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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte E. MICHAEL CAMPBELL, DAVID EIMERL, and
WILLIAM F. KRUPKE

Appeal 2018-000646
Application 14/057,922
Technology Center 3600

Before CHARLES N. GREENHUT, MICHELLE R. OSINSKI, and
JEREMY M. PLENZLER, *Administrative Patent Judges*.

GREENHUT, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant,¹ Logos Technologies LLC,
appeals from the Examiner's decision to reject claims 1 and 3–26. Final Act.

1. An oral hearing was held on August 8, 2019. We have jurisdiction under
35 U.S.C. § 6(b).

We REVERSE.

¹ We use the word “Appellant” to refer to “Applicant” as defined in
37 C.F.R. § 1.42. Appellant identifies the real party in interest as Logos
Technologies LLC. Appeal Br. 1.

CLAIMED SUBJECT MATTER

The claims are directed to a flexible driver laser for inertial fusion energy. Claim 1, reproduced below, is illustrative of the claimed subject matter:

Claim 1: A laser fusion system comprising:

a plurality of at least 512 pulsed lasers that emit laser pulses, the plurality of pulsed lasers each having an exit aperture, the plurality of pulsed lasers configured such that all of the plurality of pulsed lasers emit a laser pulse that irradiates a target within a same time window of less than about 100 ns,

at least four of the plurality of pulsed lasers having different central optical frequencies such that the central optical frequencies of their respective emitted laser pulses differ by more than 1 THz, the central optical frequency of each of the plurality of pulsed lasers being correlated with a direction of propagation toward the target of the corresponding laser pulses to contribute to an increased uniformity in a k-space representation of a local electric field of a laser drive at the target.

REJECTIONS²

Claims 1, 8–12, 19, 21, 23, and 25 are rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement. Final Act. 11.

Claims 13 and 17 are rejected under 35 U.S.C. § 112, second paragraph. Final Act. 13.

² The Examiner withdrew the rejections under 35 U.S.C. § 103(a). Ans. 2.

OPINION

Enablement

The Examiner initially indicates in the statement of rejection that the rejection under 35 U.S.C. § 112, first paragraph is for failing to comply with the *enablement* requirement. Final Act. 11, para. 32. However, the Examiner immediately, and repeatedly, thereafter asserts Appellant has failed to demonstrate *possession* of the invention, which is the standard affiliated with the *written description*, as opposed to the *enablement*, requirement of 35 U.S.C. § 112, first paragraph. Final Act. 11 (“there exists absolutely no evidence of constructive possession at the time of filing”); Final Act. 12 (quoting from a portion of *Falko-Gunter Falkner v. Inglis*, 448 F.3d 1357, 1365 (Fed. Cir. 2006) discussing the written description requirement.).

The enablement requirement of 35 U.S.C. § 112, first paragraph, is separate and distinct from the description requirement. *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d 1555, 1563 (Fed. Cir. 1991); MPEP § 2161. The test for sufficiency with the written description requirement is whether the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had actual or constructive possession of the claimed subject matter as of the filing date. *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (citations omitted); MPEP § 2163. On the other hand, the standard for determining whether the specification meets the enablement requirement was cast in the Supreme Court decision of *Minerals Separation v. Hyde*, 242 U.S. 261, 270 (1916) which postured the question: is the experimentation needed to practice the invention undue or unreasonable? That standard is still the one to be applied.

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In re Wands, 858 F.2d 731, 737 (Fed. Cir. 1988); MPEP § 2164 (discussing the *Wands* factors).

Although the standards for determining compliance with the written description and enablement requirements are separate and distinct, there are important policy considerations underlying both of these requirements. The so-called quid-pro-quo of the patent grant ensures a patentee's right to exclude does not overreach the contribution to the art that the public receives from the patent's disclosure. *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d at 1353–4; MPEP § 2162. It is vital to the purpose of the patent system that patents do not “preempt the future before it has arrived.” *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d at 1353 (citation omitted). Although the Examiner's initial rejection appears to conflate the standards for compliance with the written description and enablement requirements of 35 U.S.C. § 112, first paragraph, in the Final Action, the Examiner, in the statement of rejection, raises some valid concerns related to these underlying policy considerations. These concerns are particularly relevant here because the field of endeavor involves a highly sought-after, yet thus far elusive, technology having the ultimate goal of generating a controlled and sustainable thermonuclear fusion reaction. *See* Spec. 1–11.

Paragraphs 33–39 on pages 11 to 13 of the Final Action set forth the initial basis for the Examiner's enablement rejection. Aside from the Examiner's assertion regarding the alleged absence of evidence showing possession, there does not appear to be any dispute regarding the contents of paragraph 33 of the Final Action in which the Examiner explains the National Ignition Facility (NIF) at the Lawrence Livermore National Laboratory (LLNL) in Livermore, California represents the state of the present art, involved significant time and expense to construct, and

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encountered various unforeseen obstacles. *See* Spec. 8–11. In paragraph 24 the Examiner asserts Appellant claimed to have developed a system at least three times more powerful than that at NIF. Final Act. 11–12. Although this would be a concern if true, we agree with the Appellant that the Examiner has failed to provide adequate evidence or explanation supporting the Examiner’s conclusion in this regard. Appeal Br. 19–20.

