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EXAMINER

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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 2016-001568
Reexamination Control 95/002,188
Patent 8,148,317 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

Appeal 2016-001568
Reexamination Control 95/002,188
Patent 8,148,317 B2

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, 2, 4, 5, 7, 9, 12, 13, 16, 17, 20, 26-28, 30, 31, 35, 36, 40-44, 46, 47.¹ 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, 2, 4, 5, 7, 9, 12, 13, 16, 17, 20, 26-28, 30, 31, 35, 36, 40-44, 46, and 47.

STATEMENT OF THE CASE

United States Patent 8,148,317 B2 (hereinafter the “’317 Patent”), which is the subject of the current *inter partes* reexamination, issued to Rajiv R. Singh et al. on April 3, 2012. The ’317 Patent is related to U.S. Patent 7,524,805 B2, which is the subject of Reexamination Control. No. 95/000,574, and U.S. Patent 7,825,081 B2, which is the subject of Reexamination Control. No. 95/000,630. (App. Br. 2.) The Examiner’s rejections in both reexaminations were appealed to the Patent Trial and Appeal Board. Decisions on Appeal were rendered in 95/000,574 (Appeal No. 2014-007990) and 95/000,630 (Appeal No. 2015-001235) on June 25,

¹ See Patent Owner’s Appeal Brief 1 (filed September 2, 2014) (hereinafter “App. Br.”) Examiner’s Answer (mailed June 15, 2015) (hereinafter “Ans.”); Right of Appeal Notice (mailed May 16, 2014) (hereinafter “RAN.”).

² See Requester’s Respondent Brief (filed October 2, 2014) (hereinafter “Resp’t Br.”).

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2015, reversing the Examiner's rejections over the prior art, and requests for rehearing filed by Requester in both cases were denied by the Board on March 14, 2016. Requester has appealed both of the Board's Decisions to the Court of Appeals for the Federal Circuit.

Requester also informs us of other patents undergoing *inter partes* reexamination or *inter partes* review including similar subject matter: U.S. Patent 8,053,404 B2, which is the subject of Reexamination Control. No. 95/001,920 (Appealed to PTAB, Appeal No. 2016-006365); U.S. Patent 8,033,120 B2, which is the subject of Reexamination Control. No. 95/001,783 (Decision in Appeal No. 2015-000616 rendered March 30, 2016, affirming-in-part the Examiner's rejection of the claims, Patent Owner Request for Rehearing pending); U.S. Patent 8,065,882 B2, which is the subject of Reexamination Control. No. 95/002,030 (Decision in Appeal No. 2015-007833 rendered March 30, 2016, affirming-in-part the Examiner's rejection of the claims, Patent Owner Request for Rehearing pending); and U.S. Patent 8,444,874 B2, which is the subject of *Inter Partes* Review IPR2013-00576 (Final Written Decision, February 26, 2015, Paper No. 50, claims 1 and 3-15 held unpatentable). (Resp't Br. 1-2.)

We heard oral arguments from both the Patent Owner and Requester on April 13, 2016, a transcript of which was entered into the electronic record on May 12, 2016.

The claims of the '317 Patent relates to "azeotrope-like" compositions containing a mixture of trans-1,3,3,3-tetrafluoropropene (transHFO-1234ze) and a specific hydrofluorocarbon (HFC), 1,1,1,2-tetrafluoroethane (HFC-134a). (Col. 1, l. 64 - col. 2, l. 11; col. 3, ll. 51-61.)

Claim 1, which is illustrative of the appealed subject matter and the only independent claim on appeal, reads as follows (with underlining and bracketing show additions and deletions, respectively, relative to the originally issued claims):

1. An azeotrope-like composition comprising from greater than zero to about 60 weight percent [effective amounts of] trans-1,3,3,3-tetrafluoropropene (transHFO-1234ze) and not less than about 40 weight percent of 1,1,1,2-tetrafluoroethane (HFC-134a).

(PO App. Br. 41, Claims App'x.)

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

- I. Claims 1, 2, 4, 5, 7, 9, 12, 13, 16, 17, 20, 26-28, 30, 31, 35, 36, 40, 41, 43, 44, 46, and 47 under 35 U.S.C. § 103(a) as obvious over Inagaki,³
- II. Claim 42 under 35 U.S.C. § 103(a) as obvious over Inagaki in view of Patent Owner's Admission (Col. 7, l. 51+, col. 8, ll. 41-44 of the '317 Patent); and
- III. Claim 9 under 35 U.S.C. § 103(a) as obvious over Inagaki in view of Smits.⁴

(App. Br. 4.)

