



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
**United States Patent and Trademark Office**  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/675,798	04/01/2015	RAMEET SINGH GREWAL	SUB-US20090583- US-CNT	7169
27238	7590	02/06/2020	EXAMINER	
WHIRLPOOL CORPORATION - MD 3601 2000 North M63 Benton Harbor, MI 49022			DIAZ, MIGUEL ANGEL	
			ART UNIT	PAPER NUMBER
			3763	
			NOTIFICATION DATE	DELIVERY MODE
			02/06/2020	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

MAIL@DWPATENTLAW.COM  
PatentDocketing@whirlpool.com  
deborah\_tomaszewski@whirlpool.com

UNITED STATES PATENT AND TRADEMARK OFFICE

---

BEFORE THE PATENT TRIAL AND APPEAL BOARD

---

*Ex parte* RAMEET SINGH GREWAL, ANDERSON BORTOLETTO,  
and GUOLIAN WU

---

Appeal 2019-004070  
Application 14/675,798  
Technology Center 3700

---

Before MICHAEL J. FITZPATRICK, WILLIAM A. CAPP, and  
RICHARD H. MARSCHALL, *Administrative Patent Judges*.

CAPP, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellant<sup>1</sup> seeks our review under 35 U.S.C. § 134(a) of the final rejection of claims 1–15 and 17–20. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

---

<sup>1</sup> We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42(a). Appellant identifies Whirlpool Corporation as the Applicant and real party in interest. Appeal Br. 5.

## THE INVENTION

Appellant's invention relates to a refrigerator. Spec. ¶ 2. Claim 1, reproduced below, is illustrative of the subject matter on appeal.

1. A method for actuating a humidifier to provide humidification to an interior of a refrigeration compartment, said method including:

establishing a desired humidity level for the interior of the refrigeration compartment;

measuring a temperature in the interior of said refrigeration compartment;

determining at least one of:

a) a length of time since the last defrost operation in said refrigeration compartment;

b) a length of time since a door to said refrigeration compartment was last opened; and

c) a compressor time by performing at least one of:

determining a length of time a compressor has been operating, wherein said compressor operates to provide refrigeration for the interior of said refrigeration compartment; and

determining a length of time since said compressor ended operation;

calculating an estimated humidity level for the interior of said refrigeration compartment based, at least in part, on said temperature in the interior of said refrigeration compartment and at least one of said length of time since the last defrost operation, the length of time since the door to said refrigeration compartment was last opened and said compressor time; and

actuating said humidifier when said estimated humidity level is less than said predetermined desired humidity level.

### THE REJECTIONS

The Examiner relies upon the following as evidence in support of the rejections:

NAME	REFERENCE	DATE
Dodge	US 3,474,638	Oct. 28, 1969
Sweetman	US 4,395,887	Aug. 2, 1983
Fortmann	US 5,025,132	June 18, 1991
Hwang	US 5,974,815	Nov. 2, 1999

The following rejections are before us for review:

1. Claims 1–15 and 17–20 are rejected under 35 U.S.C. § 112(b) as indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor regards as the invention.

2. Claims 1–15 and 17–20 are rejected under 35 U.S.C. § 112(a) for failure to comply with the enablement requirement.

3. Claims 1–3, 5–7, 15, and 18 are rejected under 35 U.S.C. § 103 as being unpatentable over Hwang and Fortmann.

4. Claims 4, 8, and 19 are rejected under 35 U.S.C. § 103 as being unpatentable over Hwang, Fortmann, and Sweetman.

5. Claims 9, 17, and 20 are rejected under 35 U.S.C. § 103 as being unpatentable over Hwang, Fortmann, and Dodge.

6. Claims 10–14 are rejected under 35 U.S.C. § 103 as being unpatentable over Hwang, Fortmann, Sweetman, and Dodge.

### OPINION

#### *Indefiniteness*

The Examiner expresses concern that it is not clear as to how exactly the calculation or estimation of the humidity is performed. Final Action 9.

In particular, the Examiner expresses concern that neither the claims nor the Specification supplies the particular mathematical steps or algorithms in order to calculate a numerical amount of humidity. *Id.*

[I]t is not clear how exactly one of ordinary skill in the art would be able to take the amount of time the compressor has or has not been operating, the amount of time since the last defrost operation, or the amount of time since the door was last opened, along with the indoor temperature and be able to correlate and conclude a level of humidity.

*Id.* at 9–10.

