

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

INARI AGRICULTURE, INC.,
Petitioner,

v.

PIONEER HI-BRED INTERNATIONAL, INC.
Patent Owner.

Case No. PGR2024-00025
Patent No. 11,707,033

**PETITION FOR POST-GRANT REVIEW
UNDER 35 U.S.C. §§ 321-329 AND 37 C.F.R. § 42.1 et seq**

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Exhibit	Description
1001	U.S. Patent No. 11,707,033
1002	Prosecution History of U.S. Patent No. 11,707,033
1003	Declaration of Dr. Ray Riley
1004	Curriculum Vitae of Dr. Ray Riley
1005	U.S. Patent No. 9,572,319 (“Ross”)
1006	U.S. Patent No. 9,706,732 (“Carlone”)
1007	U.S. Patent No. 10,653,095 (“Heffner”)
1008	Plant Variety Protection Certificate No. 201700133
1009	Plant Variety Protection Certificate No. 201700146
1010	Plant Variety Protection Certificate No. 202000334
1011	Lundmark, C. Genetically Modified Maize. <i>BioScience</i> 2007, 57, 996
1012	Lee, E.A.; Tracy, W.F. <i>Modern Maize Breeding</i> , in Handbook of Maize: Genetics and Genomics; Bennetzen, J.L., Hake, S., Eds.; Springer: New York, NY, USA, 2009; pp. 141–160. ISBN 978-0-387-77863-1
1013	Byerlee, D., <i>The Globalization of Hybrid Maize, 1921–1970</i> , <i>J. Glob. Hist.</i> , 15:101–122 (2020)
1014	Varshney, R.K.; Tuberosa, R. <i>Genomics-Assisted Crop Improvement: An Overview</i> , in Genomics-Assisted Crop Improvement: Vol. 1: Genomics Approaches and Platforms; Varshney, R.K., Tuberosa, R., Eds.; Springer Netherlands: Dordrecht, The Netherlands, 2007; pp. 1–12. ISBN 978-1-4020-6295-7
1015	Andorf et al., <i>Technological advances in maize breeding: past, present and future</i> , <i>Theor Appl Genet.</i> , 132(3):817-849 (2019)
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1019	“A Brief History of Corn – From Domestication to 1995,” Pioneer Hi-Bred International, Inc. (Dec. 19, 2022), https://www.pioneer.com/us/agronomy/domestication-of-corn.html
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1021	Weber, <i>Today’s Use of Haploids in Corn Plant Breeding</i> in <i>Advances in Agronomy</i> , Volume 123 (2014)

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1022	Hostetler, <i>Bracing for sustainable agriculture</i> , Curr. Opin. Plant. Biol. 59:101985 (2021)
1023	Executive Order 14036: Promoting Competition in the American Economy, 86 Fed. Reg. 36987 (July 9, 2021)
1024	Thomas J. Vilsack, Secretary of Agriculture, and Kathi Vidal, Under Secretary of Commerce for Intellectual Property and Director of the U.S. Patent and Trademark Office, Increasing transparency, boosting competition, and supporting innovation can deliver better choices for farmers in the seed marketplace (March 7, 2023), https://www.uspto.gov/subscription-center/2023/increasing-transparency-boosting-competition-and-supporting-innovation-can
1025	USDA Agricultural Marketing Service, More and Better Choices for Farmers: Promoting Fair Competition and Innovation in Seeds and Other Agricultural Inputs (March 2023), https://www.ams.usda.gov/sites/default/files/media/SeedsReport.pdf
1026	March 7, 2023 Letter from USPTO Director Katherine K. Vidal to Secretary of Agriculture Thomas J. Vilsack and Undersecretary for Marketing and Regulatory Programs Jenny Lester Moffitt, https://www.uspto.gov/sites/default/files/documents/uspto-usda-letters03072023.pdf
1027	MacDonald, J.M., Dong, X., & Fuglie, K.O. (2023). Concentration and competition in U.S. agribusiness. U.S. Department of Agriculture, Economic Research Service, EIB-256, https://www.ers.usda.gov/webdocs/publications/106795/eib-256.pdf?v=7459
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1029	Brief for Respondent Pioneer Hi-Bred Int’l, <i>J.E.M. AG Supply, Inc. v. Pioneer Hi-Bred Int’l, Inc.</i> , 534 U.S. 124 (2001) (No. 99-1996) (filed June 2001), 2001 WL 674228
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1034	Excerpts from Merriam-Webster’s Collegiate Dictionary (11th ed. 2006)
1035	Altman, <i>Standard deviations and standard errors</i> , Brit. Med. J., 331:903 (2005)
1036	U.S. Patent No. 10,021,846
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1038	U.S. Patent No. 10,368,514
1039	U.S. Patent No. 10,238,072
1040	U.S. Patent No. 10,117,397
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1043	U.S. Patent No. 9,968,060
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1052	U.S. Patent No. 9,814,197
1053	U.S. Patent No. 11,758,864
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1055	U.S. Patent No. 11,622,520
1056	U.S. Patent No. 11,582,939
1057	U.S. Patent No. 9,737,020
1058	U.S. Patent No. 11,730,115
1059	“Genotypes,” panzea.org/genotypes
1060	U.S. Patent No. 10,912,266
1061	Brief for Intervenor – Director of the United States Patent and Trademark Office, <i>Tinnus Ents., LLC v. Telebrands Corp.</i> , 733 F. App’x 1011 (Fed. Cir. 2018) (No. 2017-1726) (filed Aug. 29, 2017)
1062	Motion of Intervenor to Withdraw From Appeal, <i>Tinnus Ents., LLC v. Telebrands Corp.</i> , 733 F. App’x 1011 (Fed. Cir. 2018) (No. 2017-1726) (filed March 29, 2018)
1063	Memorandum dated January 6, 2021 entitled “Approach to Indefiniteness Under 35 U.S.C. § 112 in AIA Post-Grant Proceedings,” https://www.uspto.gov/sites/default/files/documents/IndefinitenessMemo.pdf

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1067	“Agricultural Biotechnology Glossary,” U.S. Department of Agriculture, https://www.usda.gov/topics/biotechnology/biotechnology-glossary .
1068	Merriam-Webster, Ninth New Collegiate Dictionary (1984)
1069	U.S. Patent No. 11,659,803
1070	U.S. Patent No. 11,666,020
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1072	Crop Science Society of America, “Glossary of Crop Science Terms,” https://www.crops.org/publications/crops-glossary/browse/r/
1073	Excerpts from Merriam-Webster’s Ninth New Collegiate Dictionary (1984)
1074	Amended Complaint for Patent Infringement, <i>Pioneer Hi-Bred Int’l, Inc. v. J.E.M. AG Supply, Inc. et al</i> , No. C98-4016 (N.D. Iowa September 11, 1998)
1075	U.S. Patent No. 5,082,992
1076	U.S. Patent No. 5,347,081
1077	U.S. Patent No. 5,444,178
1078	U.S. Patent No. 5,453,564
1079	U.S. Patent No. 5,463,173
1080	U.S. Patent No. 5,491,295
1081	U.S. Patent No. 5,495,069
1082	U.S. Patent No. 5,502,272
1083	U.S. Patent No. 5,506,367
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1087	U.S. Patent No. 5,567,861
1088	U.S. Patent No. 5,569,822
1089	U.S. Patent No. 5,633,427
1090	U.S. Patent No. 5,689,034
1091	U.S. Patent No. 5,689,036
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1093	U.S. Patent No. 8,563,836
1094	USPTO Biotech/Chemical Partnership (BCP) Meetings: Biotechnology, Chemical and Pharmaceutical (BCP) Partnership Meeting, March 12, 2008, http://www.cabic.com/bcp/031208/
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1096	USDA Agricultural Marketing Service, Objective Description of Variety—Corn (<i>Zea mays</i> L.), https://www.ams.usda.gov/sites/default/files/media/28-Corn%20ST-470-28%202015.pdf
1097	USDA Agricultural Marketing Service, PVPO Program Requirements, https://www.ams.usda.gov/services/plant-variety-protection/pvpo-requirements
1098	Corteva’s Answering Brief in Opposition to Defendants’ Motion to Dismiss the First Amended Complaint (Docket No. 26 in <i>Corteva Agriscience LLC, Pioneer Hi-Bred Int’l, and Agrigenetics, Inc. v. Inari Agriculture, Inc. & Inari Agriculture NV</i> , C.A. No. 23-1059 (JFM)) (filed Jan. 9, 2024)
1099	Joint Rule 26(f) Report (Docket No. 42 in <i>Corteva Agriscience LLC, Pioneer Hi-Bred Int’l, and Agrigenetics, Inc. v. Inari Agriculture, Inc. & Inari Agriculture NV</i> , C.A. No. 23-1059 (JFM)) (filed April 3, 2024)
1100	Comparison between EX1001 (’033 Patent) and EX1005 (Ross)
1101	Comparison between EX1001 (’033 Patent) and EX1006 (Carlone)
1102	Comparison between EX1001 (’033 Patent) and EX1007 (Heffner)
1103	Comparison between EX1001 (’033 Patent) and EX1069 (U.S. Patent 11,659,803)
1104	Comparison between EX1001 (’033 Patent) and EX1070 (U.S. Patent No. 11,666,020)
1105	Comparison between EX1001 (’033 Patent) and EX1071 (U.S. Patent No. 11,696,545)

I. INTRODUCTION

Claims 1-20 (“Challenged Claims”) of U.S. Patent No. 11,707,033 (EX1001, “the ’033 Patent”) are utility patent claims to a plant—specifically, a particular variety of corn.

Patent Owner Pioneer Hi-Bred International (“PO”) obtained the claimed corn variety— designated “1PNZQ23”—by crossing (i.e., breeding) two other corn varieties—“PH1VKM” and “PH2DYM.” EX1001, 37:62-64. But such crosses were well within the level of skill for a person of ordinary skill (“POSA”) in the corn breeding field as of the ’033 Patent’s 7/2/2021 effective filing date. And nothing in the ’033 Patent or elsewhere in the record suggests the claimed 1PNZQ23 variety was patentably distinguishable over PH1VKM, PH2DYM, or any other preexisting corn variety. The ’033 Patent’s specification does not undertake any such comparison. On the contrary, it is largely identical to the specification of an indisputable prior art patent (Heffner) owned by PO and disclosing a “sibling” variety produced by *crossing the same two parental varieties PO used to create the claimed 1PNZQ23 variety*. See EX1102 (comparison between the ’033 Patent and EX1007 (Heffner)). The ’033 Patent’s specification never even acknowledges Heffner—much less disclose anything inventive about repeating the same cross.

Other indisputable prior art patents (Ross and Carlone) disclose the parental varieties themselves and teach that they can be used to create other inbred lines using the same breeding techniques later used in both the '033 Patent and Heffner.

The only differences of any note between the '033 Patent and the indisputable prior art are the recitations of different codenames (e.g., “1PNZQ23” versus “PH487D”) and—in the case of Ross and Carlone—different parental lines (corresponding to how the varieties were bred), along with tables reporting patentably insignificant differences in properties such as “flag leaf length.” But the '033 Patent is a *utility* patent—not a plant patent or certificate under the Plant Variety Protection Act (PVPA). And the properties reported by the '033 Patent concerning the claimed 1PNZQ23 variety fall well within the mainstream of corn phenotypes known long before the '033 Patent's 7/2/2021 effective filing date, and/or have no meaningful utility. Instead, the listing of characteristics included in the '033 Patent mirror the characteristics required to be identified in PVP certificates, which unlike utility patents do not require identified plant varieties to be useful or non-obvious.

Nor does the '033 Patent otherwise suggest any reason why the particular combination of reported properties made the claimed 1PNZQ23 variety any better in any respect than any preexisting type of corn for any application. On the contrary, the '033 Patent's “Industrial Applicability” section (EX1001, 36:21-65)

is—like the specification as a whole—essentially a cut-and-paste of a passage PO included in numerous prior art patents, including Ross, Carlone, and Heffner. EX1005, 42:6-49; EX1006, 42:5-48; and EX1007, 37:17-60. In sum, while the claimed 1PNZQ23 variety may have been technically *different* from prior varieties in certain respects (as would *any* new corn variety given the realities of sexual reproduction), it was neither inventive under §103 nor useful under §101.

Yet the '033 Patent's prosecution history does not reflect the necessary level of consideration of §103 or §101.¹ The Examiner did not make any such rejections. Instead, the Examiner stated that “[t]he closest prior art is US Patent Number 9,930,848 [EX1066], which teaches inbred line PH2RTZ having the same anther color, silk color, and cob color. However, inbred line PH2RTZ exhibits distinct aleurone color and genetic background.” EX1002, 101. That is, the Examiner apparently relied on two features for patentability: (1) genetic background (i.e., meaning different parentage, but without providing or pointing to any information about gene expression) and (2) aleurone color.

However, the Examiner did not apply or even discuss prior art varieties with related genetic background—including the claimed variety's parents (in Ross and

¹ Section cites are to 35 U.S.C. or 37 C.F.R. as context indicates, and all emphasis/annotations added unless noted.

Carlone) and full sibling (Heffner). *See infra* §V. Ross, Carlone, and Heffner are plainly closer prior art references than the '848 Patent—particularly given their common genetic heritage and Heffner's matching aleurone color. The Examiner's failure to address this highly pertinent prior art highlights the inadequacy of the Office's examination of the Challenged Claims.

More fundamentally, the Examiner's reliance on these alleged distinctions (genetic background and aleurone color) prevented fulsome examination of the Challenged Claims in view of the statutory non-obviousness requirement for utility patent protection. Under the Examiner's legally erroneous approach, plant breeders could obtain utility patent protection for *any* new variety provided it is technically novel—regardless of how little it actually varies from earlier varieties and whether those differences serve any useful purpose. Indeed, here PO has obtained *two* patents on crosses of the same parent varieties without showing *any* meaningful difference between the two. But utility patent protection is not available for such “ordinary innovation,” which if monopolized would “stifle, rather than promote, the progress of useful arts.” *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 427 (2007) (citing U.S. Const., Art. I, § 8, cl. 8).

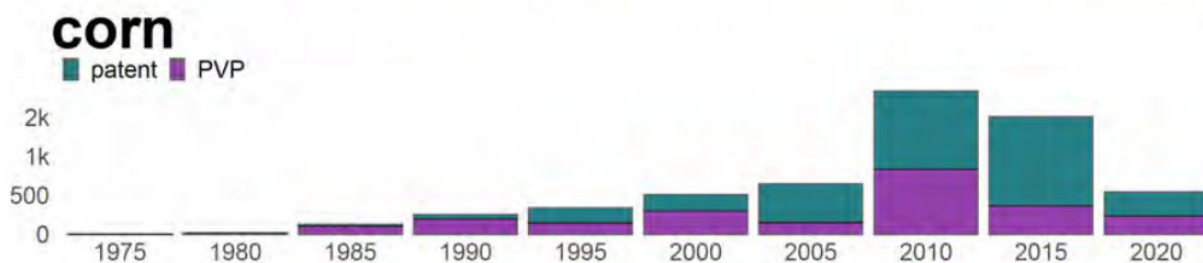
PO and other plant breeders who invest the time in such breeding remain free to pursue PVP certificates, which as the Director has explained “strike a different balance from patents in permitting farmers to save seeds and for plant

breeders to engage in continued research on the protected variety.” EX1026, 4.