In paragraph 36 of the Final Action the Examiner questions whether 512 off-the-shelf diode lasers could produce enough power to produce an inertial confinement reaction and whether one could align and synchronize the firing of those lasers adequately. Again, the Examiner fails to adequately explain, with technical reasoning or evidentiary support, specifically why a skilled artisan would not know how to achieve the power, alignment and synchronization requirements necessary to satisfy the claim language. In paragraph 37 the Examiner asserts lasers do not yet exist to carry out the invention.

The inventor, David Eimerl, has provided an example of at least one commercially available laser purported to satisfy the power requirements necessary for the invention. Eimerl Dec’l para. 13. The Declaration goes on to address the other concerns raised by the Examiner in paragraph 36 regarding alignment and synchronization of the large number of lasers. Eimerl Dec’l paras. 14–17. The Examiner’s only response regarding the Declaration and the subject matter in question is to assert that the Eimerl declaration was not entered into the record during prosecution. Ans. 10. Appellant points out (Reply Br. 17) the Eimerl Declaration was entered with, and referenced in, Appellant’s remarks of March 28, 2016. It may not have been separately indexed in the Image File Wrapper (IFW) as an affidavit or declaration under 37 C.F.R. § 1.132, as is often done, but we are not

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apprised of any specific reasons that justify the Examiner's refusal to consider the Eimerl Declaration. A coauthor on the "StarDriver" publication (*see* Eimerl Dec'1 22), but not a named inventor on the present application, Robert L. McCrory also submitted a declaration discussing some of these issues. McCrory dec'1 paras. 10–12. The McCrory declaration, though initially discussed with regard to the now-withdrawn obviousness rejection, does not appear to be discussed by the Examiner in connection with the enablement rejection. Reply Br. 6.

Paragraph 38 of the Final Action asserts regarding claims 8–11, 21, and 25:

there exists no objective proof that the multiple aperture system can provide spatial uniformity at values of 1% and 0.25% rms. While the [S]pecification makes broad statements,[□] very little attention is paid to how one of ordinary skill would go about actually optimizing spatial uniformity for the beamlet design.[□]

Final Act. 13 (citations to the Specification omitted). It is true that a specification will fail to comply with the enablement requirement if it merely states a result to be achieved and one skilled in the art, based on the specification and the knowledge generally available to them would be unable to determine how to achieve that result without undue experimentation. Here, the Examiner does not provide any cogent technical explanation or supporting evidence to demonstrate why one skilled in the art would not be able to produce the particular pulse uniformity recited in claims 8, 9, 21, and 25. The Examiner also groups claims having differing limitations so it is not clear precisely what subject matter the Examiner considered non-enabled with regard to claims 10 and 11 specifically. Appeal Br. 37. Appellant relies on, for enabling disclosure regarding spatial uniformity, paragraphs 89 and 150–173 of the Specification and Figures 9

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and 10. Appeal Br. 37–42. We are unable to find any analysis from the Examiner regarding the relied upon portion of Appellant’s disclosure.

In the response to arguments section of the Final Action and the Examiner’s Answer the Examiner discusses the *Wands* factors. Final Act. 4–7; Ans. 5–13. Appellant also presents an analysis of the *Wands* factors. Appeal Br. 27–35; Reply Br. 8–17.

On page 5 of the Answer, considering the breadth of the claims, the Examiner takes issue with the absence of any specific recitation regarding the type of laser employed and other various properties of that laser. However, the Examiner’s questions are not coupled with any explanation as to why these specific characteristics must be included to narrow the scope of the claim so as to be commensurate with the disclosure. The claims are indeed broad, including generic and functional recitations without limitation to very specific structure. However, the Examiner’s analysis does not point to specific claim elements and provide any persuasive evidence or explanation as to why using generic or functional language is inappropriate in these particular circumstances.

On page 6 of the Answer, regarding the state of the prior art, the Examiner questions the ability to align the numerous lasers. The Examiner points to the difficulties associated with NIF lasers. However the Examiner does not provide any evidence or technical explanation regarding alignment specifically or why a “technological breakthrough” is needed to achieve such alignment.

On page 7 of the Answer the Examiner makes a generic assertion, again without supporting evidence or technical reasoning to explain why, skilled artisans would need more direction than is provided by the Specification or than is generally available to the skilled artisan, to select,

tune, and operate a system having the number of lasers recited. There is no evidence before us to demonstrate that there is a simple and direct correlation between the number of lasers employed and the degree of difficulty in selecting, tuning, and operating them.

