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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/738,973	01/10/2013	Hanns WOCHNER	W1154/20065	5649
3000	7590	01/30/2020	EXAMINER	
CAESAR RIVISE, PC 7 Penn Center, 12th Floor 1635 Market Street Philadelphia, PA 19103-2212			QI, HUA	
			ART UNIT	PAPER NUMBER
			1714	
			NOTIFICATION DATE	DELIVERY MODE
			01/30/2020	ELECTRONIC

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte HANNES WOCHNER and ROBERT BAUMANN

Appeal 2019-001455
Application 13/738,973
Technology Center 1700

Before JAMES C. HOUSEL, GEORGE C. BEST, and
JEFFREY R. SNAY, *Administrative Patent Judges*.

BEST, *Administrative Patent Judge*.

DECISION ON APPEAL

Pursuant to 35 U.S.C. § 134(a), Appellant¹ appeals from the Examiner's decision to reject claims 1, 3, 4, 7, 9, 12, and 14–22 of Application 13/738,973. Final Act. (April 16, 2018). We have jurisdiction under 35 U.S.C. § 6.

For the reasons set forth below, we *reverse*.

BACKGROUND

The '973 Application describes a process for determining the surface contamination of polycrystalline silicon. Spec. 1. In particular, the method

¹ We use the word “Appellant” to refer to “Applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies Wacker Chemie AG as the real party in interest. Appeal Br. 2

described in the Specification allows determination of the surface contamination of polycrystalline silicon caused by comminution and other process steps such as storage, transport, cleaning, and packaging. *Id.* at 6.

Claim 1—the sole independent claim on appeal—is representative of the '973 Application's claims and is reproduced below from the Claims Appendix of the Appeal Brief.

1. A process for determining surface of polycrystalline silicon, comprising steps of
 - a) providing two polycrystalline silicon rods by deposition in a Siemens reactor;
 - b) determining a first concentration of non-carbon contaminants and a first concentration of carbon contaminants in a first rod of the two polycrystalline silicon rods after the deposition, wherein: i) a first rod wafer is removed from the first rod, ii) the first rod wafer is analyzed by FTIR to determine the first concentration of carbon contaminants, and iii) the first rod after removal of the first rod wafer is converted by a float zone process to a first monocrystalline rod, and the first concentration of non-carbon contaminants is determined by photoluminescence on a first monocrystalline rod wafer removed from the first monocrystalline rod;
 - c) conducting a second rod of the two polycrystalline silicon rods through at least one system for further processing polycrystalline silicon rods, wherein the further processing comprises comminution to provide rod pieces or polysilicon fragments, wherein the second rod is not comminuted and the first rod is not conducted through the at least one system;
 - d) determining contaminants in the second rod by processing the second rod by a float zone process to provide a second monocrystalline rod;
 - e) removing a FTIR wafer and a photoluminescence wafer from the second monocrystalline rod;
 - f) performing a FTIR analysis of the FTIR wafer to determine a second concentration of carbon contaminants;

- g) performing a photoluminescence analysis of the photoluminescence wafer to determine a second concentration of non-carbon contaminants; and
- h) determining the surface contamination of polycrystalline silicon resulting from the at least one system and a system environment from a difference between the first concentration of the non-carbon contaminants and the second concentration of the non-carbon contaminants.

Appeal Br. 13.

REJECTIONS

On appeal, the Examiner maintains² the following rejections:

1. Claims 1, 3, 4, 7, 9, 12, and 14–22 are rejected under 35 U.S.C. § 112, ¶ 1, as lacking written description support. Final Act. 2–3.
2. Claims 1, 3, 4, 7, 9, 12, and 14–21 are rejected under 35 U.S.C. § 112, ¶ 2, as indefinite. Final Act. 3–6.
3. Claims 1, 3, 4, 9, and 14–22 are rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Hwang,³ Mozer,⁴ Wochner,⁵ and Bourbina.⁶ Final Act. 7–12.

