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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 13/262,151 | 09/29/2011 | Clive Brereton | P10039US00 | 1047 |

22885 7590 01/22/2019
MCKEE, VOORHEES & SEASE, P.L.C.
801 GRAND AVENUE
SUITE 3200
DES MOINES, IA 50309-2721

| EXAMINER |
|---|
| LIN, KO-WEI |

| ART UNIT | PAPER NUMBER |
|---|---|
| 3762 | |

| NOTIFICATION DATE | DELIVERY MODE |
|---|---|
| 01/22/2019 | ELECTRONIC |

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michelle.woods@ipmvs.com

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* CLIVE BRERETON and SERGIO BERRETTA

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Appeal 2017-008683
Application 13/262,151
Technology Center 3700

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Before: ANNETTE R. REIMERS, ERIC C. JESCHKE, and BRENT M. DOUGAL, *Administrative Patent Judges*.

DOUGAL, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellants appeal under 35 U.S.C. § 134 from a rejection of claims 1, 3–7, 10, 12–14, 17, 18, 20, 22–33, 35, 38, and 40. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM-IN-PART.

## CLAIMED SUBJECT MATTER

The claims are directed to a method and apparatus for vaporizing liquid chlorine containing nitrogen trichloride, such as in a chlorine production process. Claim 1 and 28, reproduced below, are the sole independent claims and are illustrative of the claimed subject matter:

> 1. A method of vaporizing liquid chlorine containing nitrogen trichloride in a plug-flow vaporizer oriented non-horizontally and having an upward flow direction, comprising the steps of:
>
> (a) receiving a stream comprising the liquid chlorine containing at least 50 ppm nitrogen trichloride into the vaporizer;
>
> (b) introducing a gas into the stream of step (a) upstream of a boiling zone of the vaporizer at a gas flow rate that induces a flow regime in the stream of step (a) that minimizes mass accumulation of the nitrogen trichloride in the boiling zone of the vaporizer; and
>
> (c) vaporizing the liquid chlorine containing nitrogen trichloride from step (b) to produce a stream comprising chlorine gas and nitrogen trichloride gas.
>
> 28. An apparatus for vaporizing liquid chlorine containing at least 50 ppm nitrogen trichloride, comprising:
>
> (a) a plug-flow chlorine vaporizer oriented non-horizontally and having an upward flow direction;
>
> (b) an inlet for receiving a stream comprising the liquid chlorine containing at least 50 ppm nitrogen trichloride into the vaporizer;
>
> (c) a boiling zone in the vaporizer downstream of the inlet of paragraph (b);
>
> (d) a gas inlet upstream of the boiling zone for introduction of a gas into the liquid stream.

## REFERENCES

The prior art relied upon by the Examiner in rejecting the claims on appeal is:

| | | |
|---|---|---|
| Hunter | US 2,199,797 | May 7, 1940 |
| Balko | US 4,230,673 | Oct. 28, 1980 |
| Kaplin | US 5,437,711 | Aug. 1, 1995 |
| Okabe | EP 0730902 A1 | Sept. 11, 1996 |

## REJECTIONS[1]

Claims 1, 3–7, 10, 12–14, 17, 18, 20, and 22–27 are rejected under 35 U.S.C. § 112 second paragraph as being indefinite.

Claims 1, 3, 5–7, 10, 12–14, 23, and 24 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Balko and Okabe.

Claim 4 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Balko, Okabe, and Hunter.

Claims 17, 18, 20, and 22–27 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Balko, Okabe, and Kaplin.

Claims 28–31 and 38 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Balko.

Claims 32, 33, 35, and 40 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Balko and Kaplin.

[1] The 35 U.S.C. § 112 rejections of claims 7 and 40 have been withdrawn. Ans. 10.

OPINION

*35 U.S.C. § 112 – Claim 1*

Claim 1 is rejected as indefinite because the Examiner determines that "[i]t's unclear what amount of accumulation is considered minimized" to meet the claim limitation "minimizes mass accumulation of the nitrogen trichloride in the boiling zone of the vaporizer." Non-Final Act. 2. The full claim element states: "(b) introducing a gas into the stream of step (a) upstream of a boiling zone of the vaporizer at a gas flow rate that induces a flow regime in the stream of step (a) that minimizes mass accumulation of the nitrogen trichloride in the boiling zone of the vaporizer."

Appellants argue that this phrase is not unclear in view of the teachings of the Specification giving specific flow rates and discussing "which yields levels of nitrogen trichloride . . . are 'safe to handle.'" Appeal Br. 10 (citing Spec. 6:25, 10:4–18). Appellants also argue that one of skill in the art would have been familiar with "what levels of nitrogen trichloride in chlorine are 'safe to handle,'" as evidenced by a "publication[] of The Chlorine Institute." *Id.* (citing Pamphlet 21, submitted to the Office January 26, 2015).

The Examiner does not address Appellants' evidence, but does state that the phrase "safe to handle" is not in the claims. Ans. 11–12.

