 95/000,630 has been concurrently decided with this present appeal.

We heard oral arguments from both the Patent Owner and Requester on December 17, 2014, a transcript of which was entered into the electronic record on February 6, 2015.

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[1] *See* Patent Owner's Appeal Brief 1 (filed February 17, 2014) (hereinafter "PO App. Br.") Examiner's Answer (mailed April 11, 2014) (hereinafter "Ans."); Right of Appeal Notice (mailed September 9, 2013) (hereinafter "RAN.").

[2] *See* Requester's Respondent Brief (filed March 17, 2014) (hereinafter "Req. Resp't Br.").

The '805 Patent relates to "azeotrope-like" compositions containing a mixture of trans-1,3,3,3-tetrafluoropropene (transHFO-1234ze) and a hydrofluorocarbon (HFC). (Col. 1, ll. 29-32; col. 2, ll. 21-30; col. 3, ll. 32-46.)

Claim 1, which is illustrative of the appealed subject matter, reads as follows:

> 1. An azeotrope-like composition consisting essentially of effective amounts of trans-1,3,3,3-tetrafluoropropene (transHFO-1234ze) and a compound selected from the group consisting of 1,1-difluoroethane ("HFC-152a"), 1,1,1,2,3,3,3-heptafluoropropane ("HFC-227ea") 1,1,1,2,-tetrafluoroethane ("HFC-134a"), 1,1,1,2,2-pentafluoroethane ("HFC-125") and combinations of two or more of these.

(PO App. Br. 40, Claims App'x.)

Patent Owner contests the Examiner's decision to reject the claims as follows:

I. Claims 1, 2, 9-11, and 15 under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Inagaki;[3]

II. Claims 3-7 and 16-25 under 35 U.S.C. § 103(a) as obvious over Inagaki;

III. Claims 8 and 30-32 under 35 U.S.C. § 103(a) as obvious over Inagaki in view of Schultz;[4] and

[3] Japanese Unexamined Patent Application Laid Open H4-l l 0388 to Inagaki et al., published April 10, 1992. Citations to English translation of record.
[4] U.S. Patent No. 7,105,152 B1, issued September 12, 2006.

IV. Claim 13 under 35 U.S.C. § 103(a) as obvious over Inagaki in view of Oberle.[5]

(PO App. Br. 5.)

CLAIM CONSTRUCTION

Central to the present appeal is the interpretation of the term "azeotrope-like" composition recited in each of independent claims 1 and 6. The Examiner interpreted the term as follows: "consistent with the specification, the term 'azeotrope-like' is broadly construed as a composition containing a mixture of transHFO-1234ze and one or more of HFC-152a, HFC-227ea, HFC-134a, or HFC-125." (RAN 4.)

"'During reexamination, as with original examination, the PTO must give claims their broadest reasonable construction consistent with the specification.'" *In re Suitco Surface, Inc.,* 603 F.3d 1255, 1259 (Fed. Cir. 2010) (quoting *In re ICON Health and Fitness, Inc.*, 496 F.3d 1374, 1379 (Fed. Cir. 2007)). Thus, although the PTO construes claim terms under the "broadest reasonable interpretation" standard, our reviewing court has repeatedly "instructed that any such construction [must] be '*consistent with the specification,* . . . and that claim language should be read in light of the specification as it would be interpreted by one of ordinary skill in the art.'" *Id.* at 1260.

The '805 Patent states:

> Azeotrope-like compositions are constant boiling or essentially constant boiling. In other words, for azeotrope-like compositions, the composition of the vapor formed during

[5] U.S. Patent No. 6,374,629 B1, issued April 23, 2002.

> boiling or evaporation is identical, or substantially identical, to the original liquid composition. Thus, with boiling or evaporation, the liquid composition changes, if at all, only to a minimal or negligible extent. This is to be contrasted with non-azeotrope-like compositions in which, during boiling or evaporation, the liquid composition changes to a substantial degree. All azeotrope-like compositions of the invention within the indicated ranges as well as certain compositions outside these ranges, are azeotrope-like.

(Col. 3, ll. 3-14.)

Therefore, according to the Specification, an "azeotrope-like" composition is defined as a composition that is constant boiling or essentially constant boiling. Compositions including the recited components must exhibit such behavior in order to meet the claims. We do not subscribe to the Examiner's and the Requester's view that the claims include any composition containing a mixture of the recited components. (RAN 4, 17; Req. Resp't Br. 6-9.) To do so would read the term "azeotrope-like," as expressly defined in the Specification, out of the claims.

