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Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO. Includes application details for Bertrand Demolliens and examination information for King, Brian M.

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte BERTRAND DEMOLLIENS,
HERVE LE BIHAN, and XAVIER TRAVERSAC

Appeal 2018-000961
Application 14/111,242
Technology Center 3700

Before MICHELLE R. OSINSKI, FRANCES L. IPPOLITO, and
PAUL J. KORNICZKY, *Administrative Patent Judges*.

KORNICZKY, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant¹ appeals from the Examiner's decision, as set forth in the Final Office Action dated February 17, 2017 ("Final Act."), rejecting claims 15–21.² We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM and designate the affirmance as a NEW GROUND OF REJECTION pursuant to 37 C.F.R. § 41.50(b).

THE CLAIMED SUBJECT MATTER

The claims are directed to a process for liquefying a carbon dioxide-rich gas. Claim 15, the only independent claim on appeal, is reproduced below:

15. [A] A process for liquefying a gas containing at least 60 mol % of carbon dioxide and at least one impurity lighter than carbon dioxide in order to produce at least one liquid product

[B] wherein a first feed gas containing at least 60 mol % of carbon dioxide and at least one light impurity at a feed pressure, wherein the first feed gas has a concentration of light impurities, is cooled in order to form a liquid or supercritical flow,

[C] at least a portion of the liquid or supercritical flow is cooled in a heat exchanger to form a cycle fluid having a cycle pressure,

[D] the cycle fluid is divided into at least two fractions comprising a first fraction and an auxiliary fraction,

¹ We use the word "Appellant" to refer to "applicant" as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procédés Georges Claude. Appeal Brief, dated July 17, 2017 ("Appeal Br."), at 3.

² Claims 1–14 and 22–28 are cancelled. Appeal Br. 10–11 (Claims App.).

[E] the first fraction, having the same concentration of light impurities as the first feed gas, being expanded down to a first pressure in a valve in order to form a biphasic mixture and then sent to a phase separator,

[F] the liquid fraction of the phase separator is vaporized so as to form a vaporized gas in the exchanger, the vaporized gas then being expanded from the first pressure to a second pressure in an expansion means and then compressed in a cycle compressor and mixed with the first feed gas,

[G] the auxiliary fraction either comprising the liquid product or one of the liquid products or being treated by separation at sub-ambient temperature in at least one separation means to form the liquid product or one of the liquid products, and

[H] wherein the first pressure is varied as a function of the amount of impurities lighter than the carbon dioxide contained in the carbon dioxide-rich gas,

[I] wherein the first pressure is varied so that the higher the concentration of light impurities is, the higher the first pressure is.

For ease of reference and to identify individual process steps, we have added bracketed letters and paragraph indentations.

REJECTIONS

The Examiner made the following rejections:

1. Claims 15–21 stand rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement.
2. Claims 15–21 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention.

Appellant seeks our review of these rejections.

DISCUSSION

Rejection 1: Claims 15–21 as Failing to Comply with the Written Description

Claim 15[E] recites “the first fraction, having the same concentration of light impurities as the first feed gas.” The Examiner states that this limitation “is considered to be new matter as it does not have support in the specification.” Final Act. 3. The Examiner explains that “the feed gas stream is stream 6, [and] the cycle stream fractions are streams 43 and presumably streams 5, 7, or 15” and that “nowhere in the specification or the drawings is any detail given to the split of this stream and as such there is no support for ‘the first fraction, having the same concentration of light impurities as the feed gas’ because there is no suggestion of any mechanism, or system that splits the streams such that the concentrations remain constant.” *Id.*

Whether a specification complies with the written description requirement of 35 U.S.C. § 112, first paragraph, is a question of fact and is assessed on a case-by-case basis. *See, e.g., Purdue Pharma L.P. v. Faulding, Inc.*, 230 F.3d 1320, 1323 (Fed. Cir. 2000) (citing *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d 1555, 1561 (Fed. Cir. 1991)). The disclosure, as originally filed, need not literally describe the claimed subject matter (i.e., using the same terms or *in haec verba*) in order to satisfy the written description requirement. But the Specification must convey with reasonable clarity to those skilled in the art that, as of the filing date, Appellant was in possession of the claimed invention. *See id.*

Appellant argues that the Examiner’s rejection is erroneous because the first feed gas is the stream exiting exchanger E4, not the Examiner’s

stream 6. Appeal Br. 5–6. Appellant states that “[e]lement 6, identified by the examiner as the feed stream, is a letdown valve for one of the above five streams (stream 4).” *Id.* Appellant also explains that the “‘first feed gas’ (the combination of 1, 1A, and 1B) is simply compressed (C3, C4) and cooled (R3, R4, E4, and E1) prior to being split into ‘at least five fraction’.” *Id.* at 7. Appellant argues that the “five fractions *must have exactly the same composition* as the stream exiting E4, since there are no devices for altering composition in this stream up to this point.” *Id.* We agree.