On pages 7–9 of the Answer the Examiner points to various unforeseen issues encountered at NIF to determine the level of predictability in the art is low. When it comes to the ultimate goal of achieving ignition or a self-sustaining thermonuclear reaction, we agree the level of predictability is low. However, it is not clear to us that this should be the exclusive focus of the predictability inquiry. A device could be constructed with ignition as the ultimate goal and nevertheless have uses other than that such as for educational or research purposes. Reply Br. 12–14. The claim is directed to a “laser fusion system” and is arguably incomplete if it lacks the necessary elements for arriving at a system that produces fusion. The Examiner does not assert that fusion reactions have not been achieved at NIF and the Examiner does not identify any elements missing from the claim that are necessary to achieving fusion. The Examiner does not present any analysis as to why Appellant has not enabled at least a “laser fusion system” per se. The Examiner has not presented, and we are unaware of, any legal authority for the Examiner’s assertion that what must be enabled here is use for the specific goal of ignition.

Neither the Examiner nor the Appellant present much discussion concerning the amount of direction provided by the inventor or the existence of working examples. Ans. 9; Reply Br. 14–15. The Examiner basically summarizes some of the points discussed above on page 10 of the Answer.

We are mindful that the claims before us are broad, and the technology involved complex, elusive, and highly sought-after. As PTO

examiners are not typically in a position to obtain and test devices, particularly devices such as these, or solicit expert testimony, we are also mindful that addressing, with particularity, the declarations and the plethora of other articles and evidence of record is quite burdensome. However, the Examiner does not, in our view, adequately identify specific aspects of the claim language and adequately explain why, in light of the Specification, declarations, and other evidence of record relied upon by Appellant, those aspects cause the claim to encompass subject matter that is not enabled. *See* MPEP § 2164.04–05. Thus, on the record presently before us, we conclude the Examiner has not adequately articulated sufficient reasoning to conclude that Appellant’s Specification fails to comply with the enablement requirement.

Indefiniteness

Claims 13 and 17 are rejected as indefinite because the term “substantially different” is, according to the Examiner, a term of degree with no standard provided in the Specification for ascertaining the degree necessary to satisfy the claim language. Final Act. 13; *see* MPEP § 2173.05(b).

Appellant directs our attention to paragraph 171 of the Specification for understanding what is meant by “pulse shapes [that] . . . are substantially different” as recited in claim 13. Appeal Br. 44. In the Answer the Examiner indicates this paragraph is not sufficient to explicitly define “substantially different” and takes an alternate position that “different” is not a term that can be modified by a term of degree. Ans. 11. An explicit definition is not necessarily required for definiteness here. It is only necessary that one understands the meaning of claim terms when those terms are read in light of

the Specification. *See* MPEP § 2173.05(b)(I). Further, we cannot agree with the Examiner’s position that things are either different or not. Different is a term that can be subject to varying degrees from very similar or nearly identical to completely disparate. The relevant inquiry here is whether, in light of the Specification, one skilled in the art would know when pulse shapes do or do not fall into the category of “substantially different.” There are various well-known pulse shapes that pulses can be categorized into.³ Pulses may have significant or insignificant irregularities or deviations from these. The Examiner does not present any evidence that the dimensions of a shape (Ans. 12–13) would obfuscate categorization of the shape itself. The Examiner appears to be reading the claim as though it recites “pulses which are ‘substantially different’” (Ans. 11 n. 15). That is not what claim 13 recites. The Examiner has not presented sufficient evidence or reasoning to demonstrate that one skilled in the art could not compare pulse *shapes* and ascertain with a reasonable degree of certainty when they are, or are not, “substantially different.”

Appellant directs our attention to paragraph 168 of the Specification for understanding what is meant by “pulses irradiate . . . at substantially different times” as recited in claim 17. Appeal Br. 44–45. Paragraph 168 provides a more definitive standard than paragraph 171:

The pulses may be considered to irradiate the target substantially simultaneously when the pulses irradiate the target within a close enough window of time such that the target implodes to create a controlled fusion reaction as described herein, even though the pulses may not irradiate the target literally simultaneously . . .

³ *See, e.g.*, [https://en.wikipedia.org/wiki/Pulse_\(signal_processing\)](https://en.wikipedia.org/wiki/Pulse_(signal_processing)) last accessed Sept. 4, 2019.

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also irradiating the target at substantially different times such the pulses are time sequenced. . . .

This paragraph indicates that the nature of differences is to be judged based on the pulses' influence on the target and the sequencing capabilities of the lasers. The Examiner does not appear to provide any further analysis on this limitation in the Answer. We are not apprised as to why a skilled artisan could not compare the arrival times of pulses at a target and ascertain with a reasonable degree of certainty in this particular context whether they should be categorized as being substantially different or not.

For the foregoing reasoning we do not sustain the indefiniteness rejections.

DECISION

The Examiner's rejections are reversed.

REVERSED