However Appellants' Specification, Pamphlet 21, and the art cited by the Examiner (*see e.g.*, Balko and Okabe) all teach the desire to "minimize mass accumulation of the nitrogen trichloride" in order to maintain the amount of nitrogen trichloride at a safe level, or at a level that is safe to handle. At the same time, Appellants' evidence and the cited prior art make clear that the exact point where the amount of nitrogen trichloride present

creates a dangerous situation is not known. *See e.g.*, Spec. 1, ll. 17–29, 4, ll. 6–10. Dangerous levels are known and the evidence teaches amounts that are believed to be safe.

The Examiner further states that "[w]ithout clearly providing any range or value for the amount of mass accumulation of nitrogen trichloride, one of ordinary skill in the art would not know how much of the mass accumulation is considered 'minimized' and would not know what gas flow rate should be used in this method step." Ans. 12.

However, Appellants' Specification provides explicit flow rates, as noted by Appellants, and yet, unaddressed by the Examiner. *See* Spec. 10:4–18.

In view of the above, we do not sustain the Examiner's § 112 rejection that claim 1 is unclear.

*35 U.S.C. § 103 – Claim 1*

The Examiner relies on Balko's vaporizer 41 and the liquid chlorine and nitrogen trichloride stream that is fed thereto, in finding that Balko teaches most of the features of the method of claim 1. Non-Final Act. 3. In particular, the Examiner finds that Balko's combining of the chlorine gas and nitrogen trichloride with liquid chlorine "at the intersection of line 29 and 31," which is "upstream of a boiling zone of the vaporizer," meets most of the limitations of steps a and b of the claim. *Id.*

Step (b) of claim 1 requires that a gas be introduced into "a stream comprising the liquid chlorine containing at least 50 ppm nitrogen trichloride." However, Balko teaches introducing liquid chlorine into a stream of chlorine *gas* with nitrogen trichloride. Balko 4:34–46, Fig. 1.

This is the opposite of what is required by the claim. *See* Appeal Br. 7. As all of the claim elements have not been shown to be in the prior art, a prima facie case of obviousness has not been set forth.

We further note that the combination "at the intersection of line 29 and 31" occurs around the time of the precooling at 21, during which the chlorine gas is separated from the nitrogen trichloride, which condenses and combines with the liquid chlorine. Balko 4:34–46, Fig. 1. This liquid is then either gravity fed or pumped into the vaporizer 41. *Id.* at 5:26–44. It is unclear how the combination at 29 and 31 would "induce[] a flow regime in the stream of step (a) that minimizes mass accumulation of the nitrogen trichloride in the boiling zone of the vaporizer," as any flow regime induced by introducing a gas would be disrupted by gravity feeding or pumping only the liquid into the vaporizer 41 after processing in the precooler 21.

The Examiner further finds that "Okabe teaches NCl3 gas is produced in a vaporizer" and that "[i]t would have been obvious . . . to modify Balko by adding an additional vaporizer with higher heating capability in order to effectively vaporize the chlorine and decomposing NCL3." Non-Final Act. 4. However, the Examiner fails to provide a reason why one of skill in the art would vaporize nitrogen trichloride or why one would modify Balko to allow vaporizing of nitrogen trichloride.

For all of these reasons, we do not sustain the rejection of claim 1, nor do we sustain the rejections of the dependent claims, which rely on the rejection of claim 1.

*35 U.S.C. § 103 – Claim 28*

The Examiner finds that Balko teaches most features of the apparatus of claim 28. Non-Final Act. 8. Appellants argue that Balko does not teach the "introduction of a gas into a liquid stream" similar to claim 1. However, being that claim 28 is directed to an apparatus, rather than a method, the step of introducing gas into a liquid stream is not required. Claim 28 merely requires "a gas inlet" capable of "introduction of a gas into the liquid stream." Claim 28 also requires "an inlet" capable of "receiving a stream comprising the liquid chlorine containing at least 50 ppm nitrogen trichloride into the vaporizer."

Although "[a] patent applicant is free to recite features of an apparatus either structurally or functionally . . . , choosing to define an element functionally . . . carries with it a risk." *In re Schreiber*, 128 F.3d 1473, 1478 (Fed. Cir. 1997). This risk is that Appellants bear the burden to prove that the prior art does not possess the functional characteristic, once the Examiner has shown a sound basis for believing the claimed structure to be the same as the prior art structure. *See In re Spada*, 911 F.2d 705, 708 (Fed. Cir. 1990).

In view of the Examiner's findings, we determine that the Examiner has provided a sound basis for believing that the claimed structure is the same as that identified by the Examiner in the cited prior art. Appellants do not show error in this finding by the Examiner. Thus, we are not informed of error in the rejection of claim 28.

DECISION

The Examiner's rejection of claims 1, 3–7, 10, 12–14, 17, 18, 20, and 22–27 under 35 U.S.C. § 112 is reversed.

The Examiner's rejections of claims 1, 3–7, 10, 12–14, 17, 18, 20, and 22–27 under 35 U.S.C. § 103(a) are reversed.

The Examiner's rejections of claims 28–33, 35, 38, and 40 under 35 U.S.C. § 103(a) are affirmed.

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).

AFFIRMED-IN-PART