The Specification states that “supercritical fluid at 83 bar abs is divided into at least five fractions.” Spec. 6:9–10. We agree with Appellant that a person of ordinary skill in the art would understand that the impurities in the supercritical fluid and the five fractions would remain the same unless there is explicit modification to the fraction streams. With respect to claim 1, simply dividing the first feed gas or supercritical fluid into a first fraction and an auxiliary fraction, without more, would not necessitate changing the concentration of light impurities in the three streams. The Examiner does not provide any evidence or technical reasoning, such as equipment described in the Specification or the flow diagram in Figure 1, which indicates that dividing first feed gas or supercritical fluid 83 into the fractions changes the concentration of light impurities in the first feed gas and the fractions. We find that Appellant was in possession of the claimed invention.

For these reasons, the rejection of claims 15–21 under 35 U.S.C. § 112, first paragraph, is not sustained.

Rejection 2: Claims 15–21 as Being Indefinite

Appellant argues claims 15–21 as a group. Appeal Br. 8. We select independent claim 15 as the representative claim, and claims 16–21 stand or fall with claim 15. 37 C.F.R. § 41.37(c)(1)(iv).

The Examiner rejects claim 15 as being indefinite. Because Appellant does not address the substance of the rejection, the Examiner’s rejection is summarily affirmed. Appeal Br. 8.

The Examiner finds that limitations 15[B] and 15[E] are indefinite, but, for the reasons discussed below, we believe that claim 15 also is indefinite for other additional reasons. To ensure that Appellant is provided a fair opportunity to respond, we designate our affirmance of the rejection of claims 15–21 as a NEW GROUND OF REJECTION pursuant to 37 C.F.R. § 41.50(b) to the extent that our determination is based on the additional reasons presented for the first time herein.

Before we address the Examiner’s rejection, we note that claim 15 is a process claim that purportedly comprises a series of individual process step limitations to liquefy a gas. We note that claim 15 does not contain a transition phrase such as “comprising,” “consisting of”, and the like. In addition, it is difficult to understand where in claim 15, as presently written, one process step starts and ends, and where the next process step begins. To address the infirmities in claim 15, we have added bracketed letters and paragraph indentations in claim 15 reproduced above. Appellant should consider whether each bracketed paragraph is an individual process step which could begin with the word “wherein” to delineate more clearly an individual process step.

Claim 15[B] recites “wherein a first feed gas containing at least 60 mol % of carbon dioxide and at least one light impurity at a feed pressure, wherein the first feed gas has a concentration of light impurities, is cooled in order to form a liquid or supercritical flow.” The Examiner finds that, because of the addition of the phrase “wherein the gas has a concentration of light impurities,” it is unclear what is being “cooled in order to form a liquid or supercritical flow.” Final Act. 3. We agree. As presently written, the phrase “is cooled in order to form a liquid or supercritical flow” could refer to “a first feed gas,” the “carbon dioxide,” the “at least one impurity,” or the “light impurities.” Because multiple interpretations are plausible, the claims are indefinite. *Ex Parte Miyazaki*, 89 USPQ2d 1207, 1211 (BPAI 2008) (precedential) (“if a claim is amenable to two or more plausible claim constructions, the USPTO is justified in requiring the applicant to more precisely define the metes and bounds of the claimed invention by holding the claim unpatentable under 35 U.S.C. § 112, second paragraph, as indefinite”). Here, Appellant is in the best position to more precisely define the metes and bounds of his claim.

We also note that the phrase “wherein a first feed gas containing at least 60 mol % of carbon dioxide and at least one light impurity at a feed pressure” is unclear because it is not a process step; it merely states the composition of the feed gas without tying it to a function or process step. For example, it is unclear whether Appellant intends to recite a process for liquefying a gas “wherein a first feed gas contains (i) at least 60 mol % of carbon dioxide, (ii) at least one light impurity at a feed pressure, and (iii) a concentration of light impurities and is cooled in order to form a liquid or supercritical flow”, or some other process step.