Utility patents have no such statutory carveout once issued, but must meet a higher standard to be granted at all. As the Supreme Court has stressed—in a case involving PO—“[i]t is ***much more difficult*** to obtain a utility patent for a plant than to obtain a PVP certificate because a utility patentable plant must be new, ***useful, and nonobvious***,” whereas “a plant variety may receive a PVP certificate without a showing of usefulness or nonobviousness.” *J.E.M. Ag Supply, Inc. v. Pioneer Hi-Bred Int’l, Inc.*, 534 U.S. 124, 142 (2001). In *J.E.M.*, the Supreme Court echoed PO’s own emphasis that PVP certificates offered “narrower” protection than utility patents (EX1029, *13), but likewise had no “requirement of nonobviousness or utility” (*id.*, *11).

Here, however, PO obtained the ’033 Patent even though the claims fail both the non-obviousness and utility requirements. PO’s disclosures are at best consistent with PVP-type protection—not the more rigorous requirements for utility patent protection. The Board previously faced such a situation when affirming an obviousness rejection for a plant variety—a decision (*Ex parte C*) PO itself later cited to the Supreme Court in *J.E.M.* as proof the non-obviousness requirement had teeth as applied to plant utility claims. EX1029, *20-21, *38, & n.25 (citing *Ex parte C*, 27 U.S.P.Q.2d 1492, 1496 (BPAI 1992)).

The '033 Patent indeed reflects a broader trend in which PO and other breeders have shifted their focus *away* from PVP certificates and toward utility patents—notwithstanding that the ever-increasing level of skill in the art should be elevating rather than lowering the bar for patentability and tilting the balance in the opposite direction. As the U.S. Department of Agriculture (“USDA”) noted in a recent report, “[a]cross all crops, IP composition generally shifted from mostly PVP certificates in the 1990s to a higher percentage of utility patents in 2020.” EX1025, 20. This trend was particularly pronounced for corn-related IP, which also saw a dramatic concentration of “IP ownership” during the period “by the top four firms,” including PO. *Id.*, 20 & n.25; *see also id.* at 21:



See also EX1028, 236 (noting that “the protection available for new plant varieties exceeds that for other patentable subject matter,” particularly given “the interpretation of nonobviousness by the Patent Office”); EX1027, 19; *cf.* 8 Chisum on Patents § 24.05 (2023) (noting that “a particular plant variety may not satisfy the nonobviousness requirement”: “Protection for undefined size or color

improvements of seed plants is more easily obtained and enforced under the PVPA....”).

The USDA prepared its report in consultation with the Office (see EX1026, 2) as part of broader partnership efforts following the President’s Executive Order tasking the Director together with the Secretary of Agriculture to collaborate on strategies for ensuring that patents do not “unnecessarily reduce competition in seed and other input markets beyond that reasonably contemplated by the Patent Act.” EX1023. The Director subsequently reiterated this as a “priority” and pledged that the Office would “[e]xplore initiatives to enhance the quality of the patent examination process for innovations related to agricultural products and processes.” EX1026, 2, 4.

Instituting post-grant review (“PGR”) on the ’033 Patent would further this priority, enhance patent quality in this vital space, and add some much needed “teeth” to the Office’s partnership with the USDA. Notwithstanding the President’s mandate (issued the week after PO filed the application at issue here along with numerous other near-identical applications based on an assembly line process relying on a prior art template), the ’033 Patent wrongly reduces competition in the corn seed market beyond that reasonably contemplated by the Patent Act. Instituting review would facilitate a return to the appropriate balance PO and the Office both stressed to the Supreme Court in *J.E.M.* as between PVPA

protection (*not* subject to non-obviousness and utility requirements, but subject to statutory exceptions) and utility patent protection (subject to non-obviousness and utility requirements, but *not* subject to the PVPA’s carveouts).

Aside from being unpatentable as obvious (Grounds 1-2) and lacking specific utility (Ground 3), the Challenged Claims are indefinite under the *Nautilus* standard (Ground 4) because they fail to provide “reasonable certainty” to POSAs concerning “the scope of the invention.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 911 (2014). The scope instead turns on the meaning of two phrases—“inbred maize variety 1PNZQ23” and “representative seed”—that are neither terms of art nor defined in the specification. Unlike PO’s earlier patents on inbred corn plants at issue in *J.E.M.*, the ’033 Patent does not limit the claimed variety based on the seed actually deposited.

Instead, the claims characterize the deposited seed as merely “*representative seed* of the variety.” But the specification does not disclose any standard for determining the degree to which seeds or plants must be related to the deposited seed to be covered by the Challenged Claims. The result is an impermissible “innovation-discouraging zone of uncertainty.” *Nautilus*, 572 U.S. at 911. Notably, PVP certificates do not raise such concerns, as the PVPA regime “more resembles copyright law than patent law,” with sanctions for “willful reproduction starting from the protected variety itself” rather than “independent work.” H.R.

Rep. No. 91-1605 (1970), 1970 U.S.C.C.A.N. 5082, 5093. By contrast, the '033

Patent wrongly deters such independent development.

Grounds 5-6 are rooted in §112(b) (like Ground 4) while raising fundamental questions concerning how §112(b) should be applied in the context of plant utility patents and PGRs more generally.

Ground 5 turns on PO's attempted reliance on the deposited seed as somehow "representative" of its claims without adequate description of this approximation relative to the scope of its claims and the prior art. Specifically, **are plant utility claims unpatentable as indefinite where the specification is silent as to terms of degree necessary to construe the claims in light of the "representative" seed deposit and prior art?** While deposited seed can support utility claims to plants grown from such seed, deposits alone do not provide reasonable certainty when claims purport to stretch *beyond* the scope of what patentees deposit. PO's attempt to claim beyond the scope of the deposited seed (unlike PO's traditional approach as evidenced in the *J.E.M.* patents) is akin to means-plus-function claiming, with "representative seed"—a phrase without an objective meaning to a POSA—akin to "nonce words." But the specification itself does not disclose any structure corresponding to that phrase. And as binding precedent confirms in the case of means-plus-function claims, material incorporated by reference does not suffice to satisfy the definiteness requirement

under §112(b). Patent claims instead must provide reasonable certainty on their face. Here, by contrast, PO’s attempt to claim beyond the scope of what PO deposited—but without explaining the degree of required relationship to the deposit—wrongly enlarges the “innovation-discouraging zone of uncertainty.” *Nautilus*, 572 U.S. at 911.

Ground 6 turns on the even stricter definiteness standard the Office has traditionally applied when patent owners or applicants have the opportunity to amend their claims. Specifically, **whether patent claims should be found unpatentable as indefinite in post-grant review proceedings if the claims contain words or phrases whose meaning is unclear (per *In re Packard*, 751 F.3d 1307 (Fed. Cir. 2014)), as the Office previously explained to the Federal Circuit (EX 1061) was appropriate to protect the public in patentability assessments?** The January 6, 2021 Memorandum (EX1063) adopting *Nautilus* rather than *Packard* as the indefiniteness standard for PGRs turns on faulty premises—failing even to acknowledge the fundamental difference between PGRs (in which patent owners may amend claims) and district court litigation (in which they may not). It is also an improper agency rule made outside of proper Notice-and-Comment-Rulemaking.

Instituting review and addressing these questions would track the President’s Executive Order tasking the Director and Secretary of Agriculture to collaborate on

strategies for ensuring that patents do not “unnecessarily reduce competition in seed and other input markets beyond that reasonably contemplated by the Patent Act.” EX1023. It would likewise promote the Office’s partnership with the USDA to implement the President’s Executive Order and “help ensure that competition in agricultural markets remains vigorous and in accord with what is reasonably contemplated by the Patent Act.” EX1026, 2. Allowing patent owners to rely on materials incorporated by reference for purposes of §112(b)’s public notice requirement wrongly impedes competition and unfairly burdens the public. Applying *Nautilus* rather than *Packard* despite patent owners’ ability to amend claims likewise unnecessarily impedes competition. As the Office has stressed, the *Packard* standard “fosters innovation and competitiveness.” MPEP §2173.

II. REQUIREMENTS FOR POST-GRANT REVIEW

A. Grounds for Standing

Pursuant to §42.204(a), Petitioner certifies that the ’033 Patent is available for PGR and that Petitioner is not barred or estopped from requesting PGR of the Challenged Claims on the grounds identified herein. The ’033 Patent issued on 7/25/2023, and this Petition is being filed within nine months of that date (4/25/2024). *See also infra* §I.B.1.

B. Identification of Challenge

Pursuant to 37 C.F.R. §§42.204(b) and (b)(1), Petitioner requests PGR of the

Challenged Claims and that the Board cancel the same as unpatentable. The '033 Patent matured from U.S. Patent Application No. 17/366,121, filed 7/2/2021 (“’121 Application”).

1. The '033 Patent is Eligible for PGR

The '033 Patent is eligible for PGR because it does not assert an effective filing date earlier than the '121 Application's actual 7/2/2021 filing date. It is unquestionably therefore an AIA “first-to-file” patent filed on or after 3/16/2013.

See also supra §I.A.

2. Statutory Grounds on Which the Challenge is Based

Petitioner respectfully requests institution of PGR and cancelation of the Challenged Claims on the following grounds:

Ground	Statute	Basis	Claims
1	§103	Obviousness based on Ross (EX1005) and Carlone (EX1006)	1-20
2	§103	Obviousness based on Heffner (EX1007)	1-20

Ground	Statute	Basis	Claims
3	§101	Lack of utility	1-20

Ground	Statute	Basis	Claims
4	§112(b)	Indefiniteness	1-20

The information required by §§42.204(b)(4)-(5) is provided in Sections V-VII. As explained therein—including with supporting citations to the declaration of Dr. Raymond Riley (EX1003)—the information presented herein demonstrates that is more likely than not that at least one of claims 1-20 is unpatentable. *See* §324(a).

Furthermore, institution can and should be granted under §324(b) for the separate and independent reason that the petition raises multiple “novel or unsettled legal question[s]”:

Ground	Statute	Legal Question	Claims
5	§112(b)	Are plant utility claims unpatentable as indefinite where the specification is silent as to terms of degree necessary to construe the claims in light of the “representative” seed deposit and prior art?	1-20
6	§112(b)	Whether patent claims should be found unpatentable as indefinite in post-grant review proceedings if the claims contain words or phrases whose meaning is unclear (per <i>In re Packard</i> , 751 F.3d 1307 (Fed. Cir. 2014)), as the Office previously explained to the Federal Circuit (EX 1061) was appropriate to protect the public in patentability assessments?	1-20

See infra §VIII.

III. THE '033 PATENT

A. Summary of the '033 Patent

The '033 Patent is directed to an inbred corn variety designated 1PNZQ23, which “originated from a cross between inbred line PH1VKM and inbred line PH2DYM.” EX1001, 37:60-64. In particular, “1PNZQ23 was developed by producing a doubled haploid from the F1 plants, selfing and using pedigree selection amongst the D1 lines, and selfing and bulking from the subsequent generations.” EX1001, 37:64-38:3. These techniques were well known to POSAs (Riley, ¶46) and disclosed verbatim in prior art references like Heffner (EX1007), which discloses crossing the same two inbred lines (i.e., PH1VKM and PH2DYM). EX1007, 38:56-61. *See infra* §V.A.2. Both Ross (EX1005, disclosing PH1VKM) and Carlone (EX1006, disclosing parent) likewise teach using those earlier inbred lines the same way both Heffner and the '033 Patent later did: “to produce double haploid plants.” EX1005, 38:48-50; EX1006, 38:45-46.

Indeed, aside from the variety designation itself, the '033 Patent’s “Abstract,” “Background,” and “Summary” sections are essentially identical to prior art applications, including Heffner—disclosing information already well known to POSAs. Riley, ¶¶47-48; EX1102 (redline comparison between '033 Patent and Heffner). The “Detailed Description” section likewise largely mirrors Heffner aside from certain immaterial deletions. Riley, ¶¶49, 178-183; EX1102.

While the data in the '033 Patent's "Table 1" ("Variety Description Information," EX1001, 38:11-39:28) varies slightly from that in the prior art tables, the differences are insubstantial. Riley, ¶50. Moreover, the fields themselves (e.g., "branch angle" and "tassel length") are taken verbatim from USDA forms (e.g., EX1096) and fields used with PVP certificates. Riley, ¶51; *see also* EX1008, 6-11; EX1009, 6-11; EX1010, 6-11. The identified characteristics facilitate assessing distinctiveness for purposes of the PVPA—not utility or non-obviousness for purposes of the Patent Act.

B. Level of Ordinary Skill in the Art

The level of ordinary skill in the art is evidenced by the prior art. *See In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (determining that Board did not err in determining level of skill based on references of record). The prior art discussed herein and in the declaration of Dr. Riley demonstrates that POSAs as of July 2021 had a high level of skill, with a doctoral degree in plant breeding or a related field, at least five years of experience with corn breeding, and additional experience interfacing with laboratory-side personnel (including a computational biologist along with genetics specialists) and field-side personnel. Alternatively, additional experience could take the place of an advanced degree. Riley, ¶¶19-22, 44-45.

C. Prosecution History

The '121 Application was filed on 7/2/2021 along with numerous other applications with virtually identical specifications filed on the same day but claiming purportedly different inbred corn varieties. *See, e.g.*, EX1103 (comparison between '033 Patent and U.S. Patent No. 11,659,803, EX1069); EX1104 (comparison between '033 Patent and U.S. Patent No. 11,666,020, EX1070); EX1105 (comparison between '033 Patent and U.S. Patent No. 11,696,545, EX1071).²

On 11/25/2022, the Examiner mailed a non-final Office Action. EX1002, 94-102. The Examiner's only prior-art based rejection³ confusingly found

² The '803, '020, and '545 Patents are the subject of Petitioner's PGR2024-00019, PGR2024-00020, and PGR2024-00023, respectively.

³ The Examiner also raised certain objections and indefiniteness rejections (EX1002, 96-99), which PO overcame by purportedly perfecting its seed deposit and amending certain claims to recite "of 1PNZQ23." *Id.*, 121-22. In addition, the Examiner also rejected pending claims 11-17 for lack of written description. *Id.*, 97-98. In response, PO amended claim 10 to specify that the converted version comprised "**all of** the physiological and morphological characteristics of maize

dependent claims 3-7 were anticipated, but not the independent claim from which they depended. *Id.*, 100. The Examiner did not specifically compare the claimed variety to the prior art, but instead based the rejection on a claim interpretation under which “any maize seed/plant” anticipated. *See id.* The Examiner stated that Applicant could overcome the “any maize seed/plant” interpretation by reciting a “hybrid maize seed of 1PNZQ23.” *Id.*, 101.

The Examiner also stated that the closest prior art was U.S. Patent No. 9,930,848 (EX1066), which disclosed a variety designated PH2RTZ “having the same anther color, silk color, and cob color.” EX1002, 101. “However,” the Examiner continued, “inbred line PH2RTZ exhibits distinct aleurone color and genetic background.” *Id.*, 101. The Examiner did not explain how these could render the claims patentable where the disclosed aleurone color (clear) was well known in the art—including in Heffner, which disclosed a sibling variety sharing the same two parents. *Id.* Nor did the Examiner explain the basis for treating the ’848 Patent as the closest prior art. Indeed, Heffner as well as Ross and Carlone (disclosing the parental varieties used in both Heffner and the ’033 Patent) are each more similar in numerous respects. Riley, ¶63.

variety 1PNZQ23 when grown under the same environmental conditions.” *Id.* at 119.

