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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte CHARLES E. AHLFELD, JOHN ROGERS GILLELAND,
RODERICK A. HYDE, MURIEL Y. ISHIKAWA, DAVID G. MCALEES,
NATHAN P. MYHRVOLD, CHARLES WHITMER, and
LOWELL L. WOOD JR.

Appeal 2012-004505
Application 12/152,293
Technology Center 3600

Before EDWARD A. BROWN, WILLIAM A. CAPP, and
JAMES J. MAYBERRY, *Administrative Patent Judges*.

BROWN, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Charles E. Ahlfeld et al. (Appellants)¹ appeal under 35 U.S.C. § 134 from the Examiner's decision rejecting claims 1–14.² *Id.* We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

¹ The Appeal Brief identifies the real party in interest as Searete LLC. Appeal Br. 5.

² Claims 15–35 have been withdrawn from consideration, and claims 36–88 have been cancelled. *Id.*

CLAIMED SUBJECT MATTER

Claim 1, the sole independent claim on appeal, reads:

1. A modular nuclear fission deflagration wave reactor comprising:

a plurality of neutronically couplable nuclear fission deflagration wave reactor modules; and

a plurality of nuclear shielding material receivers configured to removably receive nuclear shielding material such that each neutronically couplable nuclear fission deflagration wave reactor module is configured to be neutronically shielded from at least one adjacent neutronically couplable nuclear fission deflagration wave reactor module.

Appeal Br. 92 (Claims. App.).

REJECTIONS

1. Claims 1–14 are rejected under 35 U.S.C. § 112, first paragraph, enablement requirement.
2. Claims 1–5, 7, and 9–14 are rejected under 35 U.S.C. § 102(b) as anticipated by Trudeau (US 3,732,427, issued May 8, 1973).
3. Claims 1–4, 7, and 12–14 are rejected under 35 U.S.C. § 102(b) as anticipated by Craig (US 4,508,677, issued Apr. 2, 1985).
4. Claims 1–7 and 12–14 are rejected under 35 U.S.C. § 102(b) as anticipated by Blanovsky (US 2008/0232533 A1, published Sept. 25, 2008).
5. Claim 8 is rejected under 35 U.S.C. § 103(a) as unpatentable over Blanovsky.
6. Claims 9–11 are rejected under 35 U.S.C. § 103(a) as unpatentable over Blanovsky and Suchy (US 4,617,170, issued Oct. 14, 1986).

ANALYSIS

Lack of Enablement of Claims 1–14

Claim 1 recites, *inter alia*, “a plurality of neutronically couplable nuclear fission deflagration wave reactor modules.” Appeal Br. 92 (Claims App.). The Examiner’s position is that a “cooling system” and a “core” are “critical or essential to the practice of the invention,” but, because these elements are not included in the claims, the claims are not enabled by the disclosure. Final Act. 8 (citing *In re Mayhew*, 527 F.2d 1229 (CCPA 1976)).

Where a claim fails to recite a feature described in the specification as essential to the claimed invention, the claim does not comply with the enablement requirement of 35 U.S.C. § 112, first paragraph. *See Mayhew*, 527 F.2d at 1233 (affirming the rejection of claims not limited to having a “special cooling apparatus, specially located,” because the specification indicated the process would not work without the special cooling apparatus). For the enablement requirement, the dispositive issue is whether Appellants’ disclosure, considering the level of ordinary skill in the art as of the date of the application, would have enabled a person of such ordinary skill to make and use the invention without undue experimentation. *In re Strahilevitz*, 668 F.2d 1229, 1232 (CCPA 1982). The Patent Office has the initial burden of advancing acceptable reasoning inconsistent with enablement to shift the burden to Appellants to show that one of ordinary skill in the art could have practiced the claimed invention without undue experimentation. *Id.* The Examiner’s burden in an enablement rejection is that:

[T]he explanation of the rejection should focus on those factors, reasons, and evidence that lead the examiner to conclude e.g., that the [S]pecification fails to teach how to make and use

the claimed invention without undue experimentation, or that the scope of any enablement provided to one skilled in the art is not commensurate with the scope of protection sought by the claims.

Manual of Patent Examining Procedure (MPEP) § 2164.04. Factors to be considered by the Patent Office in determining whether a disclosure would require undue experimentation include (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims. *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988).

Here, Appellants point out correctly that the Examiner has not addressed adequately the issue of undue experimentation. Reply Br. 15–16. The Examiner states, “[f]or example, the coolant system may be located *outside of the module*, but still within the reactor.” Final Act. 8 (emphasis added). We agree with Appellants that this statement appears to belie the Examiner’s position that the cooling system is an essential element of the claimed modules. Reply Br. 14–15.

