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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* RONALD STRYBOS

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Appeal 2017-006407  
Application 14/753,795<sup>1</sup>  
Technology Center 3600

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Before LISA M. GUIJT, ERIC C. JESCHKE, and BRENT M. DOUGAL,  
*Administrative Patent Judges.*

JESCHKE, *Administrative Patent Judge.*

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellant seeks review under 35 U.S.C. § 134(a) of the Examiner's decision, as set forth in the Final Office Action dated July 29, 2016 ("Final Act."), rejecting claims 1–3 and 7. We have jurisdiction under 35 U.S.C. § 6(b).

*We affirm.*

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<sup>1</sup> Air Liquide Large Industries U.S. LP ("Appellant") is the applicant under 37 C.F.R. § 1.46 and is identified as the real party in interest. Appeal Br. 3.

## BACKGROUND<sup>2</sup>

The disclosed subject matter relates to solution mining under an inert gas. Spec., Title. Claim 1, the sole independent claim on appeal, is reproduced below, with emphasis added:

1. A method for solution mining comprising:
  - providing a cased borehole located within a salt bed,
  - injecting an aqueous liquid into the cased borehole at a first pressure, in order to expose the salt bed to the aqueous liquid, thereby dissolving at least a portion of the salt bed and forming a brine solution within an underground storage volume, *thereby controlling the geometry of the roof of the underground storage volume*, wherein said underground storage volume comprises a maximum allowable pressure,
  - withdrawing at least a portion of the brine solution from the underground storage volume, and
  - injecting an inert gas into the cased borehole at a second pressure, in order to provide an inert blanket within the underground storage volume, wherein the second pressure is greater than the first pressure but less than the maximum allowable pressure of the underground storage volume, wherein the maximum allowable pressure ( $P_{\max}$ ) is defined as  $P_{\max} < D_{\text{casing}} \times G_{\max}$ ,  
wherein  $G_{\max} = 0.85$ , and  $D_{\text{casing}}$  is the depth of a final cemented casing shoe which defines a

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<sup>2</sup> Counsel is reminded of the requirement that an appeal brief include a “concise explanation of the subject matter defined in each of the rejected independent claims, which shall refer to the specification in the Record by page and line number or by paragraph number, *and to the drawing, if any, by reference characters.*” 37 C.F.R. § 41.37(c)(iii) (2016) (emphasis added); *see* Appeal Br. 4 (Summary of Claimed Subject Matter).

practical endpoint of a length of casing, permanently cemented into surrounding rock formations.

## REJECTIONS

1. Claims 1–3 and 7 stand provisionally rejected under the doctrine of obviousness-type double patenting as unpatentable over claims 1–6 of U.S. Patent Application No. 14/711,111.

2. Claims 1–3 and 7 stand rejected under 35 U.S.C. § 112(b) as failing to particularly point out and distinctly claim the subject matter regarded as the invention.

3. Claims 1–3 stand rejected under 35 U.S.C. § 102(a)(1) as anticipated by Dahms (US 3,148,000, issued Sept. 8, 1964).

4. Claim 7 stands rejected under 35 U.S.C. § 103 as unpatentable over Dahms and Admitted Prior Art (“APA”).<sup>3</sup>

## DISCUSSION

### *Rejection 1 – Provisional Double Patenting*

The Examiner provisionally rejected claims 1–3 and 7 on the ground of the nonstatutory double patenting in view of claims 1–6 of U.S. Patent Application No. 14/711,111, which is now abandoned. Final Act. 3–4; *see* Notice of Abandonment (dated Feb. 23, 2017). Therefore, we dismiss as moot the appeal as to this provisional rejection. *See* Ans. 3 (stating that “it may be Appellant’s intention to abandon the copending application, thus obviating the provisional double patenting rejection”).

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<sup>3</sup> As the APA, the Examiner identifies page 1, lines 11–15 of the Specification. *See* Final Act. 5–6.