While PO identified Ross, Carlone, and Heffner in an IDS, the examiner never actually addressed these prior art references, notwithstanding that:

- (1) Ross, Carlone, and Heffner share genetic heritage with the '033 Patent, and
- (2) Heffner has the same clear aleurone color as the '033 Patent (i.e., the same allegedly distinguishing feature cited by the Examiner).

In particular, there is no indication the Examiner assessed whether the “differences between the claimed variety and the [prior art varieties] are so significant and unexpected that they should weigh more heavily than the numerous similarities between the claimed variety and the varieties of the cited prior art.” *Ex parte C*, 27 U.S.P.Q.2d at 1497 (affirming obviousness determination concerning plant utility claims). Nor is there any indication the Examiner assessed PO’s specification to determine whether it provided “a base for judging whether the differences” between the claimed variety and the prior art varieties were “in fact, significant and unexpected.” *Id.*

PO failed to disclose that parental line PH2DYM had already been a parental line for corn varieties claimed in at least **twenty-two** other U.S. patents and then-pending applications—including **eighteen** indisputable §102(a)(1) prior art references, two to inbred lines (i.e., Heffner (EX1007) and U.S. Patent 10,021,846 (EX1036)) and sixteen to hybrids (EX1037-EX1052). *See infra* §V.A.3; *see also*

Riley, ¶88. PO likewise failed to disclose that parental line PH1VKM had been one of the two parental lines for corn varieties claimed in at least **four** other U.S. patents and then-pending applications—including **two** indisputable §102(a)(1) prior art references, one to an inbred line (i.e., Heffner, EX1007) and one to a hybrid (EX1057). *See infra* §V.A.3; *see also* Riley, ¶87. PO was obligated to disclose those highly material applications. *See Dayco Prod., Inc. v. Total Containment, Inc.*, 329 F.3d 1358, 1365-69 (Fed. Cir. 2003).

PO’s response to the §102 rejection concerning dependent claims 3-7 was to amend claims 3 and 4 to recite 1PNZQ23 and claim 4 to recite “somatic cell.” EX1002, 118. PO presented no arguments for patentability over the prior art. EX1002, 121-122. The Examiner then allowed the application without identifying any reasons for patentability or further discussing prior art. EX1002, 125-129.

D. Challenged Claims

Claims 1-20 are reproduced in the Claim Listing (*infra* §XI).

IV. CLAIM INTERPRETATION

Claim terms subject to PGR are to be “construed using the same claim construction standard that would be used to construe the claim in a civil action

under 35 U.S.C. §282(b)⁴, including construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” §42.200(b).

As explained in Grounds 4-6 (*infra* §§VII-XIII), the Challenged Claims are unpatentable as indefinite under §112(b) under either the *Nautilus* standard governing patent litigation (Grounds 4-5) or the *Packard* standard governing Office proceedings in which claims can be amended (Ground 6). The Challenged Claims all directly or indirectly (via dependencies) recite “inbred maize variety 1PNZQ23” and likewise “***representative seed***” of the variety “having been deposited under NCMA accession number 202301024.” This attempt to claim more broadly than the deposit departs from PO’s traditional claiming practices with inbred lines as reflected in the *J.E.M.* litigation. Riley, ¶¶157-172, 176, 198.

Yet “representative seed” is neither defined in the ’033 Patent’s specification nor otherwise understood as a term of art. Riley, ¶¶193-198. Accordingly, while “inbred maize variety 1PNZQ23” plainly ***encompasses*** the deposited seeds, the outer boundary of the Challenged Claims lacks reasonable certainty under *Nautilus*

⁴ See generally *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005). This analysis is not a concession as to the scope of any claim term in litigation, or a waiver of any argument in any other proceeding.

(Grounds 5-6) and is unclear under *Packard* (Ground 6)—failing to comply with §112(b) under either standard.

Grounds 5-6 are consistent with Grounds 1-3 (*infra* §V-VI), which explain why the Challenged Claims are unpatentable for failure to comply with other statutory requirements.

Grounds 1-2 explain why it would have been obvious to breed plants with the actual properties disclosed in the '033 Patent. Grounds 1-2 therefore render the Challenged Claims unpatentable under §103 regardless of the outer boundary of the claims and in particular the meaning of “representative seed.”

Ground 3 likewise explains why the Challenged Claims are unpatentable under §101 for lack of specific utility even if construed as limited to exactly the disclosed properties—let alone under a broader interpretation.

V. GROUND 1-2: CLAIMS 1-20 ARE UNPATENTABLE AS OBVIOUS OVER THE PRIOR ART

Claims 1-20 are demonstrated herein as more likely than not unpatentable as obvious over prior art corn varieties that are structurally, phenotypically, and genotypically similar to the claimed 1PNZQ23 variety. Specifically, the claimed 1PNZQ23 was developed by crossing two varieties, designated PH1VKM and PH2DYM. EX1001, 37:62-64. These two parent varieties were disclosed in Ross and Carlone, respectively. Ross and Carlone also disclosed that PH1VKM and PH2DYM could be used to create other inbred lines, and they further disclosed the

exact same double haploid technique ultimately used to create the claimed 1PNZQ23 variety. The prior art also includes Heffner, which discloses an inbred variety developed by crossing PH1VKM and PH2DYM—just like the claimed 1PNZQ23 variety itself. Nothing in the '033 patent specification nor otherwise in the record suggests any basis for overcoming the obviousness showing herein. Moreover, the specification suggests no reason why minor distinctions in phenotypic characteristics between 1PNZQ23 and prior art varieties sharing substantial genetic overlap—including Heffner's full sibling—were significant. Riley, ¶¶58-60.

The Challenged Claims parallel those the Board rejected in *Ex parte C*, 27 U.S.P.Q.2d 1492, which concerned utility patent claims to a soybean plant. PO itself cited *Ex parte C* to the Supreme Court in *J.E.M.* when successfully arguing that utility patent protection should be available for plant varieties if—and only if—they satisfy all statutory requirements, including non-obviousness. EX1029, *20-21, *38, n.25. In other words, PO cited *Ex parte C* in successfully arguing that utility patent protection can coexist with PVPA protection because the requirements to obtain a patent are more stringent than those for a PVP certificate.

In *Ex parte C*, as here, the specification was “cryptic” and offered “little more detail than would be” expected in PVPA disclosures. 27 U.S.P.Q.2d at 1493. The *Ex parte C* specification had “little specific language which distinguishes the

claimed soybean variety from other soybean varieties and [did] not explain the significance of any differences in attributes between the novel variety and varieties that are old in the art.” *Id.* Here, likewise, the specification says nothing regarding any such distinctions relative to prior art varieties. Riley, ¶¶69-85, 92-93.⁵

The Board in *Ex parte C* affirmed obviousness rejections over prior art plants that were similar to the claimed plant in many respects despite certain variations in “color” and resistance to rot. *Id.* at 1496-1498. Nothing in the record explained why such differences were “so significant and unexpected that they should weigh more heavily than the numerous similarities between the claimed variety and the varieties of the cited prior art.” *Id.* at 1497. The specification offered no basis even for assessing whether the differences were “significant and unexpected”; it said nothing regarding the relevance of criteria such as “flower color.” *Id.* The same is true here, as detailed below.

Aside from having been cited by PO to the Supreme Court, the Board’s approach in *Ex parte C* tracks binding controlling precedent concerning the

⁵ By contrast, PO’s earlier patents had extensive comparative data. *See* Riley, ¶¶175-190. PO stressed these “extensive recitations” to the Supreme Court in *J.E.M.* when citing *Ex Parte C* to demonstrate §103 had teeth. EX1029, *38 & n.25.

obviousness of other types of claims—for example, those to chemical compounds—based on structurally similar prior art. *See, e.g., In re Dillon*, 919 F.2d 688, 697 (Fed. Cir. 1990) (en banc); *Application of Payne*, 606 F.2d 303, 314 (CCPA 1979).

Here, likewise, that approach confirms the obviousness of claims 1-20, which concern corn varieties insubstantially different from those disclosed in prior art references.

A. *Graham* Factor Analysis Relevant to Grounds 1-2

Obviousness is resolved based on underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; (4) any secondary considerations identified by PO. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966).

1. Scope and Content of the Prior Art

a. General State of the Art

As one of the world’s most important staple crops, Maize (*Zea mays*; commonly known as corn) has been the subject of well-developed breeding and selection techniques dating back roughly nine thousand years. Riley, ¶52.

Modern cross techniques date back to 1867, when plant breeders began directing pollen from one maize plant to another. In 1878–1881, crossing maize varieties to grow the production of commercial cultivars was proposed. Maize

genes important for commercially relevant traits also began to be discovered. A revolutionary step in maize breeding began with the discovery of ‘hybrid vigor’ in 1909. EX1013, 104. This was the first step toward maize scientific breeding. In 1933, the first hybrid maize created by crossing inbred lines was introduced, and maize breeding started entering the “hybrid era.” Riley, ¶53.

Employment of modern genetics and molecular biology techniques in maize breeding started in the 1970s–1980s with the first regenerated plant from a cell culture and sequencing the first maize genes. These modern techniques aided the identification of genes conferring desirable traits such as disease and/or insect resistance. Transgenic maize varieties began to emerge in the late 1990s, and transgenic hybrids that could confer traits such as insect resistance were commercialized. EX1011; *see also* Riley, ¶54.

Principles and methods of maize breeding and cultivar development to produce maize varieties with desirable traits have been described in various textbooks and publications including, *e.g.*, Fehr et al., Principles of Cultivar Development, (1987) (EX1016); Wych et al., Production of Hybrid Seed, Corn and Corn Improvement, Chapter 9 (1988) (EX1017); Lee et al., Handbook of Maize, Modern Maize Breeding (2009) (EX1012); and Andorf et al., Theor Appl Genet. 132(3):817-849 (2019) (EX1015). Such principles and techniques are also well known and routinely practiced by POSAs. Riley, ¶¶55-57.

b. Prior Art Disclosing Closely Related Inbred Maize Varieties

Ross (EX1005), Carlone (EX1006), and Heffner (EX1007) are indisputable post-AIA §102(a)(1) prior art—all issued over one year before 7/2/2021:

Reference	Issued
Ross	2/21/2017
Carlone	7/18/2017
Heffner	5/19/2020

These references disclose inbred corn lines with characteristics very similar to those of the claimed 1PNZQ23 as illustrated below. Riley, ¶63.

	‘033 Patent (1PNZQ23)	Ross (PH1VKM)	Carlone (PH2DYM)	Heffner (PH487D)
Grain Texture	Dent	[Dent] ⁶	[Flint-Dent] ⁷	Dent
Comparative Relative Maturity (days)	109	110	108	107
Emergence to 50% plants in silk (days)	55	49	49	51
Emergence to 50% plants in silk (heat units)	1348	1228	1228	1299
Emergence to 50% plants in pollen shed (days)	55	50	49	54

⁶ Bracketed data taken from corresponding PVP certificate. EX1008, 8.

⁷ EX1009, 8.

	‘033 Patent (1PNZQ23)	Ross (PH1VKM)	Carlone (PH2DYM)	Heffner (PH487D)
Emergence to 50% plants in pollen shed (heat units)	1348	1256	1228	1374
Plant height (to tassel tip) (cm), mean (SE)	198.2 (7.88)	252.4 (8.32)	208.7 (8.91)	200.9 (6.55)
Ear height (to base of top ear node) (cm), mean (SE)	78 (6.35)	97.7 (10.78)	54.5 (8.07)	75.1 (9.43)
Length of Top Ear Internode (cm), mean (SE)	10.9 (1.49)	19.4 (0.79)	17.4 (0.91)	16.3 (1.38)
Number of Nodes Above Ground, mean (SE)	13.4 (0.73)	13.9 (0.44)	12.7 (0.48)	10.7 (0.46)
Anthocyanin of Brace Roots (1 = absent, 2 = faint, 3 = moderate, 4 = dark)	2	3	2	2
Width of Ear Node Leaf (cm), mean (SE)	9 (0.59)	9.8 (0.51)	9.7 (0.56)	8.2 (0.65)
Length of Ear Node Leaf (cm), mean (SE)	66.8 (2.93)	81.4 (2.08)	75.6 (3.49)	67.8 (4.68)

	‘033 Patent (1PNZQ23)	Ross (PH1VKM)	Carlone (PH2DYM)	Heffner (PH487D)
Number of Leaves Above Top Ear, mean (SE)	5.5 (0.5)	5.5 (0.5)	5.6 (0.49)	5.8 (0.51) ⁸
Leaf Angle (degrees) (at anthesis, 2 nd leaf above top ear to the stalk), mean (SE)	31 (4.64)	15.8 (3.37)	29.6 (4.21)	27.4 (10.79)
Leaf Color	V. Dark Green	V. Dark Green	V. Dark Green	V. Dark Green
Leaf Sheath Pubescence (1 = none to 9 = peach-like fuzz)	7	6	6	6
Number of Primary Lateral Branches, mean (SE)	8.6 (2.5)	9.5 (2.25)	7.4 (1.96)	3.7 (1.73)
Branch Angle from Central Spike (degrees), mean (SE)	10.3 (5.12)	16.5 (6.02)	13.4 (4.71)	12 (5.34)
Tassel Length (from peduncle node to tassel tip) (cm), mean (SE)	56.7 (2.48)	64.1 (3.47)	64.3 (2.22)	53.9 (2.06)

⁸ PVP reports “6.” EX1010, 7.

	‘033 Patent (1PNZQ23)	Ross (PH1VKM)	Carlone (PH2DYM)	Heffner (PH487D)
Peduncle Length (from top leaf node to lower branch) (cm), mean (SE)	26 (2.46)	39.8 (3.08)	26.7 (1.42)	25 (2.92)
Central Spike Length (cm), mean (SE)	19.6 (1.53)	25.1 (2.72)	24.7 (1.87)	25.8 (1.99)
Flag Leaf Length (cm) (from flag leaf collar to tassel tip), mean (SE)	42.9 (2.03)	50.9 (3.14)	50.2 (1.63)	29.3 (2.41)
Pollen Shed (0 = male sterile to 9 = heavy shed)	8	9	9	7
Bar Glumes (1 = absent, 2 = present)	1	1	1	1
Anther Color	Yellow	Light Green	Light Green	Pale Yellow ⁹
Silk Color	Red	Red	Red	Red
Fresh Husk Color	Light Green	Light Green	Med. Green	Light Green
Dry Husk Color	White	White	White	White
Ear position at dry husk stage (1 = upright, 2 = horizontal, 3 = pedant)	1	3	1	1

⁹ PVP reports “Yellow.” EX1010, 8.

	‘033 Patent (1PNZQ23)	Ross (PH1VKM)	Carlone (PH2DYM)	Heffner (PH487D)
Husk Tightness (1 = very loose to 9 = very tight)	3	3	1	4
Husk Extension (at harvest) (1 = short (ears exposed), 2 = medium (< 8 cm), 3 = long (8-10 cm), 4 = very long (> 10cm))	2	[1] ¹⁰	[1] ¹¹	2
Length of Interior Husk (cm), mean (SE)	16.7 (0.96)	18.8 (1.33)	18.7 (1.09)	14.8 (2.52)
Shank Length (cm), mean (SE)	12.2 (1.86)	7.6 (1.86)	11.2 (3.27)	11.6 (2.79)
Ear Length (cm), mean (SE)	14.5 (0.66)	14.8 (0.7)	15 (1.18)	14.2 (0.93)
Ear Diameter at mid-point (mm), mean (SE)	43.6 (1.56)	45.6 (1.17)	44 (2.05)	41.7 (1.5)
Ear Weight (gm), mean (SE)	122 (13.47)	130.8 (10.87)	128.5 (16.1)	118.1 (11.38)

¹⁰ EX1008, 10.

