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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte WELDON L. RANSBARGER
and J. DALE ORTEGO JR.

Appeal 2014-009500
Application 12/117,364
Technology Center 3700

Before JENNIFER D. BAHR, FREDERICK C. LANEY, and
ARTHUR M. PESLAK, *Administrative Patent Judges*.

PESLAK, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Weldon L. Ransbarger and J. Dale Ortego (“Appellants”) appeal under 35 U.S.C. § 134(a) from the Examiner’s decision rejecting claims 1–3, 5–12, 15, and 17.¹ We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

¹ Appellants submit the real party in interest is ConocoPhillips Company. Appeal Br. 2.

THE CLAIMED SUBJECT MATTER

Claim 1, reproduced below, is illustrative of the claimed subject matter.

1. A process for liquefying a natural gas stream in an LNG facility, the process comprising:

(a) cooling at least a portion of the natural gas stream in a plurality of upstream mechanical refrigeration cycles to form a predominantly natural gas stream wherein each upstream mechanical refrigeration cycle comprises a heat exchanger for providing indirect heat exchange with a pure component refrigerant for cooling the natural gas stream;

(b) introducing the predominantly natural gas stream to a heavies removal unit to remove a portion of the heavies from the predominantly methane stream to form a predominantly methane stream;

(c) after step (b) and downstream of the heavies removal unit, introducing the predominantly methane stream to an open-loop methane refrigeration cycle wherein the open-loop methane refrigeration cycle comprises an open-loop methane refrigeration cycle heat exchanger, a refrigeration compressor, and a refrigerant chiller downstream of the refrigeration compressor;

(d) after step (c) and downstream of the heavies removal unit, cooling the predominantly methane stream in the open-loop methane refrigeration heat exchanger;

(e) after step (d) and downstream of the open-loop methane refrigeration cycle heat exchanger, separating at least a portion of the predominantly methane stream in a multistage separation vessel, wherein the multistage separation vessel comprises a plurality of mass transfer surfaces and a reboiler, to provide a predominantly vapor stream and a predominantly liquid stream, wherein at least a portion of the predominantly vapor stream is routed to a nitrogen removal unit; and

(f) using the predominantly vapor stream as a refrigerant in the open-loop methane refrigeration cycle by introducing the predominantly vapor stream to a warming pass of the open-loop methane refrigeration cycle heat exchanger for cooling the predominantly methane stream in step (d);

(g) after step (f) and downstream of the warming pass of the open-loop methane refrigeration cycle heat exchanger, compressing the refrigerant in the refrigeration compressor;

(h) cooling the refrigerant in the refrigeration chiller;

(i) after step (h), introducing the refrigerant to a cooling pass of at least one of the plurality of heat exchangers of the upstream mechanical refrigeration cycles to form a reboiler duty stream;

(j) introducing the reboiler duty stream to a warming pass of the reboiler to provide a reboiler duty for the multistage separation vessel to form a cold reflux stream;

(k) introducing the cold reflux stream to the multistage separation vessel to provide reflux to the multistage separation vessel; and

(l) withdrawing at least a portion of the predominantly liquid product stream as a liquefied natural gas product.

REJECTIONS ON APPEAL²

- 1) Claim 1 is rejected under 35 U.S.C. § 112, second paragraph for indefiniteness.
- 2) Claims 1–3, 5, 10–11, 15, and 17 are rejected under 35 U.S.C. § 103(a) as unpatentable over Low (US 6,070,429, iss. June 6, 2000), Patel'521 (US 2006/0130521 A1, pub. June 22, 2006), and Patel '744 (US 7,069,744 B2, iss. July 4, 2006).
- 3) Claims 6–9 are rejected under 35 U.S.C. § 103(a) as unpatentable over Low, Patel'744, Patel'521, and Hahn (US 2005/0183452 A1, pub. Aug. 25, 2005).

² Claims 28, 30–34, and 36–38 were rejected under 35 U.S.C. § 103(a). Final Act. 10, 14. We do not address these rejections because claims 18–38 were cancelled in an amendment after final entered by the Examiner. Adv. Act. 2.

- 4) Claim 12 is rejected under 35 U.S.C. § 103(a) as unpatentable over Low, Patel '744, Patel '521, and Ransbarger (US 2007/0056318 A1, pub. Mar. 15, 2007).

DISCUSSION

Rejection 1

The Examiner rejects claim 1 as indefinite under 35 U.S.C. § 112, second paragraph. Final Act. 2. The Examiner concludes that there is insufficient antecedent basis for the limitations “the predominantly methane stream” and “the heavies removal unit” in lines 12–13 of claim 1. *Id.* The Examiner also rejects claim 1 for omitting essential elements of “how to get from a natural gas stream to the predominantly methane stream.”

Appellants filed an amendment after final rejection to traverse this rejection. Adv. Act. 2. The Examiner entered the amendment. *Id.* The Examiner did not withdraw the rejection in the Answer. *See* Ans. 2 (maintaining every ground of rejection set forth in the Final Action and not “listed under a subheading ‘WITHDRAWN REJECTIONS’”).

The entered amendments to claim 1 cure this rejection. Therefore, we do not sustain the rejection of claim 1 under 35 U.S.C. § 112, second paragraph.³

³ We note that claim 1 as amended contains a manifest informality that is deserving of correction. Subparagraph (b) of claim 1 recites, *inter alia*, “remove a portion of the heavies from *the predominantly methane stream* to form a predominantly methane stream.” It appears that the italicized language should recite “the predominantly natural gas stream.”