³ Japanese Unexamined Patent Application Laid Open H4-110388 to Inagaki et al., published April 10, 1992. Citations to English translation of record.

⁴ European Patent Application EP 398147 to Smits, published November 22, 1990.

CLAIM CONSTRUCTION

As with the appeals in 95/000,574 (Appeal No. 2014-007990) and 95/000,630 (Appeal No. 2015-001235) noted above, the interpretation of the term “azeotrope-like” composition recited in independent claim 1 is at issue in this appeal. The Examiner interpreted the term “azeotrope-like” as “a composition containing transHFO-1234ze and one or more of HFC-152a, HFC-227ea, HFC-134a or HFC-125.”⁵ (RAN 5.)

“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 (quoting *In re Bond*, 910 F.2d 831, 833 (Fed.Cir.1990)).

The '317 Patent states:

As used herein, the term “azeotrope-like” is intended in its broad sense to include both compositions that are strictly azeotropic and compositions that behave like azeotropic mixtures. . . .

Azeotrope-like compositions are constant boiling or essentially constant boiling. In other words, for azeotrope-like compositions, the composition of the vapor formed during boiling or evaporation is identical, or substantially identical, to

⁵ In this case, claim 1 recites HFC-134a in combination with transHFO-1234ze.

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. 51- col. 4, l. 6.)

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 5, 17; Resp’t Br. 6-9.) To do so would read the term “azeotrope-like,” as expressly defined in the Specification, out of the claims.

Even though claim 1 recites ranges of from greater than zero to about 60 weight percent transHFO-1234ze and not less than 40 weight percent HFC-134a, 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 ’317 Patent to be a definition as to what constitutes an “azeotrope-like” composition as is the position of the Requester. (Resp’t Br. 3, 6-7.) Rather, we look to the express definition of “azeotrope-like” composition discussed above, with the broad amounts disclosed in the ’317 Patent as providing general guidance in producing an “azeotrope-like” composition with a constant or substantially constant boiling point.

Contrary to Requester's position, we do not view the definition of "azeotrope-like" to cover the recited combinations in any amount (Resp't Br. 7-8), but instead we find the "self-defined" definition to relate to the amounts necessary to result in the identified properties of an "azeotrope-like" composition.

Regarding the specific amounts of transHFO-1234ze and HFC-134a recited in the claims, the '317 Patent expressly discloses the combination in the amounts recited in the claims. ('317 Patent, col. 5, ll. 64-66.) Thus, Requester's arguments that the claims do not include the preferred embodiments are unpersuasive. (Resp't Br. 7-9.)

Accordingly, we interpret claim 1 to be directed to composition comprising from greater than zero to about 60 weight percent transHFO-1234ze and not less than 40 weight percent HFC-134a, with a constant or substantially constant boiling point.

PRIOR ART REJECTIONS

Rejection I- 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*, having the claimed component concentration, boiling points, or are *azeotrope*, Inagaki nevertheless teaches compositions comprising the claimed components

As to the concentration of components, a person having ordinary skill in the art would have been able to determine, through routine experimentation, the range of concentrations in

the composition of Inagaki so as to produce a composition having the desired properties-including azeotrope compositions.

(RAN 8, *see also* RAN 14-15.) Requester agrees with the Examiner.

(Resp't Br. 9-10.)

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. (App. Br. 20-21.) Patent Owner argues that the compositions disclosed in Inagaki are not inherently "azeotrope-like." (App. Br. 21, 22.) Patent Owner argues also that because Inagaki does not provide any teaching or suggestion that the compositions disclosed therein 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. (App. Br. 22-24.)

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, chlorofluorohydrocarbon, fluorohydrocarbon, azeotropic composition of said

chlorofluorohydrocarbon 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. We have not been direct to sufficient evidence in this record that the compositions disclosed in Inagaki would necessarily exhibit this property or that Inagaki reasonably suggests the production of an “azeotrope-like” composition.

