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12/473,957	05/28/2009	Peter Moshchansky Livingston	NG(ST)019139 US PRI	1589
26294 7590 11/03/2016 TAROLLI, SUNDHEIM, COVELL & TUMMINO L.L.P. 1300 EAST NINTH STREET, SUITE 1700 CLEVELAND, OH 44114			EXAMINER	
			BURKE, SEAN P	
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BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte PETER MOSHCHANSKY LIVINGSTON

Appeal 2013-009519 Application 12/473,957 Technology Center 3600

Before MICHAEL L. HOELTER, JILL D. HILL, and PAUL J. KORNICZKY, *Administrative Patent Judges*.

HILL, Administrative Patent Judge.

DECISION ON APPEAL

STATEMENT OF THE CASE

Peter Moshchansky Livingston ("Appellant") appeals under 35 U.S.C.

§ 134(a) from the Examiner's decision to reject claims 1-14, 21, and 22.¹

We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM-IN-PART.

¹ Claims 15–20 have been canceled. Appeal Br. 24 (Claims App.).

CLAIMED SUBJECT MATTER

Independent claims 1 and 9 are pending. Claim 1, reproduced below, illustrates the subject matter on appeal.

1. A method of reducing the storage time of spent nuclear fuel, the method comprising:

providing a sample of spent nuclear fuel; and

irradiating the spent nuclear fuel with substantially collimated gamma ray photons having energy levels of about 10 MeV to about 15 MeV for a predetermined time period to initiate a photofission reaction in remaining fertile fissile material in the spent nuclear fuel.

REJECTIONS

I. Claims 1–3 stand rejected under 35 U.S.C. § 102(b) as anticipated by Brown (US 2002/0169351 A1; pub. Nov. 14, 2002). Ans. 4.

II. Claim 8 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Brown. Final Act. 5.

III. Claims 5 and 9 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Brown in view of Magill (US 5,966,418; iss. Oct. 12, 1999) or Baxter (US 5,513,226; iss. Apr. 30, 1996). Final Act. 6.

IV. Claims 6, 10, 12, 21, and 22 stand rejected under 35 U.S.C.§ 103(a) as unpatentable over Brown and Baxter. Final Act. 7.

V. Claim 4 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Brown, Soloway (US 2002/0186805 A1; pub. Dec. 12, 2002), and Brau et al. (US 4,189,686; iss. Feb. 19, 1980). Final Act. 8.

VI. Claims 7, 11, 13, and 14 stand rejected under 35 U.S.C.
§ 103(a) as unpatentable over Brown, Baxter, Soloway, and Brau. Final Act.
8.

ANALYSIS

Rejection I

Appellant argues claims 1–3 as a group. Appeal Br. 9. We select claim 1 as representative. Claims 2 and 3 stand or fall therewith.

Regarding claim 1, the Examiner finds that Brown discloses accelerating decay of nuclear waste or spent nuclear fuel, which inherently reduces the storage time of the spent nuclear fuel. Ans. 4–5. The Examiner also finds that Brown accelerates decay by irradiating "with gamma ray photons having energies up to 15 MeV/photon" and that "the gamma rays can be produced from a betatron (see paragraph 0051), which inherently produces a substantially collimated beam." *Id.* at 5.

Appellant argues that the Examiner fails to identify structure in Brown that corresponds to the claimed substantially collimated gamma ray photons. Appeal Br. 7. Appellant argues that the gamma rays generated by Brown's betatron impacting electrons onto a high-Z target cannot be substantially collimated gamma rays. *Id.* According to Appellant, "comparing a beam of substantially collimated gamma ray photons to the beam of a Betatron (as described by Brown) would be similar to comparing a beam of a laser (the substantially collimated gamma ray photons) to a beam of a flashlight (the beam of a Betatron)." *Id.* at 8.

The Examiner responds that Brown's gamma ray source may be noncoherent, but must be collimated to be directed. Ans. 10–11 (citing Brown ¶ 51 (generated "high energy gamma rays . . . [are] *directed at* the nucleus of the radioactive isotope to be remediated" (emphasis added))). Further, regarding Appellant's argument that laser beams differ from flashlights, the

Examiner responds that "both flashlights and lasers can be collimated." Ans. 11.

Appellant disagrees, responding that "[t]here is no requirement in . . . Brown that the incoherent gamma rays be collimated to be directed at a target, as contended by the Examiner." Reply Br. 3. According to Appellant, Brown's gamma rays need not be collimated, because random probability would cause Brown's gamma rays "to (very inefficiently) collide with the nucleus of the radioactive isotope without collimation, as long as the high-Z target and the radioactive isotope were located sufficiently close together." *Id*.