¹¹ EX1009, 10.

	‘033 Patent (1PNZQ23)	Ross (PH1VKM)	Carlone (PH2DYM)	Heffner (PH487D)
Number of Kernel Rows, mean (SE)	16.8 (1.1)	17.4 (1.16)	19.1 (1.79)	16.3 (1.14)
Number of Kernels Per Row, mean (SE)	23 (2.22)	26.5 (1.56)	26.6 (2.94)	24.4 (3.24)
Kernel Rows (1 = indistinct, 2 = distinct)	1	1	2	2
Row Alignment (1 = straight, 2 = slightly curved, 3 = spiral)	1	1	1	1
Ear Taper (1 = slight cylindrical, 2 = average, 3 = extreme conical)	2	2	2	2
Kernel Length (mm), mean (SE)	11.5 (1.04)	12.3 (0.44)	12.2 (0.62)	10.9 (0.5)
Kernel Width (mm), mean (SE)	7.5 (0.81)	7.7 (0.54)	7.4 (0.44)	7.6 (0.6)
Kernel Pericarp Color	Clear	Clear	Clear	Clear
Aleurone Color Pattern	Homozygous	Homozygous	Homozygous	Homozygous

	‘033 Patent (1PNZQ23)	Ross (PH1VKM)	Carlone (PH2DYM)	Heffner (PH487D)
Aleurone Color	Clear	Yellow ¹²	Yellow ¹³	Clear
Hard Endosperm Color	Yellow	Yellow	Yellow	Yellow
Weight per 100 Kernels (unsized sample) (gm), mean (SE)	29.5	N/D	N/D	27.8
Cob Diameter at mid-point (mm), mean (SE)	23.3 (1.06)	26 (0.98)	25.8 (1.12)	21.3 (1.57)
Cob Color	White	Pink-Orange	White	Pink

Ross, Carlone, and Heffner likewise disclose that the disclosed inbred lines provide “source[s] of breeding material that may be used to develop new maize inbred varieties.” EX1005, 36:66-37:1; EX1006, 36:60-63; EX1007, 32:38-41. All also disclose the “production of double haploids...for the development of inbreds,” with an “F1 hybrid for which [the disclosed variety] is a parent.” EX1005, 38:47-50; EX1006, 38:43-46; EX1007, 34:9-12. The ’033 Patent itself discloses using the same technique with the parental inbred lines disclosed in Ross and Carlone:

¹² PVP reports “Pale Yellow.” EX1008, 10.

¹³ PVP reports “Pale Yellow.” EX1009, 10.

Prior Art	'033 Patent
Ross (EX1005), 38:49-50 (“[A]n F1 hybrid for which PH1VKM is a parent can be used to produce double haploid plants.”) Carlone (EX1006), 38:45-46 (“[A]n F1 hybrid for which PH2DYM is a parent can be used to produce double haploid plants	EX1001, 37:62-38:1 (“1PNZQ23 is an elite corn inbred line originated from a cross between inbred line PH1VKM and inbred line PH2DYM....Inbred 1PNZQ23 was developed by producing a doubled haploid from the F1 plants....”)

Ross and Carlone likewise disclose the “selfing,” “pedigree selection,” and “bulking” techniques disclosed in the ’033 patent following creation of the F1 plants. EX1005, 37:35-52; EX1006, 37:30-47. Indeed, Ross and Carlone expressly describe their respective “invention[s]” as encompassing methods of crossing the disclosed variety (PH1VKM in Ross, PH2DYM in Carlone) with another corn plant. EX1005, 37:16-25; EX1006, 37:11-20. And Heffner expressly describes creating a new inbred line by crossing Ross and Carlone—just like the ’033 Patent itself. EX1001, 37:61-64; EX1007, 38:55-57.

2. Differences Between the Prior Art and the Claimed Invention

Any differences between the prior art and the claimed invention are insubstantial. Riley, ¶68. Both the claims and the prior art are directed to stable

inbred maize varieties for use in industrial applications as well as breeding other inbred and/or hybrid lines. *Id.* Indeed, the '033 Patent's specification is essentially identical to Heffner (disclosing a prior art sibling variety sharing the same two parents) and also substantially overlaps with Ross and Carlone (disclosing the parental lines themselves). *Id.* Moreover, as the above table illustrates, the disclosed characteristics of the claimed 1PNZQ23 plant and its associated crop (i.e., corn ears) closely track those of the identified prior art maize lines. *Id.*, ¶¶74-85. Simply put, "[t]he claimed plant does not appear to differ significantly from the prior art plants as measured by numerous characteristics." *Ex parte C*, 27 U.S.P.Q.2d at 1496.

The disclosed properties concerning the claimed 1PNZQ23 variety instead fall well within the mainstream of corn phenotypes observed long before the '033 Patent's 7/2/2021 effective filing date. Riley, ¶69. There is no basis in the record from which to conclude that the identified traits would have fallen outside the range of expected outcomes from the cross yielding the claimed invention (Riley, ¶¶69-85)—in other words crossing PH1VKM (disclosed in Ross) with PH2DYM (disclosed in Carlone). Like that in *Ex parte C*, the specification here never indicates "(1) the characteristics possessed by each parent variety, (2) which of these characteristics were expected to be passed on to progeny plants, and (3) what inheritable characteristics (goals) were sought in the progeny." 27 U.S.P.Q.2d at

1493-94. Nor does the specification even acknowledge the PH487D variety disclosed in Heffner and sharing the same parents (PH1VKM and PH2DYM)—much less explain what made a second cross using the same two parents inventive. On the contrary, the properties of the PH487D variety disclosed in Heffner confirm that there was nothing unexpected or otherwise inventive regarding the 1PNZQ23 variety disclosed and claimed in the '033 Patent.

3. Level of Ordinary Skill in the Art

The level of skill in the art is high, as exemplified by PO's repeated use of the PH1KVM (disclosed in Ross) and PH2DYM (disclosed in Carlone) varieties as parental lines when breeding other corn varieties—as disclosed in at least **nineteen** other patents (EX1007, EX1036-EX1052, EX1057) that are indisputable §102(a)(1) prior art issued before 7/2/20 and further confirming the high level of skill. Riley, ¶¶87-88; *In re Epstein*, 32 F.3d 1559, 1563, 1567 (Fed. Cir. 1994). **Two** of those siblings are inbred lines disclosed in indisputable prior art (EX1007 and EX1036)—including Heffner's PH487D, which is a full sibling created by crossing Ross's PH1KVM **and** Carlone's PH2DYM. Riley, ¶¶86-87. **Five** additional applications on other sibling inbred lines were filed the same day as the '033 Patent. EX1053-EX1056, EX1058.

Ross and Carlone also disclose the same double haploid breeding technique described in the '033 Patent to create PH2DYM itself. *See supra* §V.A.1.b.

Heffner likewise describes the same method described in the '033 Patent, as shown by comparing the “Breeding History” sections of Heffner and the '033

Patent:

Heffner (EX1007), 38:56-61	'033 Patent (EX1001), 37:62-38:3
A cross was made <i>between inbred line PH1VKM and inbred line PH2DYM</i> .	1PNZQ23 ... originated from a cross <i>between inbred line PH1VKM and inbred line PH2DYM</i> ¹⁴
Inbred PH487D was developed by producing a doubled haploid from the F1 plants, selfing and using pedigree selection amongst the D1 lines, and selfing and bulking from the subsequent generations.	Inbred 1PNZQ23 was developed by producing a doubled haploid from the F1 plants, selfing and using pedigree selection amongst the D1 lines, and selfing and bulking from the subsequent generations.

Heffner provides additional enabling information regarding each of these steps.

See EX1007, 34:8-35:44 (“Production of Double Haploids”); 33:1-17 (“Pedigree

¹⁴ The '033 Patent includes an additional sentence concerning generic “genetic analysis,” which Heffner discloses elsewhere. EX1007, 32:37-55; *see also* Riley, ¶182; *infra* §VII.B.1.

Breeding”); 10:65-11:2 (selfing); 33:41-49 (bulking). These techniques indeed were all well-known before the critical date. Riley, ¶¶64-65.

Indeed, as PO’s earlier patents confirm, corn breeding was a sophisticated science by 2021, with multi-disciplinary teams harnessing computational biology and sophisticated understandings of the corn genome (which had been sequenced in 2009) to create new varieties incorporating desired phenotypical features. Riley, ¶89; EX1018. These breeding efforts focused not only on the hybrid varieties sold to farmers, but also the “inbred” varieties used for breeding new hybrids. Riley, ¶89. As the ’033 Patent, the virtually identical Heffner prior art (disclosing a cross involving the same two parental varieties), and the likewise comparable Ross and Carlone references (disclosing the parental varieties themselves and teaching that they can be used to create new lines), each state, “[a] continuing goal of maize breeders is to develop stable, high yielding maize varieties and hybrids that are agronomically sound with maximal yield over one or more different conditions and environments.” EX1001, 1:23-26; EX1005, 1:24-27; EX1006, 1:24-27; EX1007, 1:23-26. Given the competitive nature of the market, constant evolution and improvement of a company’s inbred lines was a commercial imperative. Riley, ¶90.

In sum, “the desire to enhance commercial opportunities by improving [inbred corn varieties] is universal—and even common-sensical.” *DyStar*

Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co., 464 F.3d 1356,

1368 (Fed. Cir. 2006). Accordingly, “the proper question” when assessing obviousness “is whether the ordinary artisan possesses knowledge and skills rendering him *capable* of combining the prior art references.” *Id.* (emphasis original). And the high level of skill in the modern corn breeding field confirms such capability. POSAs were capable of breeding inbred lines to incorporate essentially any desired inbred phenotypical trait in descendent inbred lines provided it was within the scope of corn’s existing gene pool as confirmed by the existence of the trait in one or more preexisting corn varieties (as is the case with all of the identified characteristics in the ’033 Patent). Riley, ¶91; *see also Ex parte Ketkar*, Appeal 2017-008056, 2018 WL 3812708, at *6 (PTAB July 24, 2018) (affirming obviousness determination as to claimed corn variety: “The art in this case presents one skilled in the art with a finite number of known possibilities for crossing corn plants to produce the desired results.”).

It would constitute legal error “to discount the significant abilities of [POSAs] in” this “advanced area of art.” *In re Kubin*, 561 F.3d 1351, 1360 (Fed. Cir. 2009) (affirming obviousness rejection and “declin[ing] to cabin *KSR*” only to ostensibly “predictable arts”); *see also Ex parte Reid*, Appeal 2010-004943, 2010 WL 4876440, at *3 (BPAI Nov. 29, 2010) (addressing obviousness rejection of

plant utility claims and analogizing to *Kubin*: “In our opinion, *Kubin* applies in these circumstances.”).

4. Secondary Considerations

Nothing in the record suggests any purportedly unexpected results or other potential secondary considerations of non-obviousness. *Riley*, ¶¶92-93. On the contrary, the minor variations between the reported properties of the claimed variety versus prior art varieties are well within the bounds of what POSAs would expect in the ordinary course of plant breeding, as confirmed by the Heffner reference disclosing a prior art cross involving the same parental lines. *Id.*

Moreover, nothing in the specification or elsewhere in the record provides any comparative data—much less an analysis relative to the closest prior art. *See Ex parte Frohberg*, Appeal 2018-002288, 2019 WL 3033154, at *5 (PTAB July 3, 2019) (affirming obviousness rejection despite purported unexpected results:

“[T]he data is not compared to the closest prior art, the 0% amylose rice plant of Hu.”); *Ex parte Ketkar*, 2018 WL 3812708, at *6 (noting that applicants had

“presented no objective evidence,” and further that specification did “not identify [asserted] result as unexpected or surprising in any way”); *cf. Ex parte Reid*, 2010

WL 4876440, at *5 (reversing obviousness rejection based on evidence that cotton fiber from the claimed cotton plant variety was “unexpectedly better than the closest prior art”). The ’033 Patent never even acknowledges the prior art PH487D

variety disclosed in Heffner and sharing the same two parents—much less articulates how 1PNZQ23 was unexpectedly better in any way.

B. Ground 1: Claims 1-20 Are Unpatentable as Obvious Over Ross (EX1005) and Carlone (EX1006)

Ross and Carlone disclose the two parent varieties of the 1PNZQ23 variety claimed in the '033 Patent.

Specifically, the '033 Patent discloses that 1PNZQ23 “originated from a cross between inbred line PH1VKM and inbred line PH2DYM.” EX1001, 37:62-64. PH1VKM was disclosed in Ross, and PH2DYM was disclosed in Carlone. *See* EX1005, 1:32-33; EX1006, 1:32-33.

Ross and Carlone disclose that each of PH1VKM and PH2DYM, can be used “to Develop Another Maize Plant” and in particular is a “source of breeding material that may be used to develop new maize inbred varieties.” EX1005, 36:63-37:1; EX1006, 36:58-63. Each also discloses specific cross breeding techniques for producing such “new inbred” varieties. EX1005, 5:54-60; EX1006, 5:57-63; Riley, ¶¶64-66, 94-97.

Consistent with these disclosures, PH1VKM and PH2DYM had each repeatedly been used as one of the parents for other maize varieties—

PH1VKM was used as one of the parents in at least **three** other inbred lines (one of them—Heffner, EX1007—indisputable §102(a)(1) art) and at least **one** indisputable, prior art hybrid line. Riley, ¶¶87-88, 98.

PH2DYM was used as one of the parents in at least six other inbred lines (also including Heffner and a second indisputable prior art patent, U.S. 10,021,846, EX1036) and at least sixteen indisputable, prior art hybrid lines. *Id.*.

As Ross and Carlone disclose and these other crosses confirm, POSAs would have had reason to use PH1VKM and PH2DYM as patent inbred varieties to create a new inbred line. Indeed, Heffner—indisputable ¶102(a)(1) prior art—already taught exactly that combination. EX1007, 38:54-61. The nature of the maize market and the “desire to enhance commercial opportunities” (*DyStar*, 464 F.3d at 1368) confirms the reasons to create a wide array of new varieties using PH1VKM and PH2DYM. Riley, ¶¶99-100; *see also supra* §V.A.1.3. Moreover, it was routine in the industry to create multiple inbred lines using the same two parental varieties (as Heffner already disclosed). Riley, ¶99.

POSAs would have had a reasonable expectation of obtaining an inbred maize variety with PH1VKM and PH2DYM as parents, particularly given (1) the routine nature of the breeding techniques involved and (2) the multiple other instances already reported in which PH1VKM and/or PH2DYM had been used to breed other lines, including at least one indisputable prior art inbred line having both PH1VKM and PH2DYM as parents (Heffner). Riley, ¶100.

1. Claim 1: Variety 1PNZQ23

Claim 1 encompasses a seed, plant part, or plant cell of variety 1PNZQ23. 1PNZQ23's disclosed characteristics are highly similar to those in the PH1VKM and PH2DYM parents, and nothing in the specification or otherwise in the record suggests any property that POSAs would have viewed as surprising or unexpected over PH1VKM and PH2DYM. *Supra* §V.A; Riley, ¶¶101-110. Instead, as with the claims the Board found unpatentable in *Ex parte C*, the record does “not explain the significance of any differences in attributes between the novel variety and varieties that are old in the art.” 27 U.S.P.Q.2d at 1493. To the extent such differences exist, nothing suggests they are “so significant and unexpected that they should weigh more heavily than the numerous similarities between the claimed variety and the” PH1VKM and PH2DYM varieties, both of which Ross and Carlone tout as desirable bases for future inbred lines. *Id.* at 1497.