Rejection 2

The Examiner finds that Low discloses the subject matter of claim 1, including a multistage separation vessel (80), but does not disclose the multistage separation vessel comprising “a plurality of mass transfer surfaces” and “a reboiler.” Final Act. 3–5. The Examiner finds that Patel ’744 discloses an absorber containing “at least one mass transfer zone wherein the mass transfer zone can be a flash zone, an equilibrium stage, packing section, tray, or the like.” *Id.* at 5. The Examiner reasons it would have been obvious “for the separation vessel of Low to comprise a plurality of mass transfer surfaces as taught by Patel [’744] in order to separate a desired component from other components, or to enrich a fluid stream in one or more components by removal of one of more other components.” *Id.* The Examiner also finds that Patel ’744 discloses a reboiler (58) and determines it would have been obvious to “modify the separation vessel of Low by implementing a reboiler as taught by Patel [’744] in order to boil the liquid from the bottom of the separation vessel to generate vapors which are returned to the vessel to drive the vessel separation.” *Id.* The Examiner then finds that Patel ’521 discloses “a tower overhead stream 14 compressed in a gas compressor (27) and cooled in a side reboiler (31) to provide a portion of the reboiling energy for the fractionation tower (10) and further form a cooled lean tower reflux stream (26), which is fed to the fractionation tower.” *Id.* at 6. The Examiner then concludes that it would have been obvious to “modify the refrigerant stream (the reboiler duty stream)(158) of Low [to] provide a reboiler duty and further used as a reflux stream for the separation vessel as taught by Patel 521 in order to provide a reboiling

energy and a cooled lean reflux tower stream to the separation vessel to enhance the separation process.” *Id.*

Appellants contend that the Examiner erred because Low does not disclose “a multi-stage separation vessel” and the combination of the cited references does not teach the “integration of a multistage separation vessel into an LNG process in the specific manner recited by . . . steps (i)-(k) of Appellant’s claim 1.” Appeal Br. 9. The Examiner responds that Low explicitly discloses “the separation vessel is *a multistage separation vessel and comprises a plurality of mass transfer surfaces*. However, using a multistage separation vessel with a plurality of mass transfer surfaces to separate a stream into a vapor and liquid is well known in the art as taught by” Patel ’744. Ans. 3, *see also* Final Act 4 (Low disclose “a multistage separation vessel (80)”). For the following reasons, we do not sustain the rejection.

The Specification discloses multistage separation vessel 404. Spec. ¶ 43, Fig. 2. The Specification also discloses intermediate-stage methane flash drum 84 and low-stage methane flash drum 86. *Id.* Figure 2, a schematic diagram of an embodiment of Appellants’ claimed invention, represents multistage separation vessel 404 with a different symbol than flash drums 84 and 86.

Low describes vessel 80 as a “high-stage flash drum.” Low, col. 20, l. 35. We note that vessel 80 in Low is represented schematically in Low’s Figure 1 by a symbol that is similar to the symbol used in Appellants’ Figure 2 to represent flash drums 84 and 86. *Compare* Low, Fig. 1, Appellants’ Fig. 2. The Examiner has not directed us to any disclosure in Low where vessel 80 is described as a multistage separation vessel. Patel ’744 discloses

absorber column 32 with at least one mass transfer zone. Patel '744, col. 7, ll. 27, 33–34. While we appreciate the Examiner's position that Patel '744's absorber column 32 may be used to separate vapor and liquid in a methane gas stream, the Examiner has not directed us to any disclosure in Patel '744 of a multistage separation vessel or any disclosure that Patel's absorber column 32 is equivalent to the recited multistage separation vessel.⁴

Therefore, the Examiner's finding that Low and/or Patel '744 disclose a multistage separation vessel is not supported by a preponderance of the evidence. As the rejection of claim 1 is based on erroneous factual findings, the conclusion of obviousness cannot stand. *See In re Warner*, 379 F.2d 1011, 1017 (CCPA 1967) (holding that “[t]he legal conclusion of obviousness must be supported by facts. Where the legal conclusion is not supported by facts it cannot stand.”). Therefore, we do not sustain the rejection under 35 U.S.C. §103(a) of independent claim 1 and claims 2–3, 5, 10, 11, 15 and 17 which are dependent on claim 1.

Rejections 3 and 4

The Examiner rejects claims 6–9 and 12 based on various combinations of Low, Patel '744, Patel '521, Hahn, and Ransbarger. Final Act. 8, 9. Claims 6–9 and 12 are all ultimately dependent on claim 1. Appeal Br. 16–17 (Claims App.). The Examiner does not rely on Hahn or Ransbarger to cure the deficiencies in Low and Patel '744 noted above for

⁴ We note that the symbol used by for absorber column 32 in Patel '744 is similar to the symbol used by Appellants for multi-stage separation vessel 404. However, given the different terminology used by Appellants and Patel '744, the Examiner has not offered any evidence or technical reasoning to show that a person of ordinary skill in the art would have understood the absorber column of Patel '744 to be a “multistage separation vessel” as that term is used in Appellants' Specification and claims.

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claim 1. Therefore, we do not sustain the rejection of claims 6–9 and 12 under 35 U.S.C. § 103(a) for the same reasons stated above with respect to claim 1.

DECISION

The Examiner's decision rejecting claims 1–3, 5–12, 15, and 17 is reversed.

REVERSED