We interpret the term "effective amounts" recited in claim 1 to mean "amounts effective to result in an 'azeotrope-like' composition." Even though we acknowledge that the '805 Patent discloses broad ranges for such components (*see* col. 4, ll. 12-46), the claim is still limited by the requirement that the composition be "azeotrope-like." In this regard, we do not interpret the disclosure of amounts in the '805 Patent to be a definition as to what constitutes an "azeotrope-like" composition as is the position of the Requester. (Req. Resp't Br. 3, 8-10.) Rather, we look to the express definition of "azeotrope-like" composition discussed above, with the broad amounts disclosed as providing general guidance in producing an

"azeotrope-like" composition with a constant or substantially constant boiling point.

The '805 Patent supports the above interpretation in disclosing that: "[t]he term 'effective amounts' as used herein refers to the amount of each component which upon combination with the other component, results in the formation of an azeotrope-like composition of the present invention." (Col. 3, ll. 57-61.) Contrary to Requester's position, we do not view this definition of "effective amounts" as "self-defined" (Req. Resp't Br. 7), but instead to be relating the amounts to those necessary to result in the identified properties of an "azeotrope-like" composition. In view of our interpretation of the claims, Requester's arguments that the claims do not include the preferred embodiments are unpersuasive. (Req. Resp. Br. 7-9.)

PRIOR ART REJECTIONS

Rejections I and II-Inagaki

The Examiner's position is that Inagaki discloses an "azeotrope-like" composition. (RAN 7-8.) The Examiner stated: "While Inagaki does not specifically teach that mixtures of $C_3H_mF_n$ with at least one compound of the selected group are azeotrope-like, Inagaki nevertheless teaches compositions comprising the claimed components. . . . Accordingly, Inagaki teaches a composition for use in heat transfer applications which reasonably appears to be either the same as or an obvious variation of the instantly claimed composition." (RAN 6-7, *see also* RAN 18-19.) Requester agrees with the Examiner. (Req. Resp't Br. 3, 9.)

Patent Owner contends that Inagaki fails to disclose an "azeotrope-like" composition because, *inter alia*, Inagaki only discusses azeotropes in the background section and not in the context of the invention disclosed in Inagaki. (PO App. Br. 17-18.) Patent Owner argues that the compositions disclosed in Inagaki are not inherently "azeotrope-like." (PO App. Br. 19.) Patent Owner argues also that because Inagaki does not provide any teaching or suggestion that the compositions disclosed there in would result in "azeotrope-like" compositions and because the formation of "azeotrope-like" compositions is not predictable, there would have been no reasonable expectation of success in forming the "azeotrope-like" compositions recited in the claims based on the disclosure of Inagaki. (PO App. Br. 24-26.)

ISSUE

The dispositive issue on appeal is: Does Inagaki disclose or render obvious the "azeotrope-like" composition recited in the claims?

We answer this question in the negative.

FINDINGS OF FACT ("FF")

1. Inagaki discloses: "Conventionally, chlofluoro hydrocarbon, fluorohydrocarbon, azeotropic composition of said chlofluorohydrocarbon and said fluorohydrocarbon and their homologues have been known as heat media (cooling media) used for a heat pump." (Inagaki, p. 1, col. 1, "Background of Invention.")

2. Inagaki discloses fluids for heat transfer of the formula and specifically discloses F_3C-CH=CHF, (1,3,3,3-tetrafluoro-1-propene), which has a boiling point -16.0 degrees Celsius. (Inagaki, p. 2, cols. 1-2.)
3. Inagaki discloses mixtures of $C_3H_mF_n$ with R-22 ($CHClF_2$), R-32 (CH_2F_2), R-124 (CF_3CHClF), R-125 (CF_3CF_2H), R-134a (CF_3CFH_2), R-142b (CH_3CClF_2), 143a (CF_3CH_3) and R-152 (CHF_2CH_3). (Inagaki, p. 2, col. 2.)
4. Inagaki is silent as to whether the compositions disclosed therein form azeotrope or "azeotrope-like" compositions.

ANALYSIS

After considering the arguments and evidence submitted by the Patent Owner and Requester, we reverse the Examiner's rejections of the claims because we agree with Patent Owner that Inagaki does not disclose or render obvious the "azeotrope-like" compositions recited in the claims.