For one, statistical analysis of the '033 Patent data shows that most of the reported characteristics for the '033's 1PNZQ23 overlap with the values reported in Ross and Carlone for PH1VKM and PH2DYM when 95% confidence intervals are calculated (e.g., within 1.96 x standard error). *See* Riley, ¶¶80-85 and Appendix B.

It was well-known in the art to cross inbreds to create other inbreds with similar characteristics to the parent inbreds. Riley, ¶104. Moreover, comparing

the data presented in the '033 Patent with that in Heffner confirms that virtually all reported values (23 out of 25) overlap at the 95% confidence interval. *See* Riley, ¶¶103-104, 80-85 and Appendix B. Put differently, the properties of the corn plants reported in the '033 Patent based on a cross of Ross and Carlone track what a POSA would have expected based on the data disclosed in Heffner—the prior art patent disclosing an earlier cross of Ross and Carlone. Riley, ¶104.

The small number of non-overlapping values—in the case of Heffner, merely (1) number of nodes above ground and (2) flag leaf length—are no basis from which to conclude that variety 1PNZQ23 is patentable.

For one, even those categories falling outside of the 95% confidence intervals do not necessarily reflect a statistical difference in the values. The reported standard error only reflects the variation among a particular sample of the variety. Riley, ¶¶105, 80-85. It does not take into account the variation that would be expected for samples of the variety grown in different locations (but within a similar geographic area), which would be expected to be even larger. *Id.* Nor does it account for variation expected for different geographic locations or different years, each of which would be expected to be larger again. *Id.* Accordingly, the apparent differences in certain values do not necessarily indicate a statistical difference. *Id.*

Further, the characteristics in question lack any material commercial significance. Riley, ¶¶106-109. In particular, none of them are relevant to the '033 Patent's underlying goal of developing "stable, high yielding maize varieties and hybrids that are agronomically sound with maximal yield over one or more different conditions and environments." EX1001, 1:23-26; Riley, ¶106. Nor are they relevant to the nature of the '033 Patent's disclosed "Industrial Applicability." EX1001, 36:21-65; Riley, ¶106. And nothing in the '033 Patent's specification suggests any reason why such differences were "so significant and unexpected that they should weigh more heavily than the numerous similarities between the claimed variety" on the one hand and Ross and Carlone on the other. *Ex parte C*, 27 U.S.P.Q.2d at 1497; *see also* Riley, ¶106; EX1028, 265 ("[F]ood consumers are the ultimate losers when low nonobviousness standards are applied to plant varieties."); *id.*, 272 ("Proposed here is the designation of a limited number of plant characteristics, all of practical agronomic importance, which might be achieved to establish nonobviousness.").

Accordingly, claim 1 would have been obvious over Ross and Carlone.

2. Claims 2-20: Variations and Hybrids Related to 1PNZQ23

Claims 2-20 likewise would have been obvious over Ross and Carlone.

They recite variations, hybrids, and related methods concerning the claimed inbred line. Claims 2-20 indeed essentially mirror the claim set in Heffner (EX1007),

confirming that using and/or modifying inbred lines produced by crossing PH1VKM (i.e., Ross) and PH2DYM (i.e., Carlone)—as already disclosed in Heffner—in those ways would have been obvious. Riley, ¶111.

a. Claim 2: Ovule or Pollen From 1PNZQ23

Claim 2 depends from claim 1 and requires that “the plant part” be “an ovule” or “pollen.” EX1001, 39:34-35. Ross and Carlone disclose that maize plant parts include ovules and pollen. EX1005, 15:9-14; EX1006, 15:6-11. Each also includes corresponding claims. EX1005, 46:46-47; EX1006, 48:27-28. POSAs would have recognized that inbred lines created from Ross and Carlone likewise include both ovules and pollen. Riley, ¶112. Heffner (disclosing a prior art cross of Ross and Carlone) likewise has an analogous dependent claim, further confirming the obviousness of claim 2. EX1007, 40:22-23; Riley, ¶112.

b. Claims 3-8: Hybrids Derived From 1PNZQ23 and Methods Related to Such Hybrids

Claim 3 is to “[a]n F1 hybrid maize seed of 1PNZQ23 produced by crossing the plant or plant part of claim 1 with a different maize plant.” EX1001, 39:37-39. Ross and Carlone disclose that hybrids are generated by crossing two inbred varieties (such as PH1VKM and PH2DYM, respectively—see EX1005, 11:41-42, 36:64-65; EX1006, 11:39-40, 36:59-60), and further that “F1” hybrids—the “first generation” of the cross—are desired because they are “more vigorous than their inbred parents.” EX1005, 22:17-24; EX1006, 22:10-14. Claim 3 is obvious in

view of these disclosures in addition to the above-discussed reasons concerning claim 1. POSAs would have had reason to create the 1PNZQ23 inbred variety using PH1VKM and PH2DYM, and would further have had reason to use that inbred variety to create F1 hybrid seeds for commercialization. Riley, ¶113.

Claim 4 is to a plant or plant part produced by growing the F1 hybrid seed of claim 3, and in particular to “at least one somatic cell of the F1 hybrid maize plant of 1PNZQ23.” EX1001, 39:43-47. It is obvious for the same reasons as claim 3 given that the purpose of creating an F1 hybrid seed is to grow an F1 hybrid plant. Riley, ¶114.

Claim 5 concerns “[a] method for producing a second maize plant” by “applying plant breeding techniques to the F1 plant or plant part of claim 4.” EX1001, 39:42-46. Claim 5 would have been obvious given Ross’s and Carlone’s disclosures that plant breeding techniques can be used to cross an “F1 hybrid” with either another F1 hybrid or another inbred line. EX1005, 22:27-39; EX1006, 22:17-29; Riley, ¶115.

Claim 6 concerns “[a] method for producing a second maize plant or plant part, the method comprising doubling haploid seed generated from a cross of the plant or plant part of claim 4 with an inducer variety.” EX1001, 39:47-52. Claim 6 would have been obvious for the same reasons as claim 5 and in further view of Ross’s and Carlone’s disclosures of using “Haploid induction systems” for maize

in which “haploid plants from any genotype” may be created “by crossing a selected variety (as female) with an inducer variety.” EX1005, 38:60-39:6; EX1006, 38:56-39:2; Riley, ¶116. Ross’s and Carlone’s respective claims 7 likewise parallel challenged claim 6 and further confirm the obviousness of crossing an inbred maize line with an inducer variety to produce haploid seed. EX1005, 46:61-65; EX1006, 48:43-47.

Claim 7 concerns “[a] method of making a commodity plant product comprising silage, starch, fat, syrup or protein, the method comprising producing the commodity plant product from the maize plant or plant part of claim 4.” EX1001, 39:52-56. Claim 7 would have been obvious for the same reasons as claim 4 in further view of Ross’s and Carlone’s disclosure “of harvesting the grain of the F1 plant of variety [PH1VKM/PH2DYM] and using the grain in a commodity,” such as “starches, syrups, proteins, ...and sugars.” EX1005, 42:9-15; EX1006, 42:7-13. POSAs would have understood that F1 hybrids created from the inbred line of claim 1 (which would have been obvious as discussed above) could be used for the same generic application. Riley, ¶117. Ross’s and Carlone’s respective claims 8 likewise parallel challenged claim 7 and further confirms the obviousness of crossing an inbred maize line with an inducer variety to produce haploid seed. EX1005, 46:66-47:2; EX1006, 48:47-51.

Claim 8 concerns “[a] method of producing a maize seed derived from the variety 1PNZQ23” that includes (1) “crossing the plant of claim 1 with itself or a second plant”; (2) “growing the progeny seed to produce a progeny plant,” then (3) “crossing the progeny plant with itself or a different plant to produce maize seed derived from the variety 1PNZQ23.” EX1001, 39:57-64. Claim 8 would have been obvious for the same reasons as claim 5, which concerns a more specific method of generating a second-generation progeny plant derived from 1PNZQ23 using an F1 hybrid as the first-generation plant. Riley, ¶118; *see also* EX1005, 47:3-12 (Ross’s substantially identical claim 9); EX1006, 48:52-61 (Carlone’s substantially identical claim 9).

Claims 3-8 likewise mirror claims 3-8 in Heffner—further confirming that it would have been obvious to use the 1PNZQ23 variety (itself obvious as detailed in V.B.1, and based on a cross of the same two parental inbred lines disclosed in Heffner) for hybridization purposes as claims 3-8 specify. EX1007, 40:24-49; Riley, ¶119.

c. Claim 9: Nucleic Acids Isolated From 1PNZQ23

Claim 9 concerns “[a] method for producing nucleic acids” by “isolating nucleic acids from the seed, plant, plant part, or plant cell of claim 1.” EX1001, 40:1-3. Claim 9 would have been obvious for the same reasons as claim 1 in view of POSAs’ knowledge that it was routine to isolate nucleic acids from inbred maize

lines—as confirmed by Ross and Carlone. Riley, ¶120; EX1005, 47:13-15 (claim including “isolating nucleic acids from the seed, plant, plant part, or cell”); EX1006, 48:62-64. Heffner likewise has an analogous dependent claim—further confirming that there was nothing inventive about isolating nucleic acids from inbred corn plants, including crosses of Ross and Carlone as disclosed in Heffner. EX1007, 40:50-52.

d. Claims 10-17: Converted Seeds of 1PNZQ23

Claim 10 concerns “[a] converted seed, plant, plant part or plant cell of inbred maize variety 1PNZQ23” with “a locus conversion” such that “the plant or a plant grown from the converted seed, plant part or plant cell comprises the locus conversion and otherwise comprises all of the physiological and morphological characteristics of maize variety 1PNZQ23 when grown under the same environmental conditions.” EX1001, 40:16-22.

Claim 10 would have been obvious for the same reasons as claim 1 (concerning variety 1PNZQ23) in further view of POSAs’ knowledge that locus conversions such as those recited in claim 10 were a routine technique to incorporate desirable traits into inbred maize lines—as further confirmed by Ross’s and Carlone’s disclosure that “[o]ne or more locus conversion traits” such as “male sterility, insect control, disease control or herbicide tolerance” can “be introduced into a single corn variety.” EX1005, 13:48-57; EX1006, 13:43-52; *see also*

EX1005, 47:16-25 (substantially identical claim 11); EX1006, 48:65-49:8 (same); EX1005, 47:26-32 (claim to seed, plant, plant part or cell of claimed inbred variety with “a locus conversion” that “confers a property”); EX1006, 49:9-15 (same). Further, locus conversion technology was sufficiently advanced such that the additional trait(s) could be introduced without impacting the plant’s “physiological and morphological characteristics.” Riley, ¶¶121-122.

Claim 11 depends from claim 10 and states that the locus conversion of claim 10 “confers a property selected from the group consisting of male sterility, site-specific recombination, abiotic stress tolerance, altered phosphate, altered antioxidants, altered fatty acids, altered essential amino acids, altered carbohydrates, herbicide tolerance, insect resistance and disease resistance.” EX1001, 40:16-22. Claim 11 is obvious in view of Ross’s and Carlone’s respective claims 12, which are substantially identical. EX1005, 47:26-32; EX1006, 49:9-15; Riley, ¶123. Ross and Carlone teach that “[o]ne or more locus conversion traits” such as “male sterility, insect control, disease control or herbicide tolerance” can “be introduced into a single corn variety.” EX1005, 13:48-57; EX1006, 13:43-52. Ross and Carlone also separately discuss developing each of the properties recited in claim 11. EX1005, 30:11-36:51-; EX1006, 30:4-36:46.

Claims 12-17 depend directly or indirectly from claim 10 and otherwise parallel the limitations of claims 3-7 and 9, respectively. EX1001, 40:23-45. They would have been obvious for the same reasons as claim 10 and in further view of the above-discussed reasons why dependent claims 3-7 and 9 would have been obvious. The above discussions apply equally to converted seeds incorporating locus conversions, which impart additional properties but otherwise do not impact the variety or how it can be used. Riley, ¶124.

Claims 10-17 likewise mirror claims 10-17 in Heffner—further confirming that it would have been obvious to use the 1PNZQ23 variety (itself obvious as detailed in V.B.1, and based on a cross of the same two parental inbred lines disclosed in Heffner) for purposes of making and using converted seed as claims 10-17 specify. EX1007, 40:53-42:3; Riley, ¶125.

e. Claims 18-20: F1 Hybrid Derived From 1PNZQ23 with a Transgene

Much like dependent claim 3, claim 18 recites an F1 hybrid seed produced by crossing a plant or plant part of 1PNZQ23 with another variety. However, it also requires that (1) “1PNZQ23 further compris[es] a transgene”; (2) “the transgene is inherited by the F1 hybrid seed;” and (3) the transgene was incorporated by “backcrossing or genetic transformation.” EX1001, 40:45-54. As Ross and Carlone disclose, incorporating a transgene into a corn variety is one particular technique for incorporating a locus conversion (as discussed in

connection with claim 10). EX1005, 13:48-57; EX1006, 13:43-52. Ross and Carlone also disclose that backcrossing is a technique for incorporating locus conversions in general and transgenes in particular. EX1005, 23:62-67; EX1006, 23:52-57. Claim 18 would have been obvious for the same reasons as above-discussed claims 3 and 10 and in further view of these additional disclosures in Ross and Carlone. Riley, ¶126.

Claim 19 concerns “[a] method of producing progeny seed” by “crossing a plant grown from the seed of claim 18 with itself or a second plant to produce progeny seed.” EX1001, 40:55-57. It parallels above-discussed claim 5 aside from (1) the more specific requirement concerning the nature of the starting F1 hybrid seed; and (2) the fact that claim 19 refers to “progeny seed” rather than a “plant” itself. Claim 19 accordingly would have been obvious for the reasons discussed above in connection with claims 5 and 8. Riley, ¶127. In particular, POSAs would have understood that Ross’s and Carlone’s disclosures of crossing an “F1 hybrid” with either another F1 hybrid or another inbred line (EX1005, 22:57-67; EX1006, 22:47-57) was applicable to F1 hybrids created by crossing inbred varieties incorporating transgenes. Riley, ¶128.

Claim 20 parallels claim 7 (i.e., “[a] method of making a commodity plant product....”) aside from reciting the plant of claim 18 rather than claim 4.

EX1001, 40:58-64. Claim 20 would have been obvious for the same reasons as claim 7. Riley, ¶129.

Claims 18-20 likewise mirror claims 18-20 in Heffner—further confirming that it would have been obvious to use the 1PNZQ23 variety (itself obvious as detailed in V.A.B.1, and based on a cross of the same two parental inbred lines disclosed in Heffner) for purposes of making and using an F1 hybrid seed incorporating a transgene as claims 18-20 specify. EX1007, 42:4-19; Riley, ¶130.

C. Ground 2: Claims 1-20 Are Unpatentable as Obvious Over Heffner (EX1007)

Heffner discloses PH487D—a prior art inbred variety created by crossing the same two parents (the varieties disclosed in Ross and Carlone) as were crossed to create the claimed 1PNZQ23 and having very similar properties to those of the 1PNZQ23. EX1001, 37:62-64; EX1007, 48:55-61; EX1. Accordingly, Heffner teaches POSAs to prepare an inbred variety, similar to the claimed variety, by crossing the same two parent varieties.