² The Examiner has withdrawn the rejection of claim 22 under 35 U.S.C. § 112, ¶ 2, as indefinite. Answer 4.

³ Lydia L. Hwang et al., *Measurement of Carbon Concentration in Polycrystalline Silicon Using FTIR*, 138 J. Electrochem. Soc. 576–581 (1991).

⁴ US 2009/0311161 A1, published December 17, 2009.

⁵ US 2010/0154357 A1, published June 24, 2010.

⁶ US 5,361,128, issued November 1, 1994.

4. Claims 7 and 12 are rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Hwang, Mozer, Wochner, Bourbina, and Spangler.⁷ Final Act. 12–13.

DISCUSSION

A. *Rejection of claims 1, 3, 4, 7, 9, 12, and 14–22 for lack of written description support.*

1. Claims 1, 7, and 16–21

The Examiner found that claims 1, 7, and 16–21 contain negative limitations, each of which lacks basis in the original disclosure. Final Act. 2–3.

Appellant argues that the Examiner has failed to make a prima facie showing of lack of written description support because the Final Action shows no consideration of what is inherently taught by the original disclosure when read in light of conventional wisdom in the art. Appeal Br. 5.

To comply with the written description requirement, an applicant’s specification must convey with reasonable clarity to a person of ordinary skill in the art that, as of the filing date, the applicant was in possession of the claimed invention. *Carnegie Mellon Univ. v. Hoffmann-LaRoche Inc.*, 541 F.3d 1115, 1122 (Fed. Cir. 2008). “Negative claim limitations are adequately supported when the specification describes a reason to exclude the relevant limitation. Such written description support need not rise to the level of disclaimer. In fact, it is possible for the patentee to support both the

⁷ US 2006/0000409 A1, published January 5, 2006.

inclusion and exclusion of the same material.” *Santarus, Inc. v. Par Pharm., Inc.*, 694 F.3d 1344, 1351 (Fed. Cir. 2012).

Appellant presents specific arguments for reversal of the rejection with respect to claim 1, claims 7 and 12 as a group, and claims 16–21 as a group. Appeal Br. 5–6. Appellant does not mention—let alone present argument regarding—the remaining claims subject to this ground of rejection. *Id.* at 4–6. We shall assume that claims 3, 4, 9, 14, and 15 will stand or fall with claim 1, from which they ultimately depend.

First, Appellant argues that “[t]he limitation in claim 1, wherein ‘the second rod is not comminuted and the first rod is not conducted through the at least one system’ finds support in original claim 1 and the specification at page 7, lines 28-34 . . . [and] page 8, lines 18-32.” *Id.* at 5.

We begin by considering the language of original claim 1, which reads:

1. A process for determining surface contamination of polycrystalline silicon, comprising the steps of
 - a) providing two polycrystalline silicon rods by deposition in a Siemens reactor;
 - b) determining contaminants in a first rod of the two rods immediately after the deposition;
 - c) conducting a second rod of the two rods through at least one system *in which polycrystalline silicon rods are processed further to give rod pieces or polysilicon fragments*, optionally cleaned, stored or packed;
 - d) then determining contaminants *in the second rod*; wherein a difference in the contaminants determined in the first and second rods determines the surface contamination of polycrystalline silicon resulting from the at least one system and a system environment.

Spec. 15 (indentation and emphasis added).