Appellant has not shown, by a preponderance of the evidence, that the Examiner erred in finding that one skilled in the art would understand that Brown's gamma rays, which are *directed at* the nucleus of the radioactive isotope to be remediated, are collimated. Appellant has failed to proffer a definition of collimated that excludes, as alleged, the beam of a flashlight. We therefore sustain Rejection I.

Rejection II

Appellant makes no argument that claim 8 would be patentable over Brown if claim 1 is anticipated by Brown. We therefore sustain Rejection II.

Rejection III

Claims 5 and 9 recite, *inter alia*, "placing the sample of spent nuclear fuel in a nuclear reactor with active nuclear material and control material; and removing portions of the control material until the reactor reaches near criticality prior to irradiating."

The Examiner finds that Brown discloses spent nuclear fuel being disposed in a nuclear reactor during irradiation by gamma ray photons, and that Magill and Baxter teach destruction of plutonium via irradiation in operating reactors that inherently includes: "a) active nuclear material and control material in the reactor; b) removing control material (e.g., control rods) to operate near criticality." Final Act. 6. The Examiner concludes that "removing portions of the control material" is an obvious "matter of design choice and/or optimization" because "[r]emoving the control material prior to irradiating with the gamma rays would result in a simpler operation compared to removing said material while performing the irradiation, but it would result in a longer time of irradiation, to achieve the desired final result." *Id.* at 7.

We discern no disclosure in Brown, Baxter, or Magill of removing control material to operate near criticality. Further, while removing control material until the reactor reaches near criticality prior to irradiating may indeed be an obvious matter of design choice/optimization, the Examiner's conclusory statement to that effect appears to be based, at best, on Appellant's own teachings. In certain situations, it can be obvious to optimize a result effective variable "[w]hen there is a design need or market pressure to solve a problem, and there are a finite number of identified predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp." *See In re Antonie*, 559 F.2d 618, 620 (CCPA 1977); *see also KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 420 (2007). The result effective variable, however, must first be recognized in the prior art. The Examiner has not shown where the art

recognized any result effective variable that would be optimized by operating near criticality. We therefore do not sustain Rejection III.

Rejection IV

Claims 6, 10, 12, 21, and 22 depend from claims 5 and 9. For the reason set forth above in Rejection III, we do not sustain Rejection IV.

Rejection V

Claim 4 recites "irradiating the spent nuclear fuel rod with a gamma ray free electron laser (FEL)." The Examiner finds that Soloway discloses using a laser "for generating photons to irradiate a radioactive sample," and Brau discloses "that a free electron laser (FEL) offers the advantage of tenability and scalability to high powers." Final Act. 8. The Examiner concludes that it would have been obvious to modify Brown's process to use a free electron laser, which would provide the advantages of "tunability and scalability to high powers," and that such a modification "is no more than the use of a well-known expedient within the nuclear art." *Id*.

Appellant argues that Soloway's technology and technique could not be employed in Brown, because "Soloway is limited to low-energy X-ray photons that have too little energy to significantly reduce the storage time of spent nuclear fuel," and Soloway's mirrors could not "reflect the about 10MeV gamma rays" as claimed. Appeal Br. 16; Livingston Decl.² ¶ 15.

The Examiner responds that Soloway is only relied on to disclose a laser, and that the claimed energy levels are disclosed by Brown. Ans. 15.

Appellant challenges the combinability of Brown and Soloway, and the Examiner fails to address Appellant's argument that one skilled in the art

² Declaration of Peter M. Livingston, dated December 19, 2012.

would not employ Soloway's technology and technique in Brown. Lacking a response thereto, we are persuaded by Appellant's argument, and we therefore do not sustain Rejection V.

Rejection VI

Like claim 4, claims 7, 11, 13, and 14 recite "a gamma ray free electron laser (FEL)," and/or the use thereof. The Examiner makes the same findings and conclusion discussed above regarding the disclosure of Brown, Soloway, and Brau. Final Act. 8–9. For the reasons set forth above in Rejection V, we do not sustain Rejection VI.

DECISION

We AFFIRM the rejection of claims 1–3 under 35 U.S.C. § 102(b) as anticipated by Brown.

We AFFIRM the rejection of claim 8 under 35 U.S.C. § 103(a) as unpatentable over Brown.

We REVERSE the rejection of claims 5 and 9 under 35 U.S.C. § 103(a) as unpatentable over Brown in view of Magill or Baxter.

We REVERSE the rejections of claims 6, 10, 12, 21, and 22 under 35 U.S.C. § 103(a) as unpatentable over Brown and Baxter.

We REVERSE the rejection of claim 4 under 35 U.S.C. § 103(a) as unpatentable over Brown, Soloway, and Brau.

We REVERSE the rejection of claims 7, 11, 13, and 14 under 35 U.S.C. § 103(a) as unpatentable over Brown, Baxter, Soloway, and Brau.

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