Trials@uspto.gov
571-272-7822

Paper 11
Entered: January 22, 2019

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

BENSON HILL BIOSYSTEMS, INC.,
Petitioner,

v.

THE BROAD INSTITUTE INC.,
PRESIDENTS AND FELLOWS OF HARVARD COLLEGE &
MASSACHUSETTS INSTITUTE OF TECHNOLOGY,
Patent Owner.

Case PGR2018-00072
Patent 9,790,490 B2

Before SHERIDAN K. SNEDDEN, CHRISTOPHER G. PAULRAJ, and KRISTI L. R. SAWERT, *Administrative Patent Judges*.

SAWERT, *Administrative Patent Judge*.

DECISION
Denying Institution of Post-Grant Review
37 C.F.R. § 41.208

I. INTRODUCTION

Benson Hill Biosystems, Inc. ("Petitioner") filed a Petition for a post-grant review of all sixty claims of U.S. Patent No. 9,790,490 B2 ("the '490 patent," Ex. 1001). Paper 2 ("Pet."). The Broad Institute, Inc., President and Fellows of Harvard College & Massachusetts Institute of Technology (collectively, "Patent Owner") filed a Preliminary Response. Paper 9 ("Prelim. Resp.").

We have authority to determine whether to institute a post-grant review under 35 U.S.C. § 324 and 37 C.F.R. § 42.4(a). We may not institute a post-grant review unless "the information presented in the petition . . . if such information is not rebutted, would demonstrate that it is more likely than not that at least 1 of the claims challenged in the petition is unpatentable." 35 U.S.C. § 324(a).

Applying those standards, and upon consideration of the information presented in the Petition and the Preliminary Response, we determine that Petitioner has not demonstrated that it is more likely than not that at least one claim of the '490 patent is unpatentable. Accordingly, we do not institute a post-grant review of any claim of the '490 patent.

A. Related Proceedings

Petitioner and Patent Owner state that no related judicial matters are pending. Pet. 70. Both parties identify two pending patent applications, U.S. Patent Application No. 15/844,608 and U.S. Patent Application No. 15/783,770, which claim priority to the application leading to the '490 patent, as related matters. *Id.*; Paper 8, 1. Patent Owner also identifies

pending international application PCT/US16/38181, which claims priority to the application leading to the '490 patent, as a related matter. Paper 8, 1.

B. The '490 patent

The '490 patent relates to a CRISPR[1] system for targeting a nucleic acid sequence of interest, comprising a Cpf1 effector protein and an engineered guide polynucleotide. Ex. 1001, Abstract. According to the '490 patent, the Cpf1 effector protein is a novel RNA-endonuclease. *Id.* at 25:59–60.

The Cpf1 effector protein forms a complex with the guide polynucleotide, which is designed to hybridize to the target nucleic acid sequence. *Id.* at 26:15–17. Upon binding of the complex to the target sequence, the Cpf1 effector protein induces a "modification of the sequences associated with or at the target locus of interest." *Id.* at 2:47–51. "In a preferred embodiment, the modification is the introduction of a strand break." *Id.* at 3:8–9.

Unlike other known CRISPR systems, the CRISPR-Cpf1 system of the '490 patent system lacks a tracr sequence. *Id.* at 25:64–66. In this regard, "Applicants determined that Cpf1 effector protein complexes comprising only a Cpf1 effector protein and a crRNA (guide RNA comprising a direct repeat sequence and a guide sequence) were sufficient to cleave target DNA." *Id.* at 5:40–43.

[1] CRISPR stands for "Clustered Regularly Interspaced Short Palindromic Repeats." *E.g.*, Ex. 1001, 1:48–49. CRISPR systems were first discovered in bacteria and archaea, where they play a role in adaptive immunity by specifically cleaving foreign nucleic acids. *See, e.g.*, Ex. 2011.

The ’490 patent also discloses engineered Cpf1 effector proteins that, by “mutation of one or more amino acid residues of the effector protein,” have “reduced or abolished nuclease activity compared with an effector protein lacking said one or more mutations.” *Id.* at 6:38–44. This “effector protein may not direct cleavage of one or other DNA or RNA strand at the target locus of interest.” *Id.* at 6:45–46.

C. Challenged Claims

Petitioner challenges claims 1–60 of the ’490 patent. Pet. 14–15. The ’490 patent contains four independent claims. Ex. 1001, 547:49–549:26. Independent claims 1, 2, and 4 are drawn to an engineered, non-naturally occurring system comprising either a Cpf1 effector protein (claims 1 and 4) or a nucleotide sequence encoding a Cpf1 effector protein (claims 2 and 4), and at least one engineered guide polynucleotide (claims 1 and 4) or a nucleotide sequence encoding an engineered guide polynucleotide (claims 2 and 4). *Id.* Independent claim 3 is similar, but drawn to an engineered, non-naturally occurring vector system. *Id.* at 548:58–549:9. Claim 1 is representative:

> 1. An engineered, non-naturally occurring system comprising
>
> a) a Cpf1 effector protein, and
>
> b) at least one engineered guide polynucleotide designed to form a complex with the Cpf1 effector protein and comprising a guide sequence, wherein the guide sequence is designed to hybridize with a target sequence in a eukaryotic cell; and
>
> wherein the system lacks a tracr sequence, the engineered guide polynucleotide and Cpf1 effector protein do not naturally

> occur together, and a complex of the engineered guide polynucleotide and Cpf1 effector protein does not naturally occur.

Id. at 547:49–61.

D. Asserted Grounds of Unpatentability

Petitioner challenges the patentability of claims 1–60 on multiple grounds. Pet. 14–15. Petitioner presents the final two grounds—lack of utility and obviousness—as alternative grounds "if the Board disagrees with Petitioner's proposed claim construction." *Id.* at 14.

Claims	Statutory Basis
1–60	Lack of written description under 35 U.S.C. § 112(a) for a genus of Cpf1 effector proteins
1–60	Lack of enablement under 35 U.S.C. § 112(a) for a genus of Cpf1 effector proteins
1–60	Indefiniteness under 35 U.S.C. § 112(b) of "Cpf1 effector protein"
1–60	Lack of enablement under 35 U.S.C. § 112(a) for a genus of systems lacking a tracr sequence
1–60	Lack of written description under 35 U.S.C. § 112(a) for a genus of systems lacking a tracr sequence
1–60	Lack of utility under 35 U.S.C. § 101
1–60	Obviousness under 35 U.S.C. § 103 over Schunder,[2] general knowledge in the art, and various secondary references

Id. at 13–14. Petitioner also relies on the Declaration of Chase L. Beisel, Ph.D. (Ex. 1003). *E.g.*, *id.* at 1. Patent Owner disputes that Petitioner's asserted grounds render the challenged claims unpatentable. *See generally* Prelim. Resp.

[2] Eva Schunder et al., *First Indication for a Functional CRISPR/Cas System in* Francisella tularensis, 303 INT'L J. MED. MICROBIOL. 51–60 (2013). Ex. 1004 ("Schunder").

DOCKET ALARM

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts

Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research

With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips

Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS
Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS
Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS
Sync your system to PACER to automate legal marketing.