The Examiner's rejection relies on an interpretation of "azeotrope-like" composition, which we did not adopt as discussed above. That is, the Examiner relies on Inagaki's disclosure of all the components recited in the claims in order to support the position that Inagaki discloses the claimed "azeotrope-like" compositions. (RAN 6-7.) However, as explained above, the claims require the compositions comprising the recited components to be constant boiling or essentially constant boiling. There is insufficient evidence of record that the compositions disclosed in Inagaki would necessarily exhibit this property or that one of ordinary skill in the art

would have been able to produce the "azeotrope-like" compositions recited in the claims based on Inagaki's disclosure.

In reaching this conclusion, we recognize that as long as the Examiner has a reasonable basis to believe that the compositions of the prior art would be expected to possess the same or similar properties as the compositions recited in the claims, the Examiner may shift the burden to the Patent Owner to prove otherwise. *In re Spada*, 911 F.2d 705, 708 (Fed. Cir. 1990) (citing *In re King,* 801 F.2d 1324, 1327 (Fed. Cir. 1986); *In re Ludtke,* 441 F.2d 660, 664 (CCPA 1971). ("[W]hen the PTO shows sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not.") However, in this case, there is insufficient evidence to support such a belief as explained further below.

Here, we observe as does Patent Owner, that the formation of azeotropic compositions has been recognized previously as unpredictable. *In re Broadly*, 404 F.2d 616, 619 (CCPA 1968) (a homologous relationship between hydrofluorocarbons was insufficient to predict the formation of an azeotrope). In addition, Patent Owner relies on Declarations of Rajiv Ratna Singh, executed on February 1, 2011 ("First Singh Declaration") and November 8, 2012 ("Second Singh Declaration") to establish that "azeotrope-like" compositions are unpredictable.[6] (First Singh Decl. paras. 6-8.) Dr. Singh cites to three U.S. Patents, U.S. Patent No. 3,085,065 ("the

[6] Dr. Singh is a co-inventor of the '805 Patent. (First Singh Declaration para. 1.) Dr. Singh has Ph.D. in physical chemistry, and is a Senior/Corporate Fellow and Leader in the Fluorine Chemistry Group. (First Singh Declaration, paras. 2 and 3; Second Singh Declaration, para. 3.) We find Dr. Singh to be qualified to opine on azeotrope-like compositions.

'065 Patent), U.S. Patent No. 5,182,040 ("the '040 Patent"), and U.S. Patent No. 5,648,017 ("the '017 Patent"), for support of the unpredictability of forming azeotropes in fluorocarbon compositions. (First Singh Decl. para. 6.) Specifically, the '065 Patent states:

> It is impossible to predict that an azeotrope will form between any two compounds and so it is impossible to pick any two refrigerants and combine them to obtain an azeotrope boiling at some particular point by prediction. If an azeotrope occurs at all, its boiling point is a function of the system and is not under the control of the experimenter. The mere existence of a large number of fluorinated hydrocarbons does not aid in predicting the formation of azeotropes by mixtures thereof.

(Col. 1, l. 66-col. 2, l. 3.) The '040 and '017 patents have similar statements about the unpredictability of forming azeotropes. (First Singh Decl. para. 6.)

Thus, the evidence of record, as in *Broadly*, supports Patent Owner's position that azeotropes may not be formed predictably. Although the claims are directed to "azeotrope-like" compositions, which include azeotropes, but are not limited necessarily to "true" azeotropes, in light of the definition of "azeotropelike" discussed above, we credit Dr. Singh's testimony that forming an "azeotrope-like" composition would be unpredictable. That is, because "azeotrope-like" compositions are "constant boiling or essentially constant boiling," one of ordinary skill in the art would have expected that the formation of an "azeotrope-like" composition would have been equally unpredictable because their properties are not the same as they are for mixtures of pure compounds. (First Singh Decl. paras. 6-8.)

In this regard, we are not persuaded by Requester's contention that the '805 Patent does not support the formation of an azeotrope. (Req. Resp't Br.

5.) Specifically, Requester argues that the boiling point temperatures relied on for the "pure" components such as R-134a are not consistent with the values disclosed in Patent Owner's own Material Safety Data Sheet. (Req. Resp't Br. 5.) Requester relies on the declaration of Robert Elliott Low executed on September 15, 2011 (the "Low Declaration"), who declared that the discrepancy in boiling points "casts doubt" over the results reported in the '081 Patent.[7] (Req. Resp't Br. 5; Low Declaration, para. 31.)

However, Patent Owner argues that the alleged variation in boiling point is irrelevant, and that the measured boiling point of the compositions in the examples disclosed in the '805 Patent changes very little with changes in concentration of components, and thus show essentially no change in boiling point as required by an azeotropic composition. (Patent Owner Rebuttal Brief filed May 9, 2014; "PO Rebut. Br." 2-6.)