According to the Examiner, the language in step c) would lead a person of ordinary skill in the art to recognize that the claimed second rod is processed to give rod pieces or polysilicon fragments. Answer 5. The Examiner, therefore, finds that a person of ordinary skill in the art would not have understood Appellant to be in possession of the claim limitation “the second rod is not comminuted and the first rod is not conducted through the at least one system.” *Id.* The Examiner expressly states that the language of originally-filed claim 1 “is conflicting with the instantly recited limitation” at issue. *Id.*

We agree with the Examiner that, considered in a vacuum, a person of ordinary skill in the art would not have understood Appellant to be in possession of the claim limitation at issue based on the language in the originally-filed claim 1. We, however, do not agree with the Examiner that the language necessarily conflicts with the claim limitation at issue. The language in step c) describes the function of the system, but does not necessarily require that the second rod be comminuted when it passes through the system. In particular, we note that step d) requires “determining contaminants in the second rod” rather than determining the contaminants in the pieces or fragments of the second rod. Thus, step d) could be interpreted as specifying that the second rod passed through the system recited in step c) without comminution. We, therefore, determine that originally-filed claim 1 is ambiguous rather than supporting the finding that Appellant was not in possession of the claimed invention at the time of filing.

Next, we turn to the '973 Application's Specification.

The Examiner found that the limitation at issue is not supported by the portions of the Specification cited by Appellant. *See* Answer 5–6 (discussing Spec. 7–8).

We have reviewed the Specification and come to a different determination than did the Examiner. In describing the testing procedure, the Specification makes repeated references to “the contaminated rod” when referring to the second rod after it had been passed through the systems for production of polycrystalline silicon chunks. *See* Spec. 8–9. This portion of the Specification makes no reference to pieces or chunks of the second rod. *Id.* We, therefore, determine that the Specification would have conveyed with reasonable clarity to a person having ordinary skill in the art at the time of the invention that Appellant possessed the limitation at issue.

We, therefore, reverse the rejection of claim 1 as lacking written description support. Accordingly, we also reverse the rejection of claims 3, 4, 9, 14, and 15 for lack of written description support.

Second, Appellant argues that “[t]he limitation in claims 7 and 12, wherein ‘the second rod is packed in a polyethylene bag but is not comminuted, cleaned or stored’ find support in original claim 7, the specification at page 8, lines 18-32 . . . and at page 10, lines 1-14.” Appeal Br. 5–6.

For ease of reference, we reproduce originally-filed claim 7 below.

7. The process as claimed in claim 1, wherein the at least one system in step c) is/are for comminution, for cleaning, for storage or for packaging of polysilicon, and *wherein the rod, once it has been conducted through the at least one system, is packed in a polyethylene bag.*

Spec. 16.

The Examiner found that neither originally-filed claim 7 nor the disclosure support the limitation requiring that “the second rod is packed in a polyethylene bag but is not comminuted, cleaned or stored.” Answer 6–7.

We disagree with the Examiner's finding. As discussed above, we find that the Specification's repeated references to "the contaminated rod" conveys possession of the invention of claims 7 and 12 with reasonable clarity. *See* Spec. 8–10. Thus, we reverse the rejection of claims 7 and 12 as lacking written description support.

Third, claim 16–21 are directed to testing of other components in the polycrystalline silicon rod processing system. Appellant argues that the limitations at issue are suggested by the Specification at page 10, ll. 1–14. Appeal Br. 6.

We have reviewed the portion of the Specification cited by Appellant. This portion of the Specification states that the inventors' process "also enables monitoring and optimization of individual production steps with regard to surface contamination." Spec. 10. Next, the Specification provides exemplary descriptions of some of the steps that might be monitored and optimized. *Id.*

In view of this broad disclosure, we agree that a person having ordinary skill in the art would have understood the inventors to have been in possession of the subject matter of claims 16–21 at the time of filing. We, therefore, reverse the rejection of claims 16–21 as lacking written description support.

2. Claim 22

The Examiner also found that claim 22 lacks written description support because the limitation "a difference between the first concentration of carbon contaminants and the second concentration of carbon contaminants" is not disclosed in the Specification. Final Act. 3.

Appellant argues that support for this limitation is found in the Specification. Appeal Br. 6 (citing Spec. 9).