Appellant argues that the claims are sufficiently definite and that the Examiner’s concerns are directed more to the issue of enablement than indefiniteness. Appeal Br. 22. We agree.

The PTO can properly reject a claim as indefinite if the claim is ambiguous, vague, incoherent, opaque, or otherwise unclear. *In re Packard*, 751 F.3d 1307, 1311 (Fed. Cir. 2014). The test for definiteness under 35 U.S.C. § 112, is whether “those skilled in the art would understand what is claimed when the claim is read in light of the specification.” *Orthokinetics, Inc. v. Safety Travel Chairs, Inc.*, 806 F.2d 1565, 1576 (Fed. Cir. 1986) (citations omitted).

Here, the Examiner’s concerns about how the estimation of humidity is performed goes more to the question of whether the claims can be practiced without undue experimentation than whether a person of ordinary skill in the art would understand what is claimed in light of the Specification. We address that question in connection with the Examiner’s non-enablement rejection discussed below.

We do not sustain the Examiner’s Section 112 indefiniteness rejection of claims 1–15 and 17–20.

*Non-Enablement*

The Examiner takes the position that each of the independent claims (1, 5, 10, and 15) contains a limitation directed to estimating the humidity level in the interior compartment of a refrigerator based on measuring the temperature in such compartment in conjunction with one or more time duration measurements that are recited in the claim. Final Action 2–3. The Examiner determines that the Specification fails to provide enough information to enable one of ordinary skill in the art to make and use the claimed invention. *Id.* at 3.

[T]he claims require a series of inputs (i.e. inputs A, B, C, D) that are used to calculate or estimate an output (i.e. output Y), without sufficiently describing how exactly the claimed calculation takes place . . .

[T]he specification does not describe how exactly this calculation is accomplished, it only describes that the amount of required humidity is a function of said variables, without providing the necessary algorithm or mathematical formula so as to obtain a numerical value for an absolute humidity or a relative humidity.

*Id.* at 3–4.

In traversing the rejection, Appellant raises a plethora of procedural objections, none of which we find persuasive. Appeal Br. 9–11. For example, Appellant argues that a parent application has issued as US 9,004,369. *Id.* In essence, Appellant argues that, since the parent application issued, its claims must be considered enabled and, if those claims are enabled, the claims of the instant continuation application must also be enabled. *Id.* We express no opinion as to whether the claims of US 9,004,369 were properly allowed as enabled or whether they might survive an invalidity challenge in a Re-Examination Proceeding, District

Court litigation, or a trial proceeding before the Board brought under the America Invents Act. The sole issue before us is whether the claims of the instant application are enabled. The instant application must stand or fall on its own merits.

Appellant next argues that the Examiner's rejection is deficient because it does not analyze and apply "all" of the factors set forth in the case of *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988). Appeal Br. 12. This argument contravenes prevailing law. Contrary to Appellant's position, there is no requirement that an Examiner explicitly cite to the *Wands* case in making a non-enablement rejection; neither is there a requirement to address each and every one of factors in formulating a rejection.

As the MPEP states, "it is not necessary to discuss each [Wands] factor in the . . . enablement rejection." MPEP § 2164.04. Rather, the rejection "should focus on those factors, reasons, and evidence that lead [to] the [conclusion] that the specification fails to teach how to make and use the claimed invention without undue experimentation." *Id.* (emphasis omitted).

*In re Hillis*, 484 Fed. Appx. 491, 495 (Fed. Cir. 2012).

Turning to the merits of the rejection, Appellant asserts that the claim is directed to an "estimated" humidity level which, by definition, is not as accurate as measuring humidity directly. Appeal Br. 13. Appellant notes that the Specification distinguishes between a closed loop control system based on measured levels of humidity and an open loop control system that estimates humidity. *Id.* Appellant points out that the goal of the invention is to provide a less expensive refrigeration system that provides enhanced food storage capability, while avoiding the expense of a humidity sensor. *Id.* Appellant further explains that paragraph 97 of the Specification discloses

that regression data from tests done under several different operating conditions allows one to estimate the humidity level within the refrigeration compartment. *Id.*

[O]ne skilled in the art could design and build a refrigerator, install a temporary humidity sensor, place the refrigerator in environmental conditions similar to those expected to be encountered during use, and record the humidity within the refrigerator. Afterwards, the humidity level could be measured at regular intervals to determine the rate of change of the humidity level over time. With this information, the length of time since the door was last opened could be used to calculate the humidity level within the refrigerator without the need for a humidity sensor. Such testing can be repeated in different environmental conditions and for different refrigerator interior temperatures.