Claim 15[E] recites “the first fraction, having the same concentration of light impurities as the first feed gas, being expanded down to a first pressure in a valve in order to form a biphasic mixture and then sent to a phase separator.” The Examiner states that it is unclear what is being “expanded down” “because of the addition of ‘having the same concentration . . .’ between that and the first fraction.” Final Act. 4. We agree. As presently written, items such as the “first feed gas,” “light impurities,” and the “first fraction” could be the gas that is “expanded down.” For example, it is unclear whether Appellant intends to recite a process for liquefying a gas “wherein the first fraction has the same concentration of light impurities as the first feed gas and is expanded down to a first pressure in a valve in order to form a biphasic mixture and then sent to a phase separator”, or some other process step.

We also note the phrase “expanded down” is unclear and is not recited in the Specification. How is a gas (or a gas pressure) “expanded down”? The term “expanded” connotes that the gas pressure is increased or expanded “up,” whereas the term “down” denotes that the gas pressure is decreased or the gas is compressed.

Claim 15[F] recites “the liquid fraction of the phase separator is vaporized so as to form a vaporized gas in the exchanger, the vaporized gas then being expanded from the first pressure to a second pressure in an expansion means and then compressed in a cycle compressor and mixed with the first feed gas.” The terms “liquid fraction” and “exchanger” lack antecedent basis.

Claim 15[G] recites “the auxiliary fraction either comprising the liquid product or one of the liquid products or being treated by separation at

sub-ambient temperature in at least one separation means to form the liquid product or one of the liquid products.” This limitation is incomprehensible. First, the phrase that the auxiliary fraction comprises either (i) “the liquid product,” (ii) “one of the liquid products,” ***or*** (iii) “being treated by separation . . .” is incomprehensible. How can “the auxiliary fraction comprise[] . . . either being treated by separation”? Second, while claim 15[A] recites “at least one liquid product,” there is no antecedent basis for “the liquid product” and “one of the liquid products” in claim 15[G]. Also, the phrase appears to be redundant because “one of the liquid products” encompasses the phrase “the liquid product.” Third, the phrase in claim 15[G] is not a process step — it is unclear whether Appellant intends to recite a process for liquefying a gas “wherein the auxiliary fraction comprises at least one liquid product and is treated by separation . . .” or some other process step. Finally, claim 15[G] does not identify the source of the “liquid product(s),” which is supposed to be the end result of the process.

Claim 15[H] recites “wherein the first pressure is varied as a function of the amount of impurities lighter than the carbon dioxide contained in the carbon dioxide-rich gas.” There is no antecedent basis for “the carbon dioxide-rich gas.” It is unclear whether Appellant intends to refer to the “gas” recited in claim 15[A] or the “first feed gas” recited in claim 15[B]?

For the above reasons, claim 15, and claims 16–21 which depend from claim 15, are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite.

CONCLUSION

In summary:

Claims Rejected	Basis (35 U.S.C.)	Affirmed	Reversed	New Ground
	§ 112, first paragraph		15–21	
	§ 112, second paragraph	15-21		15–21
Overall Outcome		15–21		15–21

For the above reasons, we AFFIRM the Examiner’s rejection of claims 15–21 under 35 U.S.C. § 112, second paragraph, as being indefinite, and we designate our affirmance as a NEW GROUND OF REJECTION pursuant to 37C.F.R. § 41.50(b) only to the extent that the basis of our determination rests on additional reasons presented for the first time herein and not presented in the Final Action.

We REVERSE the Examiner’s rejection of claim 15–21 under 35 U.S.C. § 112, first paragraph.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv).

FINALITY AND RESPONSE

This decision contains a new ground of rejection pursuant to 37 C.F.R. § 41.50(b). 37 C.F.R. § 41.50(b) provides “[a] new ground of rejection pursuant to this paragraph shall not be considered final for judicial review.”

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37 C.F.R. § 41.50(b) also provides that the Appellant, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of the appeal as to the rejected claims:

(1) *Reopen prosecution*. Submit an appropriate amendment of the claims so rejected or new Evidence relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the proceeding will be remanded to the examiner. . . .

(2) *Request rehearing*. Request that the proceeding be reheard under § 41.52 by the Board upon the same Record. . . .

AFFIRMED; 37 C.F.R. §41.50(b)