*Rejection 2 – The rejection of claims 1–3  
and 7 under 35 U.S.C. § 112(b)*

The Examiner rejected independent claim 1, stating that “the phrase ‘thereby controlling the geometry of the roof’ renders the claim indefinite because it is not clear what the term ‘thereby’ is referencing.”<sup>4</sup> Final Act. 4. According to the Examiner, “[i]t is not clear from the claim language, for example, whether it is the injection of the aqueous liquid, the exposing of the salt bed to the aqueous liquid, the dissolving of at least a portion of the salt bed, the forming of a brine solution, or some combination thereof that is causing the geometry of the roof to be controlled.” *Id.*<sup>5</sup>

The Examiner also rejected claim 7 (which depends from claim 1) on two separate bases: (1) “‘the underground storage cavern’ lacks proper antecedent basis” and (2) “the recitation ‘modified dome shape’ is indefinite” because “[t]he term ‘modified’ is not defined by the claim language or the specification.” *Id.*

In the Appeal Brief, Appellant states that “[t]hese deficiencies are easily remedied” and Appellant “requests that the disposition of these be made after the determination of the board.” Appeal Br. 5.

As to claim 1, the Examiner states that resolution of the identified issue “is believed to be essential before any meaningful evaluation can occur as to whether or not the claim patentably defines over the prior art.” Ans. 4. The Examiner also states that the “specification and drawings . . . fail to unequivocally define the meaning of the claim language in question” in

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<sup>4</sup> We will refer to this claim language, shown with emphasis above, as the “thereby controlling” limitation.

<sup>5</sup> The claim language referenced by the Examiner is in the second step, which begins “injecting an aqueous liquid.”

claim 1. *Id.* Later in the Answer, the Examiner states, “[f]or purposes of applying the prior art (and affording the language its broadest reasonable interpretation under the circumstances), the examiner construes th[e] phrase [at issue] as meaning controlling the geometry of the roof (i.e., impacting or affecting the shape of the roof) by any means.” *Id.* at 6.

In the Reply Brief, Appellant states that “it is the ‘injecting of an aqueous liquid into the cased bore hole’ (and the subsequent dissolving of the salt bed) that is used to control the geometry of the roof.” Reply Br. 2. Appellant also “accept[s] the definition proffered by the examiner that th[e] phrase [at issue] means ‘controlling the geometry of the roof (i.e. impacting or affecting the shape of the roof) by any means.’” *Id.* at 3.

A claim fails to comply with 35 U.S.C. § 112, second paragraph, “when it contains words or phrases whose meaning is unclear.” *In re Packard*, 751 F.3d 1307, 1310, 1314 (Fed. Cir. 2014) (per curiam) (approving, for pre-issuance claims, the standard from MPEP § 2173.05(e)); *see also Ex parte McAward*, Appeal 2015-006416, 2017 WL 3669566, at \*5 (PTAB Aug. 25, 2017) (precedential) (adopting the approach for assessing indefiniteness approved by the Federal Circuit in *Packard*). If an examiner “has initially issued a well-grounded rejection that identifies ways in which language in a claim is ambiguous, vague, incoherent, opaque, or otherwise unclear in describing and defining the claimed invention, and thereafter the applicant fails to provide a satisfactory response,” the examiner “can properly reject the claim as failing to meet the statutory requirements of § 112(b).” *Packard*, 751 F.3d at 1311. A “satisfactory response” to an indefiniteness rejection “can take the form of a modification of the language identified as unclear, a separate definition of the unclear language, or, in an

appropriate case, a persuasive explanation for the record of why the language at issue is not actually unclear.” *Id.*

We view the statements in the Reply Brief (quoted above) as adequately defining the “thereby controlling” limitation so as to provide a “satisfactory response” to this rejection of claim 1.<sup>6</sup> *Id.* Thus, we reverse the rejection of claim 1 as indefinite.

We turn now to the separate bases for the rejection of claim 7 as indefinite. As an initial matter, the rules of the Board do not allow holding a rejection in abeyance, as requested by Appellant. *See* 37 C.F.R. § 41.31(c) (“An appeal, when taken, is presumed to be taken from the rejection of all claims under rejection unless cancelled by an amendment filed by the applicant and entered by the Office.”); *see also* Ans. 5 (stating that these issues “cannot reasonably be deferred until after a determination regarding the prior art rejections is made by the Board”).

The only statement by Appellant that could be viewed as addressing this rejection is in the Reply Brief, where Appellant states that “[i]t would be very clear to the skilled artisan reading the specification and reviewing the figures that the intention is to create a roof that is stepped, or dome shaped, and not simply flat.” Reply Br. 2.