*Id.* at 13–14. Appellant asserts that such an amount of experimentation is not “undue.” *Id.* at 14.

In response, the Examiner emphasizes that information is missing about the relationships between claimed elements that cannot be developed without undue experimentation. *Ans.* 7. The Examiner identifies a number of variables that affect humidity levels within a refrigerator which, in the Examiner’s opinion, should be accounted for in estimating humidity. *Id.* Among other things, the Examiner lists: (1) environmental conditions such as ambient temperature and humidity; (2) compressor capacity; (3) compartment volume; (4) stored item temperatures; (5) food load amounts, and (6) the number of fans. *Id.* at 9. The Examiner considers it to be “practically impossible” to estimate a humidity based merely on measured temperature and a time duration as claimed, without considering what the Examiner characterizes as an “undue plethora” of factors. *Id.* The Examiner faults Appellant for not providing actual regression analysis data to support

its argument that the invention could be practiced using regression analysis.  
*Id.* at 11.

Proceeding further, the Examiner takes issue with Appellant's failure to provide criteria of acceptable performance for embodiments of the invention.

[T]he disclosure does not specifically establish . . . the requisite degree of what may be considered a level of "estimated" humidity. In other words, what margin of error reasonably comprises an "estimated" humidity for the claimed invention? Would it be a relative humidity level of approximately +/- 3%, 5%, 10%, or even more? . . . Given the fact that appellant has not established the requisite degree for what may be considered an "estimated" humidity, it is unclear how the claimed invention would function, since there are many factors (such as the type of food stored within the refrigerator, and convection between the refrigerator and the outside environment) that may influence the level of humidity therein, which is not accounted for with the claimed calculation.

Ans. 11–12.

In reply, Appellant points out that some of the variables identified by the Examiner are static, such as compressor capacity and compartment volume. Reply Br. 2. Appellant argues that such variables lend themselves to routine experimentation as they do not vary during use of the refrigerator. *Id.* at 2–3. Appellant further argues that other variables identified by the Examiner, such as ambient temperature and humidity, the temperature of stored items, and food load can reasonably be expected to fall within certain ranges. *Id.* at 3. Appellant concludes that such variables lend themselves to a regression analysis that does not amount to "undue" experimentation. *Id.*

Appellant next points out that there are a limited number of refrigerator manufacturers, each with a limited product line. *Id.* Appellant

explains that, in the ordinary course of new product development, design engineers can construct a refrigerator for testing purposes, install a humidity sensor, place the refrigerator in environmental conditions similar to those expected to be encountered during use, and then collect humidity data. *Id.* Appellant explains that actual, measured humidity data can be correlated to the temperature and time duration parameters recited in the claims to derive an estimated humidity level “without the need to install a humidity sensor in the . . . refrigerators that will subsequently be produced.” *Id.* Appellant describes this process as “ordinary” product development steps that would be performed by engineers that specialize in refrigerator design. *Id.* Distilled to its essence, Appellant asserts that the Examiner is imposing an artificial and exacting performance criteria on Appellant’s refrigerator that does not align with the legal standards of enablement and undue experimentation. Reply Br. 4.

At the outset, we commend the Examiner for the thorough, detailed, thoughtful, and insightful analysis that went into the Final Rejection and the Examiner’s Answer. The Examiner has demonstrated a clear grasp of the technical issues that are involved in estimating the humidity level inside of a refrigerator without the use of a humidity sensor. Notwithstanding the foregoing, however, the Examiner has applied an incorrect standard of non-enablement to the facts of this case in the following two respects: (1) the performance criteria that is applied to an invention; and (2) the amount of experimentation that is considered to be “undue.”