Further, although the rejection need not discuss every *Wands* factor (see MPEP § 2164.04, *citing* MPEP § 2164.01), as noted by Appellants, the Examiner does not indicate that any of the *Wands* factors have been considered, and it is not apparent that the Examiner has relied on any evidence sufficient to support the conclusion of lack of enablement. Reply Br. 15–16. Regarding the “critical or essential” elements in claim 1, the Examiner acknowledges Appellants’ Specification discloses that the recited “modules” “suitably include a reactor coolant system and a nuclear fission deflagration wave module core.” Final Act. 8. The Examiner does not

explain adequately the reasons that undue experimentation would be required to make and use the claimed subject matter. We do not sustain the rejection of claims 1–14 under § 112, first paragraph.

Anticipation of Claims 1–4, 7, and 9–14 by Trudeau

The Examiner finds Trudeau discloses all elements of claim 1. Final Act. 9. Specifically, the Examiner finds Trudeau discloses the module limitation (citing col. 5, ll. 65–67) and nuclear shielding material receivers 56. *Id.* Trudeau’s column 5, lines 65–67, describes “two primary cask subassemblies 28, each loaded with a fuel assembly having 204 spent fuel rods (not shown).” *See also* Trudeau, Figs. 5, 6. The Examiner indicates that the element shown in Figure 8 of Trudeau is interpreted as the module. Final Act 3.

Appellants contend Trudeau does not teach “a nuclear fission deflagration wave reactor, let alone a modular nuclear fission deflagration wave reactor.” Appeal Br. 40. According to Appellants, “the shielded trailer of Trudeau et al. that may be pulled by a truck or loaded onto a train and that holds spent fuel in a shielded cask cannot possibly, let alone reasonably, be found to teach a modular nuclear fission deflagration wave reactor.” *Id.* at 41.

Appellants’ contentions are persuasive. Trudeau discloses a transport system for *spent* nuclear fuel assemblies *removed from* a nuclear power reactor. Trudeau, col. 8, ll. 45–55. The spent fuel assemblies removed from the reactor are loaded into primary cask subassemblies 28, which are then loaded into secondary casks 30. *Id.* at col. 9, ll. 44–45, Fig. 8. As shown in Figure 5, the secondary casks 30 containing the loaded primary cask subassemblies 28 are then loaded onto a trailer transporter 12. Trudeau does

not disclose that the secondary casks 30 containing the loaded primary cask subassemblies 28 are a reactor, or form part of a reactor.

During examination, “the PTO must give claims their broadest reasonable construction consistent with the [S]pecification.” *In re ICON Health & Fitness, Inc.*, 496 F.3d 1374, 1379 (Fed. Cir. 2007). Under the broadest reasonable interpretation standard, claim terms are generally given their ordinary and customary meaning as would be understood by one of ordinary skill in the art in the context of the Specification. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). The Examiner’s interpretation of the recited plurality of neutronically couplable nuclear fission deflagration wave reactor modules to encompass Trudeau’s primary subassemblies 28 and secondary casks 30 is unreasonably broad. *See* Appeal Br. 43.

Accordingly, the Examiner’s finding that Trudeau discloses all limitations of claim 1 is not supported by a preponderance of the evidence. We do not sustain the rejection of claim 1 and dependent claims 2–4, 7, and 9–14 as anticipated by Trudeau.

Anticipation of Claims 1–5, 7, and 12–14 by Craig

The Examiner finds Craig discloses all elements of claim 1. Final Act. 12 (citing Craig, Fig. 5). Regarding the module limitation, the Examiner finds Craig discloses “inner and outer core fuel assemblies and fertile fuel assemblies.” *Id.* The Examiner states that “the modules of Craig et al. are reasonably considered to include a coolant system (coolant surrounding fuel assemblies) and a core (i.e., space containing fuel).” *Id.* at 5. The Examiner also states that “the modules of Craig et al. are capable of

ignition and facilitating at least some propagation of a deflagration wave due to the burn/breed materials present in the assemblies.” *Id.*

Figure 1A of Craig depicts a nuclear reactor unit 10 including a nuclear heat supply module having a reactor core unit 13. *See also* Craig, col. 6, l. 60–col. 7, l. 7. Figure 5 of Craig depicts a fast breeder reactor core unit, which includes inner core fuel assemblies and outer core fuel assemblies surrounded by fertile fuel assemblies, which are surrounded by reflectors. *Id.* at col. 10, ll. 43–58; Fig. 5.