With this statement, however, Appellant has not provided a “satisfactory response” to the Examiner’s two separate bases as to claim 7. *Packard*, 751 F.3d at 1311. As to the first basis, Appellant fails to address

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<sup>6</sup> To the extent Appellant asserts that “controlling the geometry of the roof” in claim 1 *requires* creating a “roof that is stepped, or dome shaped, and not simply flat” (Reply Br. 2), we disagree. Although claim 7 requires that “the geometry of the roof . . . is a modified dome shape,” claim 1 does not specify the shape of the roof.

the lack of antecedent basis for “the underground storage cavern.” *See* Appeal Br. 5; Reply Br. 2. As to the second basis, Appellant fails to address the meaning of “modified” in the phrase “modified dome shape.” *See* Appeal Br. 5; Reply Br. 2. Appellant has thus failed to persuasively explain “for the record why the language at issue is not actually unclear.” *Packard*, 751 F.3d at 1311. Because Appellant has not rebutted the Examiner’s prima facie case, we sustain the rejection of claim 7 as indefinite.

*Rejection 3 – The rejection of claims 1–3  
under 35 U.S.C. § 102(a)(1)*

For this rejection, Appellant argues the patentability of claim 1 and does not provide separate arguments for claims 2 and 3, which depend from claim 1. Appeal Br. 5–7; Reply Br. 2–4. Thus, we address claim 1, with claims 2 and 3 standing or falling with claim 1. *See* 37 C.F.R. § 41.37(c)(1)(iv) (2016).

The Examiner relied on Dahms as disclosing, either explicitly or inherently, every limitation of claim 1. Final Act. 5. As to the “thereby controlling” limitation, the Examiner stated that “injecting the aqueous liquid in the method of Dahms will inherently change or impact (and, thus, ‘control’) the roof geometry, to at least some extent.” *Id.*

Before addressing Appellant’s arguments, we discuss the construction of the “thereby controlling” limitation. As noted above (*see* Rejection 2), the Examiner has proposed and Appellant has accepted a construction of this limitation. *See* Ans. 6; Reply Br. 3. For purposes of this decision, we apply the agreed-upon construction of the “thereby controlling” limitation: “controlling the geometry of the roof (i.e., impacting or affecting the shape of the roof) by any means.” Ans. 6. We turn now to the arguments, which,

according to Appellant, “center[] on the observation that Dahms . . . fails to disclose ‘controlling the geometry of the roof.’” Reply Br. 3.

First, Appellant argues that “salt has a low tensile strength, so a large flat roof is not as desirable, and can be unstable.” Appeal Br. 5. Appellant asserts, however, that “a ‘modified dome shape’ [as recited in claim 7] will prove to be more stable,” and thus:

it would be clear to one of ordinary skill in the art of salt cavern solution mining that in order to produce a cavern that will not repeatedly, and intentionally, collapse in on itself, would involve controlling the geometry of the roof to produce something more like a modified dome shape.

*Id.* at 5–6. Appellant argues that Dahms “fails to disclose any particular shape of the roof” and that “[i]mmiscible layer 6 [in Dahms], which is presumably directly below the roof, is indicated as being flat, with no indicated dome shape.” *Id.* at 6.

We are not apprised of error based on this argument. Claim 1 requires “controlling the geometry of the roof” but does not recite a specific *shape* for the “roof.” See *In re Self*, 671 F.2d 1344, 1348 (CCPA 1982) (rejecting arguments “not based on limitations appearing in the claims”). To the extent Appellant asserts that the limitations in claim 7 limit the scope of claim 1— from which claim 7 depends—we disagree.<sup>7</sup> See *id.*; Ans. 5 (stating that “the ‘modified dome shape’ language discussed by Appellant at the top of page 6 appears in dependent claim 7 and not independent claim 1”); see also 35 U.S.C. § 112(d) (“A claim in dependent form shall be construed to incorporate by reference all the limitations of the claim to which it refers.”).

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<sup>7</sup> To the extent Appellant intends to argue claim 7 separately, for the reasons discussed below (see Rejection 4), we sustain that rejection.

Moreover, as noted by the Examiner, claim 1 does not currently recite a requirement to be “stable”; Appellant expressly removed that limitation from claim 1. *See* Ans. 5 (“Appellant’s arguments spanning pages 5–6 of the Brief appear to center on the salt cavern being ‘stable’, a limitation that was deleted from claim 1 in Appellant’s amendment filed May 24, 2016, and that does not appear in any of the currently pending claims.”).

Second, Appellant argues that “[t]he only references to the cavern’s roof in Dahms . . . deal with the desired effect of having the roof collapse in order to more efficiently remove the potassium chloride.” Appeal Br. 7 (citing Dahms, 2:43–44 and 2:53–56). According to Appellant, “[o]ne skilled in the art of solution mining a stable cavern with the intention of storing gases in them, as is the clear intent of the present invention, would not find that the disclosure in Dahms . . . ‘inherently controls the roof geometry’ to this end.” *Id.* (internal quotations omitted).