We agree with Appellant that the Specification discloses the step of determining the differences between the concentration of carbon contaminants in the first rod and the concentration of carbon contaminants and the second rod. *See* Spec. 9. We, therefore, reverse the rejection of claim 22 as lacking written description support.

B. Rejection of claims 1, 3, 4, 7, 9, 12, and 14–21 as indefinite.

The Examiner maintains the specific rejection of independent claim 1 and dependent claims 7, 12, and 14 as indefinite. Final Act. 3–6. We separately address each of these claims below. Claims 3, 4, 9, and 15–21 are rejected solely because they depend from claim 1. *Id.* at 4. We, therefore, group claims 3, 4, 9, at 15–21 with claim 1. 37 C.F.R. § 41.37(c)(1)(iv).

1. Claims 1, 3, 4, 9, and 15–21

The Examiner rejected claims 1 as indefinite for any of three independent reasons. Final Act. 4.

First, the Examiner concluded that the phrase “c) conducting a second rod of the two polycrystalline silicon rods through at least one system for further processing polycrystalline silicon rods” is indefinite. *Id.* In particular, the Examiner states that it is unclear whether “polycrystalline silicon rods” in the phrase “for further processing polycrystalline silicon rods” refers to the previously recited “two polycrystalline silicon rods” or other polycrystalline silicon rods. *Id.*

We disagree with the Examiner’s determination that this phrase renders claim 1 indefinite. In this case, the phrase “for further processing polycrystalline silicon rods” modifies the noun “system,” identifying the

type of system at issue. As such, this instance of the words “polycrystalline silicon rods” refers to polycrystalline silicon rods generally. This is consistent with the claimed omission of the words “the” or “said” prior to “polycrystalline silicon rods.”

We, therefore, cannot affirm the rejection of claim 1 as indefinite on this basis.

Second, the Examiner concluded that the phrase “c) conducting a second rod . . . through at least one system for further processing polycrystalline silicon rods” is indefinite. Final Act. 4. In particular, the Examiner concluded that it is not clear what “at least one system” means. *Id.*

As discussed above, the prepositional phrase “for further processing polycrystalline silicon rods” modifies the noun “system.” Thus, it is clear that the system in question is a system used to process polycrystalline silicon rods generally. As the balance of step c) recites, the further processing in question comprises comminution of polycrystalline silicon rods.

We, therefore, do not affirm the rejection of claim 1 as indefinite on this basis.

Third, the Examiner concluded that the phrase “determining contamination in the second rod by a float zone process to provide a second monocrystalline rod” is indefinite. Final Act. 4. In particular, the Examiner determined that “this limitation is a process for providing a second monocrystalline silicon rod. It is not clear how this process can determine contamination in the second rod.” Final Act. 4.

We agree with the Examiner that this portion of claim 1 is not a model of clarity. We, however, disagree with the Examiner’s determination that claim 1 is indefinite. As Appellant argues, after review of the Specification, a person of ordinary skill in the art would understand the steps e), f), and g)

of claim 1 specifically set forth the way in which contamination of the second monocrystalline silicon rod is determined. *See* Appeal Br. 7 (citing Spec. 9).

Thus, we do not affirm the rejection of claim 1 as indefinite on this basis.

* * * *

In view of the foregoing, we reverse the rejection of claims 1, 3, 4, 9, and 15–21 as indefinite.

2. Claim 7

Claim 7 of the '973 Application reads:

7. The process as claimed in claim 1, wherein the further processing conducted by the at least one system in step c) comprises *comminution*, cleaning, storage and packaging of polysilicon, wherein the second rod is packed in a polyethylene bag but is not comminuted, cleaned or stored.

Appeal Br. 14 (emphasis added).

The Examiner rejected claim 7 as indefinite for three reasons. We address these reasons below.

First, the Examiner rejected claim 7 as indefinite by virtue of its dependence from claim 1. Final Act. 4. For the reasons set forth above, we reverse the rejection of claim 1 as indefinite. We, therefore, cannot affirm the rejection of claim 7 as indefinite on this basis.