Appellants contend, *inter alia*, that “Craig et al. clearly and unambiguously teaches that the fuel rods are grouped into fuel assemblies that are contained in *one* core barrel 31 that is contained in *one* reactor core unit 13 that is contained in *one* reactor unit 10.” Appeal Br. 48 (emphasis added). Appellants contest “how *each single* fuel rod and its surrounding coolant can be reasonably interpreted in light of the [S]pecification as ‘neutronically couplable nuclear fission deflagration wave reactor modules.’” *Id.* (emphasis added).

Claim 1 requires “a *plurality* of neutronically couplable nuclear fission deflagration wave reactor *modules*,” and “a *plurality* of nuclear shielding material receivers configured to removably receive nuclear shielding material such that *each* neutronically couplable nuclear fission deflagration wave reactor *module* is configured to be neutronically shielded from at least one adjacent neutronically couplable nuclear fission deflagration wave reactor module.” Appeal Br. 92 (Claims App., emphasis added). We agree with Appellants that the Examiner has not explained adequately how the reactor core unit of the nuclear reactor unit shown in Figure 5 of Craig corresponds to a plurality of the claimed neutronically

couplable nuclear fission deflagration wave reactor modules. Additionally, the Examiner has not shown with evidence that Craig's reactor core unit comprises a plurality of nuclear shielding material receivers with all claimed limitations.

Accordingly, the Examiner's finding that Craig discloses all limitations of claim 1 is not supported by a preponderance of the evidence. We do not sustain the rejection of claim 1 and dependent claims 2–4, 7, and 9–14 as anticipated by Craig.

Anticipation of Claims 1–7 and 12–14 by Blanovsky

The Examiner that Blanovsky discloses all elements of claim 1. Final Act. 14 (citing Blanovsky, Fig. 2). The Examiner finds Blanovsky's elements "27/29" meet the module limitation. *Id.* According to the Examiner, "[i]t is reasonable to interpret the coolant surrounding the assemblies 27/29 as the coolant system and the fuel rods containing the fuel as the module core, in light of the instant disclosure." *Id.* at 6. The Examiner also states that "the modules of Blanovsky are capable of ignition and facilitating at least some propagation of a deflagration wave due to the fertile/fissile materials present in the assemblies." *Id.* at 7.

Blanovsky discloses a reactor vessel 19 containing weapons or reactor-grade plutonium fuel 27 and fertile fuel assemblies 29. Blanovsky ¶ 44; Fig. 2. The Examiner has not explained adequately how the weapons or reactor-grade plutonium fuel 27 and fertile fuel assemblies 29 of the reactor shown in Figures 1 and 2 of Blanovsky corresponds to a plurality of the claimed neutronically couplable nuclear fission deflagration wave reactor modules. Additionally, the Examiner has not shown with evidence

that Blanovsky also discloses a plurality of nuclear shielding material receivers with all claimed limitations.

Accordingly, the Examiner's finding that Blanovsky discloses all limitations of claim 1 is not supported by a preponderance of the evidence. We do not sustain the rejection of claim 1 and dependent claims 2–4, 7, and 9–14 as anticipated by Blanovsky.

Obviousness of Claim 8 over Blanovsky

Claim 8 recites that “the neutron absorbing material includes at least one element chosen from lithium and europium.” Appeal Br. 93 (Claims App.). The Examiner finds Blanovsky teaches this limitation. Final Act. 16–17 (citing Blanovsky ¶ 72, ll. 7–8).

The Examiner's application of Blanovsky to the rejection claim 8 fails to cure the deficiencies of the rejection of claim 1 over Blanovsky. Thus, we do not sustain the rejection of claim 8 as unpatentable over Blanovsky.

Obviousness of Claims 9–11 over Blanovsky and Suchy

Claim 9 recites that “the nuclear shielding material includes γ absorbing material.” Appeal Br. 93 (Claims App.). Claim 10 depends from claim 9 and recites that “the γ absorbing material includes high-Z material.” *Id.* Claim 11 depends from claim 10 and specifies the high-Z material. *Id.* The Examiner relies on Suchy for teaching the limitations of claims 9–11. Final Act. 17–18.

The Examiner's application of Suchy to the rejection of claims 9–11 fails to cure the deficiencies of the rejection of claim 1 over Blanovsky. Thus, we do not sustain the rejection of claims 9–11 as unpatentable over Blanovsky and Suchy.

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DECISION

The decision of the Examiner to reject claims 1–14 is reversed.

REVERSED