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 that the formation of azeotropic compositions has been recognized previously as unpredictable. *In re Broadley*, 404 F.2d 616, 619 (CCPA 1968) (a homologous relationship between hydrofluorocarbons was insufficient to predict the formation of an azeotrope). (*See* App. Br. 3, 15, 23, declaration of Robert Elliott Low executed on March 4, 2011 (the “Low Declaration”), para. 12(a)(i).) In addition, Patent Owner relies on Declarations of Rajiv Ratna Singh,⁶ executed on February 11, 2013 (“First

⁶ Dr. Singh is a co-inventor of the ’317 Patent. (First Singh Declaration para. 1.) Dr. Singh has a Ph.D. in physical chemistry and is a Senior/Corporate Fellow and Leader in the Fluorine Chemistry Group.

Singh Declaration”), October 31 2013 (“Second Singh Declaration”), and September 2, 2014 (“Third Singh Declaration”),⁷ as well as a Declaration of Mark W. Spatz executed on February 11, 2013 (“Spatz Declaration”), to establish that “azeotrope-like” compositions having the claimed composition would have been unpredictable. (First Singh Decl. paras. 6-9, 11-12.)

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 “azeotrope-like” 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, which do not exhibit a constant or substantially constant boiling point. (First Singh Decl. paras. 6-9, 11.)

We are not persuaded by Requester’s contention that the ’317 Patent does not support the formation of an azeotrope. (Resp’t Br. 5-6.) Specifically, Requester argues that the boiling point temperatures relied on for the “pure” components such as R-134a are not consistent with the values reported in the Singh Declarations. (Resp’t Br. 5.) Requester relies on the Low Declaration, which declares that the discrepancy in boiling points

(First Singh Declaration, paras. 2 and 3.) We find Dr. Singh to be qualified to opine on azeotrope-like compositions.

⁷ Entered as indicated in the Examiner’s Answer, p. 2.

“casts doubt” over the results reported in the ’317 Patent.⁸ (Resp’t Br. 5; Low Declaration, para. 31.) Requester also argues that Patent Owner’s data is not credible because it was not reproduced, i.e., the graphical curves between the ’317 Patent and the Singh Declarations have different slopes. (Resp’t Br. 6.)

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 ’317 Patent changes very little with changes in concentration of components, and thus shows essentially no change in boiling point as required by an azeotropic composition. (Patent Owner Rebuttal Brief filed July 15, 2015; “Reb. Br.” 6-7.) We find that the evidence pointed to by the Patent Owner and Requester in the briefs weighs in favor of the Patent Owner. (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 ’317 Patent supports Patent Owner’s position that azeotrope-like compositions containing the claimed components would be unpredictable. (Reb. Br. 3-7.) Indeed, the results in the Singh Declaration, particularly for the components in the specific amounts recited in claim 1, show the formation of a composition having a negative or very small rate of change in boiling point (referred to as “glide”) as the percentage of the components of the

⁸ Dr. Low, who is employed by Mexichem, earned a Doctorate in Chemical Engineering with experience in azeotropic and nonazeotropic refrigerants. (Low Declaration, paras. 1-4.) We find Dr. Low qualified to opine on azetropic compositions. Dr. Low references U.S. Patent No. 7,825,805, but Table 1 of the ’805 Patent is identical to Table 1 of the ’317 Patent.

composition are varied. (First Singh Decl. paras. 7-9, Ex. C; Spatz Decl., paras. 6-7, 12-17.)

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.) The Examiner did not provide a reason as to why one of ordinary skill in the art would have been guided to select an azeotrope from Inagaki’s broadly disclosed compositions. 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 obvious over Inagaki.

Rejections II and III

The remaining prior art rejections on appeal all rely on Inagaki for the disclosure of an “azeotrope-like” composition. (RAN 9, 10.) Therefore, we reverse the Examiner’s rejections (Rejections II-III) 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, 2, 4, 5, 7, 9, 12, 13, 16, 17, 20, 26-28, 30, 31, 35, 36, 40-44, 46, and 47 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).

In the event neither party files a request for rehearing within the time provided in 37 C.F.R. § 41.79, and this decision becomes final and appealable under 37 C.F.R. § 41.81, a party seeking judicial review must

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timely serve notice on the Director of the United States Patent and
Trademark Office. *See* 37 C.F.R. §§ 90.1 and 1.983.

REVERSED

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