Second, the Examiner also rejected claim 7 as indefinite because “it is not clear whether the ‘comminution’ in claim 7 is referring to the previously recited ‘comminution’ in parent claim 1 or a different comminution.” Final Act. 4–5.

We determine that this rejection is based upon a misunderstanding of the function of claim 7. Claim 7 is a dependent claim. Thus, claim 7 further

limits the open language in claim 1's phrase "wherein the further processing comprises comminution" by specifying additional processing steps that must be present—namely cleaning, storage, and packaging of the polysilicon—for a process to fall within the scope of claim 7. *See* 35 U.S.C. § 112, ¶ 4 (“[A] claim in dependent form shall contain a reference to a claim previously set forth and then specify a further limitation of the subject matter claimed.”). Because claim 7 sets forth a further limitation of claim 1, it is clear that the comminution referred to in claim 7 is the same comminution recited in parent claim 1.

Thus, we cannot affirm the rejection of claim 7 as indefinite on this basis.

Third, the Examiner determined that it is not clear which polysilicon rod is being comminuted, cleaned, stored, and packaged. Final Act. 5. This basis for rejection is also the result of a misunderstanding of the function of claim 7 as a dependent claim. Because a dependent claim contains all of the limitations of the parent claim, 35 U.S.C. § 112, ¶ 4, claim 1's identification of the second polycrystalline silicon rod as being subject to the processing identified in step c) still applies.

We, therefore, determine that we cannot affirm the rejection of claim 7 as indefinite on this basis.

In sum, we reverse the rejection of claim 7 as indefinite.

3. Claim 12

Claim 12 reads:

12. The process as claimed in claim 9, wherein the further processing conducted by the at least one system in step c) comprises *comminution*, cleaning, storage and packaging of poly silicon, wherein the second rod is packed in a polyethylene bag but is not comminuted, cleaned or stored.

Appeal Br. 14 (emphasis added).

First, the Examiner rejected claim 12 as indefinite by virtue of its dependence from claim 1. Final Act. 4. For the reasons set forth above, we reverse the rejection of claim 1 as indefinite. We, therefore, also cannot affirm the rejection of claim 12 as indefinite on this basis.

Second, the Examiner further rejected claim 12 using essentially the same reasoning used to reject claim 7. As discussed above, this reasoning is faulty and cannot support a rejection of claim 12 as indefinite.

In sum, we reverse the rejection of claim 12 as indefinite.

4. Claim 14

Claim 14 reads:

14. The process as claimed in claim 9, wherein in step c) the second rod is conducted through a comminution system and a packaging system.

Appeal Br. 14 (emphasis added).

The Examiner rejected claim 14 as indefinite for two reasons.

First, the Examiner rejected claim 14 as indefinite by virtue of its dependence from claim 1. Final Act. 4. For the reasons set forth above, we reverse the rejection of claim 1 as indefinite. We, therefore, also cannot affirm the rejection of claim 14 as indefinite on this basis.

Second, the Examiner further rejected claim 14 as indefinite because “[i]t is not clear whether ‘the second rod’ is comminuted or not.” Final Act. 5. As discussed above, a dependent claim contains all of the limitations of the parent claim. 35 U.S.C. § 112, ¶ 4. Thus, claim 1’s limitation that “the second rod is not comminuted” is still effective. We, therefore, cannot affirm the rejection of claim 14 on this basis.

In sum, we reverse the rejection of claim 14 as indefinite.

5. Summary

For the reasons set forth above, we reverse the rejection of claims 1, 3, 4, 7, 9, 12, and 14–21 as indefinite.

C. Rejection of claims 1, 3, 4, 9, and 14–22 as unpatentable over the combination of Hwang, Mozer, Wochner, and Bourbina.