Heffner was not the basis of a rejection during examination, despite its identical parentage, substantially identical disclosures, and highly similar traits as compared to the '033 Patent. Riley, ¶¶131-132, 63, 69-85, 137-141; EX1002, 95-102 *see also* EX1102 (redline comparison). Indeed, despite Heffner's genotypical and phenotypical similarities, the Examiner inexplicably stated that "[t]he closest prior art is US Patent Number 9,930,848." EX1002, 101.

Heffner also discloses that PH487D can be used “to Develop Another Maize Plant” and in particular is a “source of breeding material that may be used to develop new maize inbred varieties.” EX1007, 32:36-41. It also discloses specific cross breeding techniques for producing such “new inbred” varieties. *Id.*, 5:37-44; Riley, ¶133.

Consistent with these disclosures, PH487D was previously used as one of the parents for another maize variety. EX1060, 11:19-21; Riley, ¶134; *see also supra* §V.A.3.

As Heffner itself discloses and the other prior art cross confirms, POSAs would have had reason to use PH487D as the starting point to create other maize varieties as recited in certain dependent claims (*see, e.g.*, EX1001, 39:37-52 (claims 3-6)). The nature of the maize market confirms the reasons to create a wide array of new varieties using PH487D as the starting point. Riley, ¶135; *see also* §V.A.3 (citing *DyStar*).

POSAs would have had a reasonable expectation of obtaining additional maize varieties with PH487D as a parent, particularly given (1) the routine nature of the breeding techniques involved, (2) Heffner’s disclosure that its claimed variety can be “used to develop hybrids for commercialization” and also “used to develop new maize inbred varieties” (EX1007, 17:40-43, 32:37-41) and (3) the

previous instance already reported in which PH487D had been used as a parent to obtain another line (EX1060, 11:19-21). Riley, ¶136.

1. Claim 1

Claim 1 encompasses a seed, plant part, or plant cell of variety 1PNZQ23. 1PNZQ23's disclosed characteristics are at minimum highly similar to its sibling, PH487D's characteristics as disclosed in Heffner, and nothing in the '033 Patent's specification or otherwise in the intrinsic record suggests any property of 1PNZQ23 that POSAs would have viewed as surprising or unexpected over PH487D. *Supra* §V.A.2; Riley, ¶¶137-141, 63, 69-85. Instead, as with the claims the Board found unpatentable in *Ex parte C*, the record does “not explain the significance of any differences in attributes between the novel variety and varieties that are old in the art.” 27 U.S.P.Q.2d at 1493. To the extent such differences exist, there is no basis from which to conclude they are “so significant and unexpected that they should weigh more heavily than the numerous similarities between the claimed variety and the” PH487D variety disclosed in Heffner and touted therein as a potential starting point for future inbred lines. *Id.* at 1497. Indeed, none of the differences have any material commercial significance. Riley, ¶¶139-141. In particular, none of them are relevant to the underlying goal identified in the '033 Patent of developing “stable, high yielding maize varieties and hybrids that are agronomically sound with maximal yield over one or more

different conditions and environments.” EX1001, 1:23-26; Riley, ¶139. Nor are they relevant to the nature of the ’033 Patent’s disclosed “Industrial Applicability.” EX1001, 36:21-65; Riley, ¶139.

Accordingly, claim 1 would have been obvious over Heffner. Riley, ¶¶140-141.

2. Claims 2-20

Claims 2-20 are unpatentable as obvious over Heffner for the same reasons detailed immediately above concerning claim 1 and for the additional reasons explained in §V.B.2 concerning why claims 2-20 are obvious over Ross and Carlone. Heffner indeed has disclosures paralleling the disclosures in Ross and Carlone identified in §V.B.2 concerning claims 2-20. Riley, ¶¶142-143. In particular:

	Relevant Disclosures in Heffner (EX1007)
Claim 2	12:35-42 (“plant part” includes “pollen” and “ovule”); 40:22-23 (“The plant part of claim 1, wherein the plant part is an ovule or pollen”)
Claims 3-4 and 12-13	18:12-20 (“F1 hybrids” sought as “commercial hybrids” because they “are more vigorous than their inbred parents”)
Claims 5, 14, and 19	18:57-60 (disclosing crossing “F1 hybrid” with “third inbred”)

	Relevant Disclosures in Heffner (EX1007)
Claims 6 and 15	34:20-24 (disclosing “[h]aploid induction systems” in which “haploid plants from any genotype” may be created “by crossing a selected variety (as female) with an inducer variety”)
Claims 7, 16, and 20	37:55-60 (“The seed of maize variety PH487D, the plant produced from the seed, the hybrid maize plant produced from the crossing of the variety, hybrid seed, and various parts of the hybrid maize plant and transgenic versions of the foregoing, can be utilized for human food, livestock feed, and as a raw material in industry.”)
Claim 8	18:57-60 (disclosing crossing “F1 hybrid” with “third inbred”); 40:29-32 (claim 5)
Claim 10	18:4-7 (“locus conversion of PH487D for herbicide tolerance”); 18:7-9 (“locus conversion for insect or disease resistance”); 19:38-40 (“PH487D represents a new base genetic variety into which a new locus may be introgressed”); 11:2-31.
Claim 11	11:22-31 (“A locus conversion ...comprises one or more loci with a specific desired trait, such as male sterility, insect resistance, disease resistance or herbicide tolerance or resistance.”); 40:64-41:3.

	Relevant Disclosures in Heffner (EX1007)
Claim 18	11:28-30 (“Examples of single locus conversions include... transgenes”); 20:40-42 (“Transgenes transferred via backcrossing typically function as a dominant single gene trait and are relatively easy to classify.”); 26:1-32:35 (identifying particular types of transgenes)

Heffner’s own claims 2-20 likewise parallel Challenged Claims 2-20—further confirming that it would have been obvious not only to cross the two parental inbred lines disclosed in Heffner, but also to use the resulting inbred line as the basis for the routine practices recited in claims 2-20:

Claim in '033	Corresponding Claim in Heffner
2	2 (EX1007, 40:22-23)
3	3 (40:24-25)
4	4 (40:26-28)
5	5 (40:29-32)
6	6 (40:33-37)
7	7 (40:38-41)
8	8 (40:42-49)
9	9 (40:50-52)

Claim in '033	Corresponding Claim in Heffner
10	10 (40:53-63)
11	11 (40:64-41:3)
12	12 (41:4-5)
13	13 (41:6-8)
14	14 (41:8-11)
15	15 (41:12-16)
16	16 (41:17-20)
17	17 (42:1-3)
18	18 (42:4-12)
19	19 (42:13-15)
20	20 (42:16-19)

Riley, ¶143.

VI. GROUND 3: CLAIMS 1-20 LACK SPECIFIC UTILITY

Aside from being obvious, claims 1-20 are unpatentable for the separate and independent reason that the claimed invention “lacks a specific and substantial utility” as required by §101. *In re Fisher*, 421 F.3d 1365, 1367 (Fed. Cir. 2005) (affirming Board’s finding that claims lacked utility).

A. The '033 Patent Fails to Disclose Any Specific Utility for the Claimed Variety

Nothing in the specification suggests any “specific benefit” provided by the claimed invention consistent with “[t]he basic quid pro quo contemplated by the Constitution and the Congress for granting a patent monopoly.” *Brenner v. Manson*, 383 U.S. 519, 534 (1966) (reversing CCPA and upholding Office’s determination that claim to chemical compound lacked disclosed utility). Corn breeding has a long history, and PO alone controls over 3000 corn-related utility patents (EX1027, 14)¹⁵—including the three detailed in §V above. EX1025, 77. Nothing in the specification of *this particular patent* establishes that claims 1-20 are a “useful improvement” over earlier corn varieties—for example, the PH487D variety disclosed in Heffner and based on a cross of the same two parental lines used to create the 1PNZQ23 variety disclosed in the '033 Patent. Accordingly, there is no basis to conclude that issuance and maintenance of *this particular patent* “promote[s] the Progress of Science and useful Arts.” U.S. Const. art. I, § 8, cl. 8. It serves no purpose but to inflate PO’s patent estate and create an unjustified “monopoly of knowledge” not “clearly commanded by the statute.” *Brenner*, 383 U.S. at 534.

¹⁵ PO merged with another entity to become Corteva. EX1027, 11.

It does not help PO that the claimed corn variety appears highly similar to PO's earlier varieties. In *Brenner*, the Supreme Court reversed the CCPA and reinstated the Office's utility rejection concerning claims to methods of producing a steroid even though published literature confirmed that a closely related "homologue" had "tumor-inhibiting effects." 383 U.S. at 531. *Fisher* likewise affirmed a Board rejection that had cited *Brenner* and reasoned by the same logic that claimed expressed sequence tags (ESTs) lacked substantial utility because they required "further research" to "confirm" any "real world" benefit. 421 F.3d at 1368-69. While the applicant suggested various potential uses, "[n]othing about [applicant's] uses" distinguished them "from *any* EST derived from *any* organism." *Id.* at 1374; *see also Ex parte Kropp*, 143 U.S.P.Q. 148, 151 (PBA 1959) (affirming rejection for lack of utility of claims to process for producing antibiotic because applicant had not shown the claimed antibiotic had "any particular value or utility" aside from the generic function "of inhibiting some bacteria," as would be true for any antibiotic generically).

It is likewise immaterial that the claimed inbred corn lines may be "useful as building blocks of value to" plant breeders in developing future hybrid varieties. *In re Kirk*, 376 F.2d 936, 945 (CCPA 1967). On the contrary, §101 requires a "substantial" utility—"one that provides a *specific benefit in currently available form.*" *Ex parte Fisher*, 72 U.S.P.Q.2d 1020, 1025 (BPAI 2004) (citing *Brenner*).

Here, however, the '033 Patent “only disclosed general uses for its claimed [1PNZQ23 variety], not specific ones that satisfy §101.” *Fisher*, 421 F.3d at 1374. The specification’s “Industrial Applicability” section is essentially identical to those in *Ross*, *Carlone*, and *Heffner*. *See* EX1001, 36:21-65; EX1005, 42:6-49; EX1006, 42:5-48; EX1007, 37:17-65; *Riley*, ¶¶144-146; EX1095, 23 (presentation by supervisory patent examiner in March 2008 (EX1094) concerning plant utility patents and stressing that §101 requires “[u]tility *specific to the subject matter claimed as opposed to a general utility to a broad class of inventions*”).

Nothing in the record suggests any utility specific to 1PNZQ23 beyond that generic to *any* corn variety. *Riley*, ¶¶146-156; *Ex parte Kropp*, 143 U.S.P.Q. at 151 (affirming finding that claims to production of a particular antibiotic was unpatentable “when there is no showing, or even assertion, of the production of other than routine or ordinary results”).

Likewise, to the extent the '033 Patent suggests particular phenotypical differences between the claimed 1PNZQ23 variety and prior art varieties, it never even expressly identifies such differences—much less explains why they confer some specific benefit not previously available. *Riley*, ¶147. The relevant table (“Variety Description Information”) instead excerpts fields from a form prepared by the USDA (EX1096) and used in connection with PVP certificates for new corn varieties. *Riley*, ¶147. But the claimed inventions in utility patents must be

“useful” whereas “a plant variety may receive a PVP certificate without a showing of usefulness.” *J.E.M.*, 534 U.S. at 142.

**B. The '033 Patent Fails to Disclose Any Characteristics
Markedly Different From Those Found in Other Varieties**

As the Supreme Court noted in *J.E.M.* when upholding the availability of utility patent protection for new plant varieties if—and only if—they satisfy all patentability requirements including utility, the Office’s rationale for issuing such patents tracked the Supreme Court’s earlier decision in *Diamond v. Chakrabarty*, 447 U.S. 303 (1980). *J.E.M.*, 534 U.S. at 145 (“[T]he Board...relied heavily on this Court's decision in *Chakrabarty* when it interpreted the subject matter of § 101 to include plants.”) (discussing *In re Hibberd*, 227 U.S.P.Q. 443 (BPAI 1985)).

Chakrabarty held that utility patents are available for living organisms if—and only if—the organism has “markedly different characteristics from any found in nature.” 447 U.S. at 310. In particular, utility patent protection was available for a “human-made, genetically engineered bacterium...capable of breaking down multiple components of crude oil”—a property that “no naturally occurring bacteria” possessed and which suggested “significant value for the treatment of oil spills.” *Id.* at 305. Specifically, “[b]y breaking down multiple components of oil, Chakrabarty’s micro-organism promis[ed] more efficient and rapid oil-spill control” than was possible with “naturally occurring bacteria.” *Id.* at 305 n.2.

By contrast, man-made organisms are not patentable if they lack such “markedly different characteristics” and corresponding “significant utility” as compared to naturally occurring organisms. *In re Roslin Institute (Edinburgh)*, 750 F.3d 1333, 1336 (Fed. Cir. 2014) (affirming §101 rejection of claims to cloned animal lacking “markedly different characteristics from any found in nature”); *Ex parte Uchiyama*, Appeal No. 2017-005387, 2018 WL 1378136, at *4 (PTAB Mar. 12, 2018) (affirming §101 rejection of claims to composition of bacteria because appellants had not cited “evidence showing that the viable bacteria in the claimed composition are ‘markedly different’ from the viable bacteria naturally found in human stools”) (quoting *Chakrabarty*, 447 U.S. at 310).

Nothing in the '033 Patent suggests any reason why the claimed variety's properties offer benefits over preexisting corn varieties—for example, Heffner's PH487D. Riley, ¶¶148-156. Any argument by PO to that effect would instead necessarily flow from POSAs' preexisting knowledge rather than being based on the specification's actual disclosures. Aside from being insufficient as a matter of law for purposes of §101, such preexisting knowledge would simply further confirm the obviousness of claims 1-20 as detailed in Grounds 1-2. For example, if one assumed *arguendo* that the claimed variety's “number of nodes above ground” and/or “flag leaf length” (i.e. the only reported values even nominally statistically significant as compared to Heffner's reported properties), somehow

established the variety’s specific utility because POSAs would recognize some alleged benefit (despite the values falling within the range defined by PO’s other prior art patents), such a conclusion would simply confirm the obviousness of claims. Achieving such phenotypical variations through breeding techniques was well within the level of ordinary skill in the art as of July 2021. Riley, ¶¶148-156.

Accordingly, claims 1-20 are unpatentable under §101 for lack of substantial utility.

VII. GROUND 4: CLAIMS 1-20 ARE INDEFINITE UNDER THE *NAUTILUS* STANDARD

In addition to being obvious and lacking specific utility even if “variety 1PNZQ23” were construed as limited to what PO actually deposited, the Challenged Claims are also unpatentable under §112(b) and the *Nautilus* standard for indefiniteness because (1) the claims were drafted to extend ***beyond*** seed actually deposited, yet (2) the record fails to delineate the outer boundary of that coverage. Accordingly, the “claims, viewed in light of the specification and prosecution history” fail to “inform those skilled in the art about the scope of the invention with reasonable certainty.” *Nautilus*, 572 U.S. at 910.