Requester relies further on declarations of Stuart Corr, one executed in 2011, (the "First Corr Declaration") and a second declaration submitted with a response filed September 26, 2012 (the "Second Corr Declaration).[8] We address the declarations of Dr. Corr to the extent they are consistent with

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[7] Dr. Low, who is employed by Mexichem, earned a Doctorate in Chemical Engineering with experience in azeoptropic and nonazeotropic refrigerants. (Low Declaration, paras. 1-4.) We find Dr. Low qualified to opine on azetropic compositions.

[8] The exact date of the First Corr Declaration is not legible and the Second Corr Declaration is undated. Dr. Corr, who is employed by Mexichem, has Ph.D. in physical chemistry, and worked in developing ozone-benign alternatives to chlorfluorocarbons (CFC) and hydrochlorofluorocarbons (HCFC) refrigerants. (First Corr Declaration, paras. 3-5; Second Corr Declaration, para. 3.) We find Dr. Corr to be qualified to opine on fluorocarbon compositions used as refrigerants.

our interpretation of "azeotrope-like" set forth above. Dr. Corr declared that one of ordinary skill in the art would not be able to determine whether or not a particular composition is or is not "azeotrope-like" in view of the disclosure in the '081 Patent. (First Corr Declaration, para. 25.) Dr. Corr states further that in view of the boiling point changes in Examples 1-4 (less than 2 ºC, less than 6 ºC, less than 1 ºC, less than 1 ºC, respectively) of the '081 Patent, the skilled person would see "different criteria" being applied to each of the binary mixtures in the examples. (First Corr Declaration, para. 30.) Dr. Corr appears to be relying on the quantitative difference in boiling changes between the examples, but does not adequately explain why such differences rise to the level of "different criteria" as opposed to different examples illustrating azeotrope-like compositions.

Thus, we find that the evidence pointed to by the Patent Owner and Requester in the briefs weighs in favor of the Patent Owner. (PO Reb. Br. 2-6.) Specifically, we agree with Patent Owner that the behavior of the compositions with respect to the change in temperature of the boiling points as discussed in the '805 Patent supports Patent Owner's position that azeotrope-like compositions containing the claimed components would be unpredictable. (PO Reb. Br. 2-6.)

Thus, although Inagaki discloses compounds and combinations of compounds that may include the compounds recited in the claims (FF2, FF3), Inagaki is silent as to whether azeotrope or "azeotrope-like" compositions are formed. (FF4.) Inagaki does mention azeotropic compositions, but only in the background section of the disclosure, and not in conjunction with the disclosure of their invention. (FF1, FF4.) In view of

the above discussion, insufficient basis exists to support the Examiner's position that Inagaki discloses or renders obvious "azeotrope-like" compositions as recited in independent claim 1. Accordingly, we reverse the Examiner's rejection of the claims as anticipated by or obvious over Inagaki.

Rejections III-IV

The remaining prior art rejections on appeal all rely on Inagaki for the disclosure of an "azeotrope-like" composition. (RAN 8, 10.) Therefore, we reverse the Examiner's rejections (Rejections III-IV) for the same reasons.

CONCLUSION

On this record, the Examiner erred in determining that Inagaki discloses or renders obvious the "azeotrope-like" composition recited in the claims.

DECISION

The Examiner's decision to reject claims 1-11, 13, 15-25 and 30-32 is reversed.

In accordance with 37 C.F.R. § 41.79(a)(1), the "[p]arties to the appeal may file a request for rehearing of the decision within one month of the date of: . . . [t]he original decision of the Board under § 41.77(a)." A request for rehearing must be in compliance with 37 C.F.R. § 41.79(b). Comments in opposition to the request and additional requests for rehearing must be in accordance with 37 C.F.R. § 41.79(c) & (d), respectively. Under

37 C.F.R. § 41.79(e), the times for requesting rehearing under paragraph (a) of this section, for requesting further rehearing under paragraph (d) of this section, and for submitting comments under paragraph (c) of this section may not be extended.

An appeal to the United States Court of Appeals for the Federal Circuit under 35 U.S.C. §§ 141-144 and 315 and 37 C.F.R. § 1.983 for an *inter partes* reexamination proceeding "commenced" on or after November 2, 2002 may not be taken "until all parties' rights to request rehearing have been exhausted, at which time the decision of the Board is final and appealable by any party to the appeal to the Board." 37 C.F.R. § 41.81. *See also* MPEP § 2682 (8th ed., Rev. 7, July 2008).

REVERSED

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