Appellant argues for reversal of this rejection on the basis of limitations in claim 1. Appeal Br. 9–10. Appellant stipulates that claims 3 and 22 stand or fall with claim 1. *Id.* at 9. Appellant attempts to argue for the separate patentability of claims 4, 9, and 14–21. *See id.* at 10–11. These “arguments” consist of recitation of the additional limitation recited in the claim followed by a bare assertion that the cited references do not disclose or suggest that limitation. *Id.* This is not sufficient to amount to separate arguments for patentability of claims 4, 9, and 14–21. *See* 37 C.F.R. § 41.37(c)(1)(iv) (“A statement which merely points out what the claim recites will not be considered an argument for separate patentability of the claim.”). Thus, claims 4, 9, and 14–21 also stand or fall with claim 1.

In rejecting claim 1, the Examiner found that the combination of Hwang, Mozer, and Wochner does not describe or suggest measuring non-carbon contaminants. Final Act. 9. The Examiner further found that Bourbina describes a method for analyzing non-carbon contaminants in polysilicon. *Id.* at 9–10. The Examiner also found that a person having ordinary skill in the art would have modified the process described or suggested by the combination of Hwang, Mozer, and Wochner to analyze silicon contamination and provide appropriate silicon materials for use in other applications. *Id.* at 10.

Appellant argues that the rejection of claim 1 should be reversed because the cited references do not describe or suggest measuring the concentration of non-carbon contaminants in polycrystalline silicon for any purpose. Appeal Br. 9. Appellant further argues that

the references do not teach or suggest a process for determining surface contamination of polycrystalline silicon, wherein a second rod of two polycrystalline silicon rods being tested is conducted through at least one system for further processing polycrystalline silicon rods, wherein the further processing comprises comminution to provide rod pieces or polysilicon fragments, *wherein the second rod is not comminuted* and the first rod is not conducted through the at least one system, as specified in claim 1.

Id. at 10 (emphasis added).

We agree that the Examiner has not found that the prior art describes or suggests a process for determining surface contamination of a silicon rod by passing a polycrystalline silicon rods through a comminution apparatus without comminuting the rod. Nor has the Examiner explained why such a process step would have been obvious to a person having ordinary skill in the art at the time of the invention.

On the record before us, it appears that the inventors of the '973 Application were the first to recognize that the environment in which various processes—e.g., comminution, stored, and transport—take place also influenced surface contamination of the silicon. *See* Spec. 6. As the Federal Circuit has observed, “an invention can often be the recognition of a problem itself.” *Leo Pharm. Prods., Ltd. v. Rea*, 726 F.3d 1346, 1353 (Fed. Cir. 2013).

For the reasons set forth above, the Examiner has failed to establish a *prima facie* case of unpatentability for claim 1. We, therefore, are

constrained to reverse the rejection of claims 1, 3, 4, 9, and 14–22 as obvious over the combination of Hwang, Mozer, Wochner, and Bourbina.

D. Rejection of claims 7 and 12 as unpatentable over the combination of Hwang, Mozer, Wochner, Bourbina, and Spangler.

Claims 7 and 12 depend from claim 1. Because we have reversed the rejection of claim 1 and the Examiner did not find that Spangler cured the defects in the rejection of claim 1, we also reverse the rejection of claims 7 and 12.

CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1, 3, 4, 7, 9, 12, 14–22	112, ¶ 1	Written Description		1, 3, 4, 7, 9, 12, 14–22
1, 3, 4, 7, 9, 12, 14–21	112, ¶ 2	Indefiniteness		1, 3, 4, 7, 9, 12, 14–21
1, 3, 4, 9, 14–22	103(a)	Hwang, Mozer, Wochner, Bourbina		1, 3, 4, 9, 14–22
7, 12	103(a)	Hwang, Mozer, Wochner, Bourbina, Spangler		7, 12
Overall Outcome				1, 3, 4, 7, 9, 12, 14–22

REVERSED