Independent Claims 1, 10, and 18 recite “***inbred maize variety 1PNZQ23***,” with “***representative seed***” of the variety “having been deposited under NCMA accession number 202301024.” EX1001, 39:32-34, 40:5-7, 40:48-50. The other

Challenged Claims directly or indirectly descend from claims 1, 10, or 18. *Id.*, 39:35-40:3, 40:16-45; 40:55-63.

The scope of all Challenged Claims therefore depends on the meaning of “inbred maize variety 1PNZQ23” and “representative seed.” Yet the intrinsic evidence fails to establish the boundaries of these terms, which are not well-known phrases in the art. *See IBSA Institut Biochimique, S.A. v. Teva Pharms. USA, Inc.*, 966 F.3d 1374, 1381 (Fed. Cir. 2020) (affirming indefiniteness finding under *Nautilus* standard because “intrinsic evidence fail[ed] to establish the boundaries of a ‘half-liquid’” and extrinsic evidence indicated that the phrase was “not a well-known term in the art”). The two terms therefore raise separate but interlocking questions together confirming the indefiniteness of the Challenged Claims under the *Nautilus* standard.

Indeed, aside from the reference to the deposit, nothing in the ’033 Patent indicates to a POSA how the claimed “variety 1PNZQ23” is meaningfully different even in theory from variety PH487D as disclosed in Heffner and sharing the same two parents. *See infra* §VI.A. Yet Heffner expires over two years before the ’033 Patent. Heffner’s status as “close prior art” confirms the indefiniteness of the Challenged Claims. *Amgen, Inc. v. Chugai Pharm. Co.*, 927 F.2d 1200, 1217–18 (Fed. Cir. 1991) (affirming that “at least about 160,000 IU/AU” was indefinite).

Nor can the deposit save the Challenged Claims, which characterize the deposit as merely “representative seed”—a phrase lacking a discernible meaning to POSAs even after reviewing the intrinsic record. *See infra* §I.B. At best, it is a subjective term of degree—without any standard defined in the specification. But it was “incumbent” on PO “to define terms of degree if those terms are relied upon to distinguish the claims particularly and distinctly over close prior art.” *Ex parte Bonaventura*, No. 2007-2994, 2008 WL 163546, at *6, n.8 (BPAI Jan. 17, 2008).

By contrast, PO’s earlier inbred corn variety patents in *J.E.M.* did not include such language attempting to broaden the claims beyond what PO had deposited. *See infra* §VII.C.

A. “Inbred Maize Variety 1PNZQ23” is Not a Term of Art, and Its Outer Boundaries Lack Reasonable Certainty to POSAs Even After Reviewing the Intrinsic Record

“Inbred maize variety 1PNZQ23” reflects an arbitrary codename without any preexisting meaning to POSAs. Riley, ¶176. Nor does the intrinsic evidence “establish the boundaries” of 1PNZQ23. *IBSA*, 966 F.3d at 1381 (affirming indefiniteness finding because “intrinsic evidence fail[ed] to establish the boundaries of a ‘half-liquid’” and extrinsic evidence indicated that the phrase was “not a well-known term in the art”).

While repeatedly referencing “1PNZQ23,” the ’033 Patent never defines the scope of what this variety constitutes. Aside from the different codename, the

specification instead is largely identical to that of Heffner (EX1007)—the prior art patent disclosing inbred line PH487D, sharing the same two parents as the '033 Patent. Riley, ¶177 (discussing EX1102, redline comparing '033 Patent and Heffner). Aside from the different codenames, the only distinctions of even potential note are:

- (1) one additional sentence in the “Breeding History” section;
- (2) slightly different data in Table 1 (“Variety Description Information”);
and;
- (3) different depositories, accession numbers, and deposit dates for the deposited seeds.

Riley, ¶¶178-179. But as detailed below, none of these distinctions offers a POSA reasonable certainty as to whether or not a given seed or plant actually constitutes “inbred maize variety 1PNZQ23” as opposed to “inbred variety PH487D” as claimed in Heffner, which expires over two years earlier than the '033 Patent. As such, the Challenged Claims are indefinite because their “legal scope is not clear enough that a person of ordinary skill in the art could determine whether a particular composition infringes or not.” *Geneva Pharmaceuticals, Inc. v. GlaxoSmithKline PLC*, 349 F.3d 1373, 1384 (Fed. Cir. 2003). Even after Heffner expires in June 2039, there would be a twenty-five-month period (through July

2041) during which the '033 Patent would cloud the landscape and impermissibly deter fair competition.

Breeding History. The additional “Breeding History” sentence in the '033 Patent merely notes that from the cross “between inbred line PH1VKM and inbred line PH2DYM” (i.e., the same cross disclosed in Heffner, and based on two prior art varieties), “ears were selected based on genetic analysis predicting disease, insect, and agronomic phenotypic performance.” EX1001, 37:64-66. But Heffner discloses comparable “genotypic analysis” elsewhere. EX1007, 32:37-55; Riley, ¶181. Further, nothing in the intrinsic record discloses any information concerning how the inventor actually selected ears based on this analysis—much less how it distinguishes variety 1PNZQ23 (claimed in the '033 Patent) from variety PH487D (claimed in Heffner). Riley, ¶¶180-183.

Table 1. Nor does the data in the '033 Patent’s Table 1 provide reasonable certainty concerning the meaning of “1PNZQ23” and how it differs from Heffner’s variety PH487D. Many of the reported values and colors are literally identical in both tables, and numerous others fall within the same ranges such that any distinctions are not statistically significant. Riley, ¶¶184-185. For example, both tables report identical grain texture, level of anthocyanin of brace roots, leaf color, silk color, fresh husk color, dry husk color, ear position at dry husk stage, husk

extension, row alignment, ear taper, kernel pericarp color, aleurone color pattern, aleurone color, and endosperm color. Riley, ¶¶186-187.

Even to the extent Table 1 in the '033 Patent reports different values from Table 1 in Heffner, it is impossible for a POSA to draw any conclusions from those distinctions given that (1) the properties disclosed vary significantly depending on environmental conditions, yet (2) neither Heffner nor the '033 Patent discloses the conditions under which the data were generated. Riley, ¶¶67, 188. Even identical seeds can yield plants with markedly different characteristics depending on the growing conditions. *Id.* For example, many of the physical properties of a corn plant grown in North Dakota under cold and wet conditions would be very different from those of a plant grown from the exact same seed in Iowa under hot and dry conditions. *Id.* Both Heffner and the '033 Patent implicitly acknowledge this and disclose crossing the claimed varieties with others to derive seed having “essentially the same morphological characteristics as” the claimed variety “when grown in the same environmental conditions.” EX1001, 34:41-43; EX1007, 35:37-40. Riley, ¶189.

But nowhere does the '033 Patent ever disclose the environmental conditions under which the data in Table 1—the only morphological characteristics disclosed in the specification—were generated. Riley, ¶190. Nor does Heffner disclose such information. These omissions mark a departure from PO’s previous

practice of disclosing the location and growing season in which data were collected. Riley, ¶190; *see also infra* §VII.C.

Without such context concerning the relevant environmental conditions, Table 1 in the '033 Patent does not provide reasonable certainty concerning the boundaries of “inbred maize variety 1PNZQ23” and how they differ from those of Heffner’s variety PH487D. To the extent there are distinctions between Table 1 in the '033 Patent and Table 1 in Heffner, they merely suggest that the plants reflected in the '033 Patent’s Table 1 were grown under harsher conditions—particularly during early stages of the growing season. Riley, ¶¶67, 191.

Deposit. Nor does the deposit of seed provide reasonable certainty concerning the scope of “variety 1PNZQ23” and the Challenged Claims as a whole. Riley, ¶192. On the contrary, the Challenged Claims depart from PO’s conventional practice (*infra* §VII.C) and are written to sweep ***beyond*** the deposited seed itself. Independent claims 1, 10, and 18 instead recite that the deposited seed merely as “***representative seed*** of” variety 1PNZQ23—begging the question of what makes the deposited seed representative.

B. “Representative Seed” is Not a Term of Art, and Its Meaning Lacks Reasonable Certainty to a POSA Even After Reviewing the Intrinsic Record

The reference to “representative seed” confirms the indefiniteness of the Challenged Claims, as neither the intrinsic record nor extrinsic materials provide

reasonable certainty concerning the meaning of “representative seed” and thus the meaning of “inbred maize variety 1PNZQ23” and the scope of the Challenged Claims as a whole.

1. The Intrinsic Record Does Not Disclose to What Degree Covered Seeds Must Mirror the “Representative Seed”

The “intrinsic evidence fails to establish the boundaries of a” representative seed. *IBSA*, 966 F.3d at 1380.

Aside from the Challenged Claims, the ’033 patent refers to “representative seed” only twice—both times merely replicating the claim language and noting that “representative seed of said inbred maize variety 1PNZQ23 has been deposited.” EX1001, 34:25-26, 34:38-39. Nothing in this paragraph or elsewhere in the intrinsic record indicates what makes the deposited seed “representative” of variety 1PNZQ23—much less the extent of variation allowable while still qualifying as variety 1PNZQ23. Instead, both references to “representative seed” in the specification simply highlight the lack of reasonable certainty as to what the phrase means.

The first sentence describes “maize seed derived from the inbred maize variety 1PNZQ23” and having “92%, 93%, 94%, 95%, 96%, 97%, 98% or 99% of the same polymorphisms for molecular markers as the plant or plant part of inbred maize variety 1PNZQ23.” EX1001, 34:27-30. But nothing in this passage or elsewhere in the specification identifies such molecular markers. Instead, the next

sentence refers generically to the “Panzea database” (*id.*, 34:30-33)—a website concerning corn genetic diversity in general and lacking any specific reference to variety 1PNZQ23. Riley, ¶196. The researchers responsible for the Panzea website sequenced “hundreds of maize lines” and thereby identified “millions of polymorphisms.” EX1059. Nothing in the record indicates any polymorphisms characteristic of 1PNZQ23 as a variety. *Id.*

The second sentence likewise describes “maize seed derived from the inbred maize variety 1PNZQ23” and “having essentially the same morphological characteristics as maize variety 1PNZQ23 when grown in the same environmental conditions.” EX1001, 34:41-43. But nothing in this passage or elsewhere in the specification identifies such distinguishing morphological characteristics and ties them to particular conditions. As discussed in *supra* §VII.A (and as the passage itself implicitly acknowledges), even identical seeds can yield very different plants depending on the growing conditions. But nowhere does the ’033 Patent ever disclose the conditions under which the data in Table 1—the only morphological characteristics disclosed in the specification—were generated. Riley, ¶197.

2. “Representative Seed” is Not Otherwise a Term of Art

Nor does extrinsic evidence elucidate the meaning of “representative seed.” Indeed, the phrase “is not a well-known term in the art.” Riley, ¶193; *see also* *IBSA*, 966 F.3d at 1381 (affirming district court’s finding crediting testimony of

patent challenger’s expert). For example, technical dictionaries do not define “representative seed.” Riley, ¶193; EX1067; EX1072.

While the word “representative” on its own has an ordinary meaning, that understanding—“serving to ... symbolize’ or ‘standing for,”” *Wasica Fin. GmbH v. Cont’l Auto. Sys., Inc.*, 853 F.3d 1272, 1280 (Fed. Cir. 2017)—merely highlights the problem. The deposited seed does not establish the scope of the claimed “inbred maize variety 1PNZQ23, but at most “symbolizes” or “stands for” it. EX1068, Merriam-Webster, Ninth New Collegiate Dictionary, 1000 (1984) (defining “representative” as “serving to represent” or “serving as a typical or characteristic example”). But that just begs the question of how much divergence from the deposited seed is permissible. *See AstraZeneca AB v. Dr. Reddy's Lab'ys, Inc.*, No. 11-2317, 2013 WL 1847639, at *9 (D.N.J. May 1, 2013) (rejecting as “too rigid” construction of “represented by Fig. 1” that required a spectrum identical to Fig. 1); Riley, ¶¶194-195.

Indeed, PO’s inclusion of “representative seed” is a transparent attempt to expand the scope of the Challenged Claims such that “inbred maize variety 1PNZQ23” covers more than the deposited seed and plants derived from that seed. By including “representative seed” in the claims without a corresponding definition, PO “inject[ed] ambiguity into their claims” and “foster[ed] the innovation-discouraging ‘zone of uncertainty’” against which [the Supreme] Court

has warned.” *Nautilus*, 572 U.S. at 911. POSAs lack reasonable certainty as to what degree a seed, plant, plant part, or plant cell may differ from the deposited seed, yet still sufficiently similar such that the deposited seed is “representative.” Riley, ¶¶193-197.

C. Claims 1-20 Depart From PO’s Traditional Drafting Practices for New Inbred Corn Lines

The Challenged Claims depart from how PO traditionally drafted claims to new inbred lines—including those in the patents at issue in *J.E.M.*. The below comparison is illustrative and concerns PO’s U.S. Patent No. 5,506,367 (EX1083), which the Supreme Court specifically cited. 534 U.S. at 127.

Challenged Claim 1	Claim 1 of U.S. Patent No. 5,506,367 (EX1083)
“A seed, plant, plant part, or plant cell of inbred maize variety 1PNZQ23, <i>representative seed of the variety having been deposited under NCMA accession number 202301024.</i> ”	“Inbred corn seed designated PHP38, <i>having ATCC Accession No. 75612</i> ”

Claim 1 of the ’367 patent is tied specifically to the seed that PO deposited—indicating that variety “PHP38” was defined based on the deposit. Neither it nor any of PO’s other inbred patent claims at issue in *J.E.M.* recited “representative seed.” Riley, ¶¶198-199. By contrast, the inclusion of “representative seed” in the Challenged Claims attempts to claim more broadly, yet begs the question how

similar the deposited seed must be to a competitor's seed, plant, plant part, or plant cell for the latter to infringe.

The other claims in PO's earlier '367 patent are likewise instructive. Claim 2 concerns "a corn plant produced by the seed of claim 1" (EX1083, 20:49)—in other words, the seed that PO had deposited. Claims 3-4 relate to tissue cultures derived from the plant of claim 2, and claim 5 concerns "a corn plant regenerated from" the culture of claim 4. EX1083, 20:50-59. In sum, claims 2-5 all require corn plants or tissue cultures that trace their origins back to the seed PO deposited. Finally, claim 6 concerns "[a]n inbred corn plant having *all* the physiological and morphological characteristics of the plant of claim 2" (EX1083, 20:60-61)—in other words, a plant produced by the seed PO deposited. In addition to disclosing such physiological and morphological characteristics (EX1083, Table 1), the '367 Patent disclosed the growing conditions—location and growing season—under which those characteristics were determined. *E.g.*, EX1083, 9:28 ("Johnston, Iowa, grown in 1988"). As such, claim 6 extends beyond the seed that PO deposited, yet still has boundaries reasonably understandable to a POSA in view of the intrinsic record. By contrast, the '033 Patent lacks such disclosure even though all of the Challenged Claims nominally extend *beyond* the seed that PO deposited. *See supra* §VII.A.

**VIII. GROUNDS 5-6: THE PETITION PRESENTS NOVEL AND
UNSETTLED QUESTIONS CONCERNING INDEFINITENESS
STANDARDS FOR PLANT UTILITY CLAIMS**

Review should be instituted because the above-discussed grounds establish it is more likely than not claims 1-20 are unpatentable as obvious (Ground 1-2), lacking substantial utility (Ground 3), and indefinite (Ground 4). §324(a).