The Examiner responds by further explaining why “Dahms discloses controlling the geometry of the roof of the cavity 8” as shown in, for example, Figure 1 of Dahms, reproduced below. Ans. 6.

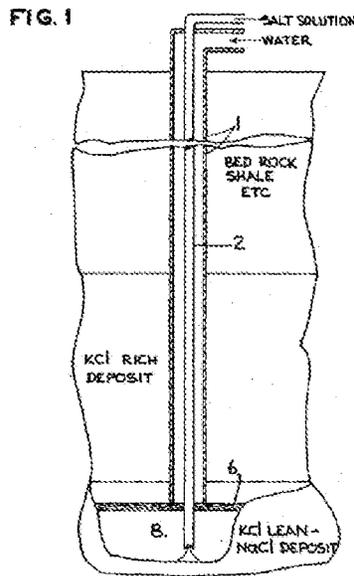


Figure 1 of Dahms depicts “a typical cavity [8] being developed below a mineable deposit” of potassium chloride. Dahms, 4:29–30. The Examiner makes the following findings as to the teachings of Dahms:

Dahms generally discloses a solution mining method (described, for example, at col. 2, lines 14–28) in which a solvent (water or an aqueous solution) is introduced through a cased borehole (see Fig. 1 or Fig. 2) to dissolve salt from an underground salt deposit, thereby forming a cavity 8. Dahms further discloses a lateral growth phase (described in general terms at col. 2, lines 29–38) in which the underground cavity 8 is caused to grow laterally (i.e., horizontally). In order to accomplish this lateral growth, Dahms injects an inert fluid (e.g., nitrogen gas) through the borehole while the solvent is being introduced. The inert fluid forms a protective layer 6 at the roof of the cavity to protect the roof material from being contacted and dissolved by the solvent (see, e.g., col. 4, lines 64–74).

Ans. 6–7. According to the Examiner, in the “lateral growth phase” disclosed in Dahms, “cavity 8, and thus also the roof of the cavity, is caused to expand laterally (i.e., horizontally),” however, “[t]he roof . . . is prevented from expanding vertically (upwardly) by the presence of the protective layer

6[,] which prevents the solvent from contacting the roof.” *Id.* at 7. The Examiner states that “[e]xpanding the roof laterally in this manner, while preventing vertical expansion, is considered to meet the claim 1 limitation ‘controlling the geometry of the roof.’” *Id.* The Examiner also states that “to the extent the rejection may rely on the theory of inherency, such reliance is proper since the potentially inherent characteristic (i.e., lateral expansion of the roof of the cavity) necessarily flows from the explicit teaching in Dahms (i.e., lateral expansion of the cavity).” *Id.* at 8.

Appellant’s second argument does not apprise us of error. As to the discussion of column 2, lines 43 to 44 and lines 53 to 56 by Appellant, we agree with the Examiner that these are not the “only references to the cavern’s roof in Dahms.” Appeal Br. 7. As noted by the Examiner, column 2, lines 34 to 36 disclose an inert fluid “fed into the cavity in order to establish a thin layer at the roof” of the cavity, thereby “caus[ing] the cavity to expand laterally as water is fed thereto.” *See* Ans. 8–9. And, as further noted by the Examiner, column 4, lines 72 to 74 discloses how thick the layer should be in order to “protect the roof” of the cavity. *See id.* at 9. Both of these disclosures relate to the relied-upon lateral growth phase in Dahms, which *precedes* the phase discussed by Appellant, in which the roof is collapsed. *Compare, e.g.,* Dahms, 2:14–38 and 4:57–5:16 (discussing activity *prior to* collapsing the roof), *with id.* at 2:39–56 and 5:17–23 (discussing collapsing the roof). Appellant does not argue that the lateral growth phase fails to satisfy the “thereby controlling” limitation. For the reasons discussed by the Examiner as summarized above, the record here supports the Examiner’s position that the relied-upon aspects in Dahms satisfy the “thereby controlling” limitation as construed.