The enablement requirement prevents mere ideas from being patented. *In re ‘318 Patent Infringement Litigation*, 583 F.3d 1317, 1324 (2009). Enablement requires that the Specification enable those skilled in the art to

make and use the full scope of the claimed invention without undue experimentation. *Genentech, Inc. v. Novo Nordisk A/S*, 108 F.3d 1361, 1365 (Fed. Cir. 1997) (quoting *In re Wright*, 999 F.2d 1557, 1561 (Fed. Cir. 1993)). The enablement requirement ensures that the public knowledge is enriched by the patent specification to a degree at least commensurate with the scope of the claims. *Nat'l Recovery Tech., Inc., v. Magnetic Separation Sys, Inc.*, 166 F.3d 1190, 1195–96 (Fed. Cir. 1999). The scope of the claims must be less than or equal to the scope of the enablement. *Id.* The scope of enablement, in turn, is that which is disclosed in the Specification plus the scope of what would be known to one of ordinary skill in the art without undue experimentation. *Id.* Whether making and using the claimed invention would have required undue experimentation, such that claims were not sufficiently enabled by the Specification, is a legal conclusion based upon underlying facts. *In re Goodman*, 11 F.3d 1046, 1049–50 (Fed. Cir. 1993).

In analyzing enablement of Appellant's invention, the Examiner errs in comparing the accuracy and performance of Appellant's humidity estimation technique with that of an actual humidity sensor. Patents may be obtained for inventions that are new and "useful." 35 U.S.C. § 101. There is no requirement that the disclosure enables a perfected, commercially viable embodiment.

Enablement does not require an inventor to meet lofty standards for success in the commercial marketplace. Title 35 does not require that a patent disclosure enable one of ordinary skill in the art to make and use a perfected, commercially viable embodiment absent a claim limitation to that effect . . .

[W]hen an invention claims a general system to improve . . . the disclosure enables that invention by showing improvements.

*CFMT, Inc. v. Yieldup Int'l Corp.*, 349 F.3d 1333, 1338 (Fed. Cir. 2003). The invention here does not seek to improve on control systems that use actual humidity sensors, rather, it seeks to improve on the food storage capabilities of a refrigerator that has no humidity sensor. The invention saves the expense associated with providing a humidity sensor, while still providing some, albeit admittedly imperfect, humidity control. In that sense, it provides a “poor man’s” humidity control system. Thus, the question is not whether it works perfectly, but whether it works at all. The Examiner offers no evidence or technical reasoning to challenge the notion that Appellant’s invention provides some amount of humidity control improvement over prior art refrigerators with no humidity control system whatsoever.

On the question of whether the amount of experimentation required to practice the invention is “undue,” Appellant has the better position. Although experimentation must not be undue, a reasonable amount of routine experimentation required to practice a claimed invention does not violate the enablement requirement. *Enzo Biochem, Inc. v. Calgene, Inc.*, 188 F.3d 1362, 1371 (Fed. Cir. 1999). The Examiner’s undue experimentation analysis is, in the first instance, predicated on the Examiner’s notion that the invention achieve some artificially imposed standard of performance, a notion that the law does not endorse. In evaluating Appellant’s arguments regarding undue experimentation, we are mindful that an inventor is speaking to those skilled in the art. *In re Howarth*, 654 F.2d 103, 105 (CCPA 1981). Consequently, what is conventional knowledge will be read into the disclosure. *Id.* Thus, the disclosure of an application embraces not only what is expressly set forth in

words or drawings, but what would be understood by persons skilled in the art. *Id.* at 106.

Appellant's Specification teaches that an adaptive method for estimating humidity levels in a refrigerator is based on the physical understanding of mass transfer or moisture transfer inside of the refrigerator. Spec. ¶ 77. The Specification identifies factors that add to or remove moisture from the refrigerator. *Id.* ¶ 79. The Specification explains that regression data from tests done in several operating conditions helps estimate current relative humidity and consequently, the need for water atomization. *Id.* ¶ 97.

We find persuasive Appellant's arguments that a skilled refrigerator design engineer would be able to test a prototype refrigerator during product development by collecting data using an actual humidity sensor and correlating and comparing such data against the temperature and other parameters recited in claim 1 and develop an algorithm to estimate a humidity level. Reply Br. 3. We do not consider the prospect that such a design effort would need to be undertaken for each new refrigerator product under development constitutes "undue" experimentation. Moreover, we are not inclined to fault Appellant for not providing a precise algorithm in the Specification, when it is understood that the particulars of the algorithm may vary depending on design consideration variables such as compartment size or anticipated environmental operating conditions particular to each new product. Under the circumstances, it is enough that a person of ordinary skill in the art would have been able to derive the appropriate algorithm given a specified set of physical and operational parameters.

In view of the foregoing discussion, we do not sustain the Examiner's Section 112 non-enablement rejection of claims 1–15 and 17–20.

*Unpatentability of Claims 1–3, 5–7, 15, and 18  
over Hwang and Fortmann*

*Claim 1*

The Examiner finds that Hwang discloses the invention substantially as claimed except that it uses an actual humidity sensor and, therefore, does not rely on temperature and time duration parameters to estimate humidity level. Final Action 11. The Examiner relies on Fortmann as disclosing a food treatment cabinet with a humidity control routine that relies on measuring a temperature of the interior of the compartment, determining a length of time since a door to the compartment was last opened, and calculating an estimated humidity level for the interior of the compartment based on the temperature and the length of the time since the door to said compartment was last opened. *Id.* at 12.

We have reviewed the Fortmann reference. Fortmann is directed to a food steamer, not a refrigerator. Fortmann, col. 4, ll. 1–4. To be sure, Fortmann does disclose controlling temperature within the food steamer. *Id.* col. 4, ll. 21–30. Fortmann also discloses using humidity control logic to control a water heater. *Id.* col. 4, ll. 60–62. Fortmann also discloses monitoring the length of time a door has remained open in connection with adjusting the temperature and relative humidity within the steamer. *Id.* col. 3, ll. 1–32. However, nowhere, insofar as we are able to determine, does Fortmann disclose calculating an estimated humidity level based in part on temperature. In our opinion, the passage of Fortmann relied on by the Examiner in the Final Rejection fails to provide evidentiary support for the

Examiner's findings of fact. *See* Final Action 12 (citing Fortmann, col. 7, ll. 7–15).

In view of the foregoing, we determine that the Examiner's findings of fact are not supported by a preponderance of the evidence and that the Examiner's legal conclusion of unpatentability based on such erroneous fact finding is not well-founded. Accordingly, we do not sustain the Examiner's unpatentability rejection of claim 1.

*Claims 2, 3, 5–7, 15, and 18*

Claims 2 and 3 depend from claim 1. Claims App. Claim 5 is an independent claim that, like claim 1, contains a limitation directed to determining a humidity level based in part on a temperature of a refrigeration compartment. *Id.* Claims 6 and 7 depend from claim 5. *Id.* Claim 15 is an independent claim that, like claim 1, contains a limitation directed to determining a humidity level based in part on a temperature of a refrigeration compartment. *Id.* Claim 18 depends from claim 15.

The Examiner's rejection of these claims suffers from the same infirmity that was identified above with respect to claim 1. Thus, for essentially the same reason expressed above in connection with claim 1, we do not sustain the rejection of claims 2, 3, 5–7, 15, and 18.

*Unpatentability of Claims 4, 8, 9, 17, 19, and 20  
over Hwang Combined with Sweetman or Dodge*

Claim 4 depends from claim 1. Claims App. Claims 8 and 9 depend from claim 5. *Id.* Claims 17, 19, and 20 depend from claim 15. *Id.* The Examiner's rejection of these claims suffers from the same infirmity that was identified above with respect to claim 1, which infirmity is not removed by any findings of fact based on either the Sweetman or Dodge reference.

Thus, for essentially the same reason expressed above in connection with claim 1, we do not sustain the rejection of claims 4, 8, 9, 17, 19, and 20.

*Unpatentability of Claims 10–14  
over Hwang, Fortmann, Sweetman, and Dodge*

Claim 10 is an independent claim and claims 11–14 depend directly therefrom. Claims App. As with claim 1, claim 10 contains a limitation directed to determining a humidity level based in part on a temperature of a refrigeration compartment. *Id.* The Examiner’s rejection of these claims suffers from the same infirmity that was identified above with respect to claim 1, which infirmity is not removed by any findings of fact based on either Sweetman or the Dodge reference. Thus, for essentially the same reason expressed above in connection with claim 1, we do not sustain the rejection of claims 10–14.

CONCLUSION

In summary:

<b>Claims Rejected</b>	<b>§</b>	<b>Reference(s)/Bases</b>	<b>Aff’d</b>	<b>Rev’d</b>
1-15, 17-20	112	Indefiniteness		1-15, 17-20
1-15, 17-20	112	Non-Enablement		1-15, 17-20
1-3, 5-7, 15, 18	103	Hwang, Fortmann		1-3, 5-7, 15, 18
4, 8, 19	103	Hwang, Fortmann, Sweetman		4, 8, 19
9, 17, 20	103	Hwang, Fortmann, Dodge		9, 17, 20
10-14	103	Hwang, Fortmann, Sweetman, Dodge		10-14
<b>Overall Outcome</b>				1-15, 17-20

REVERSED