As to Appellant’s assertion that the “clear intent of the present invention” is “storing gases” (Appeal Br. 7) and that “[o]ne skilled in the art would clearly see that the intention of this solution mining method is to create an underground storage space that will have a long term commercial use” (Reply Br. 3), claim 1 recites a “method for solution mining” and does not recite the step of storing gases, whether or not for long-term commercial use. *See In re Self*, 671 F.2d at 1348 (rejecting arguments “not based on limitations appearing in the claims”); *see also* Reply Br. 3 (“It would be clear to the skilled artisan that the intention of the instant invention is not to merely commercially mine salt from an underground formation and then abandon the spent cavity afterwards.”). Appellant also argues that “[i]t would be very clear to one of ordinary skill in the art that, using the definition offered by the [E]xaminer, [the intention of the instant invention] would be to impact or affect the shape of the roof to create a cavern that will not immediately collapse.” Reply Br. 3. Appellant does not, however, identify claim language that reflects this argument. *See In re Self*, 671 F.2d at 1348.

As noted by Appellant, claim 1 does, however, recite an “underground storage volume.” Appeal Br. 9 (Claims App.) (emphasis added); *see* Reply Br. 3 (stating that although “the phrase ‘stable salt cavern’ was removed from claim 1, the phrase ‘underground storage volume’ remains”). We view the term “storage” in the phrase “underground storage volume” (recited multiple times in claim 1) as an intended use of the “underground” “volume” resulting from the claimed method, and thus, we view the term “storage” as not limiting the claimed method. *See In re Anderson*, 662 Fed. App’x 958, 963 (Fed. Cir. 2016) (nonprecedential) (discussing how “for use” language

in the body of a method claim was an intended use that does not limit the claimed method); *see also Minton v. Nat'l Ass'n of Sec. Dealers, Inc.*, 336 F.3d 1373, 1381 (Fed. Cir. 2003) (“A whereby clause in a method claim is not given weight when it simply expresses the intended result of a process step positively recited.”). Moreover, even if the term “storage” were limiting, Appellant has not explained how the term “storage” structurally distinguishes over the identified aspect of the prior art—cavity 8 in Dahms. *See* Final Act. 5 (identifying “cavity 8” in Dahms as an “underground storage volume”); Dahms, Figs. 1, 2.

For the reasons above, we sustain the rejection of independent claim 1. Claims 2 and 3 fall with claim 1.

*Rejection 4 – The Rejection of Claim 7 under 35 U.S.C. § 103*

For claim 7, the Examiner relied on Dahms in view of APA. *See* Final Act. 5–6. The Examiner stated that “Dahms discloses all of the limitations of independent claim 1” but that “Dahms does not . . . explicitly disclose a cavern having a dome shape, as recited in claim 7.” *Id.* at 6. The Examiner then made certain findings regarding APA and provided a reason to modify Dahms based on the teachings of APA. *Id.*

Based on the record as a whole, we do not view Appellant as separately arguing this rejection. Although Appellant does reference language in claim 7—such as “modified dome shape” (*see* Appeal Br. 5, 6)—Appellant concludes the relevant discussion by stating that “*claim 1*, as currently amended, is not anticipated by, or obvious in view of, Dahms” and that “[h]ence *this rejection* is improper and should be vacated.” *Id.* at 6 (emphasis added). Moreover, even after the Examiner states, in the Answer, that “it is not clear . . . whether or not Appellant is seeking review of the

rejection of dependent claim 7” (Ans. 9), Appellant does not discuss claim 7, including its “modified dome shape” limitation. *See* Reply Br. 2–4.

Moreover, even assuming that Appellant *had* intended to separately argue this rejection, Appellant does not address the rejection as articulated, in which the Examiner relies on Dahms in view of APA. *See* Final Act. 5–6. Instead, to the extent Appellant addresses claim 7 at all, Appellant argues that claim 7 would not have been obvious in view of Dahms *alone*. *See* Appeal Br. 5–6; Ans. 10 (discussing the rejection of claim 7 based on Dahms in view of APA and stating that Appellant has “not disputed” the Examiner’s positions).

For these reasons, we sustain the rejection of claim 7.

#### DECISION

We *dismiss as moot* the decision to provisionally reject claims 1–3 and 7 under the doctrine of obviousness-type double patenting, we *reverse* the decision to reject claims 1–3 under 35 U.S.C. § 112(b), we *affirm* the decision to reject claim 7 under 35 U.S.C. § 112(b), and we *affirm* the decision to reject claims 1–3 and 7 under 35 U.S.C. § 103.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1). *See* 37 C.F.R. § 1.136(a)(1)(iv); 37 C.F.R. § 41.50(f).

AFFIRMED