Review should also be instituted for the separate and independent reason that the '033 Patent presents “novel or unsettled legal question[s]... important to other patents or patent applications,” including other utility patents and utility patent applications related to methods of breeding maize (subclass 275.000 within class 800) and other agricultural crops critical to our national food supply. §324(b).

The questions arise under §112(b). The first (Ground 5) arises from the '033 Patent's above-discussed claim structure, which mirrors that in many other patents PO recently obtained despite the departure from the claim format at issue in *J.E.M.* See, e.g., EX1007; EX1069; EX1070; EX1071. The question is:

**Are plant utility claims unpatentable as indefinite where the
specification is silent as to terms of degree necessary to construe
the claims in light of the “representative” seed deposit and prior
art?**

The Office can and should answer this question affirmatively—consistent with the objective of the joint Office-USDA Working Group to “enhance the

quality of the patent examination process for innovations related to agricultural products” and also “enhance the transparency of IP information” for such innovations. EX1024. An affirmative answer would also further the President’s mandate that the Office ensure the patent system does not “unnecessarily reduce competition in seed and other input markets beyond that reasonably contemplated by the Patent Act.” EX1023. The Patent Act does not contemplate reducing competition in seed markets based on patent claims analogous to means-plus-function claims seeking to extend coverage beyond what is deposited, but without a disclosure of the required relationship. *See infra* §VIII.A.

The second question (Ground 6) concerns the standard appropriate for assessing definiteness in PGRs. The question is:

Whether patent claims should be found unpatentable as indefinite in post-grant review proceedings if the claims contain words or phrases whose meaning is unclear (per *In re Packard*, 751 F.3d 1307 (Fed. Cir. 2014)), as the Office previously explained to the Federal Circuit (EX 1061) was appropriate to protect the public in patentability assessments?

The Office can and should answer this question affirmatively—returning the Office to its practice before the previous Administration withdrew (EX1062)

the Office’s Federal Circuit brief and subsequently issued a January 6, 2021 memorandum (EX1063) citing *Nautilus*.

Such a step would again track the President’s mandate that the Office ensure the patent system does not “unnecessarily reduce competition in seed and other input markets beyond that reasonably contemplated by the Patent Act.” EX1023. As the MPEP states in the first sentence of the applicable section discussing *Packard*, “[o]ptimizing patent quality by providing clear notice to the public of the boundaries of the inventive subject matter protected by a patent grant *fosters innovation and competitiveness*.” MPEP §2173. By contrast, assessing indefiniteness challenges in PGRs under the less stringent *Nautilus* standard unnecessarily reduces competition in seed markets and wrongly tilts the table to favor patentees even though they can amend their claims during PGRs (unlike district court litigation such as *Nautilus*). *See infra* §VIII.B.

A. Ground 5: The Challenged Claims Are Analogous to Means-Plus-Function Claims Without Adequate Supporting Structure

The Challenged Claims implicate the same problems the Federal Circuit has repeatedly stressed when holding that means-plus-function claims were indefinite for lack of adequate supporting structure.

As explained in *supra* §§VII.A-B, “inbred maize variety 1PNZQ23” and “representative seed” are neither terms of art nor otherwise defined in the intrinsic record. At best, they are merely “verbal constructs,” which PO has linked to the deposit of seeds. *Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1350 (Fed. Cir. 2015) (en banc) (“Generic terms such as ‘mechanism,’ ‘element,’ ‘device,’ and other nonce words that reflect nothing more than verbal constructs may be used in a claim in a manner that is tantamount to using the word ‘means’ because they ‘typically do not connote sufficiently definite structure’ and therefore may invoke § 112, para. 6.”). Yet by the ordinary meaning of “representative” itself (*supra* §VII.B.2), PO sought claims sweeping beyond the actual deposited seed—nominally akin to how §112(f) allows applicants to stretch claims to equivalent structures based upon meaningful guidance in the specification on adequately disclosed structures.

But unlike a proper §112(f) claim, there is no structure disclosed in the ’033 Patent’s specification itself to support these claim terms. While the specification references a deposit (“NCMA accession number 202301024”), the deposit is “*not* a part of the patent application.” *Application of Argoudelis*, 434 F.2d 1390, 1394 (CCPA 1970).

Instead, PO’s deposit was—at best—“incorporated by reference.” *Enzo Biochem, Inc. v. Gen-Probe Inc.*, 323 F.3d 956, 965–66 (Fed. Cir. 2002) (“A

person of skill in the art, reading the accession numbers in the patent specification, can obtain the claimed sequences from the ATCC depository by following the appropriate techniques to excise the nucleotide sequences from the deposited organisms containing those sequences.”).

But “material incorporated by reference **cannot** provide the corresponding structure necessary to satisfy the definiteness requirement for a means-plus-function clause.” *Default Proof Credit Card Sys., Inc. v. Home Depot U.S.A., Inc.*, 412 F.3d 1291, 1301 (Fed. Cir. 2005); *see also Samsung Elecs. Co., Ltd v. Collect, LLC*, IPR2020-00474, 2020 WL 4814227, at *8 (PTAB Aug. 17, 2020) (quoting same); *Google Inc. v. Visual Real Est., Inc.*, IPR2014-01338, 2016 WL 783562, at *9 (PTAB Feb. 22, 2016) (same). Even indisputable prior art identified in the specification by title cannot “provide corresponding structure.” *Pressure Prod. Med. Supplies, Inc. v. Greatbatch Ltd.*, 599 F.3d 1308, 1317 (Fed. Cir. 2010).

By the same logic, the Office can and should rule that a deposit cannot satisfy the definiteness requirement for the Challenged Claims and other claim sets describing a deposit as “representative seed.” Permitting deposits to serve such purpose—even when, as here, applicants seek claims extending beyond the deposits themselves—would wrongly enlarge the “innovation-discouraging zone of uncertainty.” *Nautilus*, 572 U.S. at 911. Indeed, it would shift the burden to the public to conduct potentially extensive experimentation (e.g., obtaining deposited

seed and growing it in a range of environmental conditions) in attempting to avoid infringement. But disclosures that require “experimentation” are “too vague and indefinite to constitute invention.” *Standard Brands v. Nat’l Grain Yeast Corp.*, 308 U.S. 34, 38 (1939) (affirming indefiniteness determination).¹⁶

Per the Supreme Court’s holding, PO’s deposit would be inadequate to satisfy the definiteness requirement for claims stretching beyond the scope of the deposited seed even assuming that the public could grow plants from such deposited seed during the ’033 Patent’s term. But it also bears note that in co-pending litigation, PO takes an exceptionally broad view of “use” under §271(a) even when it comes to deposited seed. *E.g.*, EX1098, 10-11; EX1099, 2-3. Under PO’s theory, POSAs can do little with deposited seeds during the term of utility patent protection aside from gazing at them inside the United States. In other words, the “representative seed of the variety having been deposited under NCMA accession number 202301024” (EX1001, 39:32-34) would be nothing more than a “black box” until the ’033 Patent expires. *Williamson*, 792 F.3d at 1350 (affirming

¹⁶ By contrast, certain experimentation is permissible to satisfy the enablement requirement provided it is not “undue.” *In re Wands*, 858 F.2d 731, 736 (Fed. Cir. 1988). Consistent with that principle, deposits may “satisfy the enablement requirement” under §112(a). *Id.* at 735.

indefiniteness finding: “[T]he word ‘module’ does not provide any indication of structure because it sets forth the same black box recitation of structure for providing the same specified function as if the term ‘means’ had been used.”).

If credited, PO’s position in the pending litigation would thus further reinforce how the Challenged Claims are unpatentable under §112(b) because the ’033 Patent “fail[s] to inform, with reasonable certainty, those skilled in the art about the scope of the invention.” *Nautilus*, 572 U.S. at 901.

B. Ground 6: *Packard* Rather than *Nautilus* Defines the Appropriate Standard For Assessing Indefiniteness in PGRs and Further Confirms the Indefiniteness of Claims 1-20

1. The Ability to Amend Claims Distinguishes PGRs From District Court Proceedings and Justifies Requiring Patent Owners to Ensure Their Claims Are As Clear as Possible

As the Office persuasively explained to the Federal Circuit, *Packard* and the Office’s guidance in the MPEP define the appropriate standard when “assess[ing] indefiniteness” in post-grant review proceedings. EX1061, 1.¹⁷ The Office indeed plays a crucial role “in ensuring that patent claims are clear and unambiguous.”

¹⁷ The previous Administration’s withdrawal of that brief does not undermine the document’s persuasive force. The notice never addressed the substance of the brief, but merely noted that the Office was “considering” the PTAB’s approach to “indefiniteness during post-issuance proceedings.” EX1062, 1-2.

Packard, 751 F.3d at 1313. By contrast, the “different approach” that district courts apply “when making invalidity determinations...permits more ambiguity.” EX1061, 7.

Unlike litigation in district court, PGR proceedings concern patentability—not invalidity. No presumption of patentability (much less validity) applies. PGRs instead “are essentially agency reconsideration of a prior patent grant,” *Regents of the Univ. of Minn. v. LSI*, 926 F.3d 1327, 1338 (Fed. Cir. 2019)—in short, “a second look.” *Cuozzo Speed Techs., LLC v. Lee*, 579 U.S. 261, 279 (2016). There is no basis for applying one definiteness standard upon initial consideration of patentability and a different standard on reconsideration. Post-grant proceedings under the AIA instead implicate “the same interests as the determination to grant a patent in the first instance.” *Oil States Energy Servs., LLC v. Greene's Energy Grp., LLC*, 584 U.S. 325, 337 (2018).¹⁸

By contrast, the January 6, 2021 Memorandum proceeded on the faulty premise that “[b]ecause the [O]ffice’s claim construction standard in AIA post-

¹⁸ While the above-quoted decisions concerned IPRs, the logic applies even more forcefully to PGRs, which as the Office has stressed are “permissible only during a short window after a patent issues” and “serve as a quality enhancement check on issued claims.” EX1061, 8.

grant proceedings now aligns with that used by courts in a civil action, and because indefiniteness questions are generally considered as part of the claim construction process, the [O]ffice’s approach to indefiniteness should likewise align with that used by the courts following...*Nautilus*.” EX1063, 5. Neither premise survives scrutiny. Nor was the memorandum procedurally proper.

First, in stressing the parallel in claim construction standards between AIA post-grant proceedings and civil litigation, the January 6, 2021 Memorandum ignored a more significant difference: patent owners can amend claims in AIA proceedings, but not in court. When claim language is not clear, it is “highly desirable” to “demand that applicants” resolve such ambiguity via amendment at the Office “rather than attempting to resolve the ambiguity in litigation.” *Packard*, 751 F.3d at 1313 (quoting *Halliburton Energy Servs., Inc. v. M-I LLC*, 514 F.3d 1244, 1255 (Fed. Cir. 2008)). Yet the January 6, 2021 Memorandum never addresses this difference.

Second, the January 6, 2021 Memorandum’s unattributed assertion regarding the timing when indefiniteness questions are considered neglects that “[n]othing in the law confines a party’s indefiniteness argument to the claim construction stage of the litigation.” *Versata Software, Inc. v. Zoho Corp.*, 213 F. Supp. 3d 829, 834 (W.D. Tex. 2016) (citing earlier cases).

Separately, the memorandum amounted to an improper agency rule made outside of proper Notice-and-Comment-Rulemaking. *Cf. Tinnus Enterprises, LLC v. Telebrands Corp.*, 733 F. App'x 1011, 1018 (Fed. Cir. 2018) (noting that the Court would “consider any **rulemaking** from the Director” concerning the applicable indefiniteness standard for AIA proceedings).

2. The *Packard* Standard Further Confirms That Claims 1-20 Are Indefinite

Under the *Packard* standard, “[a] claim is indefinite when it contains words or phrases whose meaning is unclear.” 751 F.3d at 1310, 1314. For the reasons detailed in *supra* §VII, both “1PNZQ23” and “representative seed” (contained or incorporated via dependencies in all Challenged Claims) have unclear meanings. The scope of “1PNZQ23” ultimately turns on the meaning of “representative seed,” but that meaning is itself unclear. PO plainly sought to cover more than just the deposited seed alone—much like a “representative” patent claim need only be “**similar**” (not necessarily identical) to others. *Amdocs (Israel) Ltd. v. Openet Telecom, Inc.*, 841 F.3d 1288, 1296 (Fed. Cir. 2016); *see also AstraZeneca*, 2013 WL 1847639, at *9 (rejecting as “too rigid” construction of “represented by Fig. 1” that required a spectrum identical to Fig. 1). But the extent of the required similarity (and likewise the degree of permissible variation) is unclear—much like the Board has consistently found pending claims indefinite when they recite one structure or apparatus, but also seek to cover “similar” structure or apparatus. *Ex*

parte Pappas, 23 U.S.P.Q.2d 1636, 1638 (BPAI 1992); *Ex parte Kristensen*, 10 U.S.P.Q.2d 1701, 1703-04 (BPAI 1989). Here, likewise, it is “unclear from the specification what [PO] intended to cover by the recitation of [representative].” *Pappas*, 23 U.S.P.Q.2d at 1638.

Given that the '033 Patent does not specify the degree to which a seed or plant must be similar to the “representative” deposited seed, the meaning of “representative seed” would instead wrongly “depend on the unpredictable vagaries of any one person’s opinion.” *Datamize, LLC v. Plumtree Software, Inc.* 417 F.3d 1342, 1350 (Fed. Cir. 2005). The only way to avoid that conclusion would be to adopt one of two equally problematic alternative conclusions—confirming the indefiniteness of the claims. *Cf.* EX1061, 8 (noting that claims are indefinite under *Packard* if “reasonably amenable to two different constructions”).

First, one could read “representative seed of” out of the claims entirely, such that the deposit would literally define the variety—much like PO’s traditional practice when claiming inbred corn lines. *See supra* §VII.C. But reading out claim language is impermissible even in litigation—let alone Office proceedings offering opportunities to amend. *See Bicon, Inc. v. Straumann Co.*, 441 F.3d 945, 950–52 (Fed. Cir. 2006).

Second, one could interpret “inbred maize variety 1PNZQ23” broadly such that it covers **any** corn variety produced using inbred lines PH1VKM and

PH2DYM. *See* EX1001, 37:62-64 (“1PNZQ23 is an elite corn inbred line originated from a cross between inbred line PH1VKM and inbred line PH2DYM”). But Heffner discloses that same cross and would anticipate claim 1 under such construction. Ground 2 (*supra* §V.C) encompasses that scenario. *See Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1373 (Fed. Cir. 2019) (“[I]t is well settled that a disclosure that anticipates under §102 also renders the claim invalid under §103, for anticipation is the epitome of obviousness.”). Heffner also discloses all additional elements of claims 2-20, such that this construction would compel a finding that Heffner anticipates all Challenged Claims. *See supra* §V.C.2.

IX. NO BASIS EXISTS FOR DISCRETIONARY DENIAL

A. §314(a)

There is no previous petition concerning the '033 Patent that would warrant discretionary denial based on the factors in *General Plastic Industrial Co., Ltd. v. Canon Kabushiki Kaisha*, IPR2016-01357, Paper 19 (Sept. 6, 2017) (precedential).

B. §324(a)

There is no co-pending litigation involving the '033 Patent that would warrant discretionary denial based on the factors in *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (Mar. 20, 2020) (precedential).

C. §325(d)

Considering the two-part framework discussed in *Advanced Bionics, LLC v. Med-El Elektromedizinische Gerate GMBH*, IPR2019-01469, Paper 6 (Feb. 13,

2020) (precedential), the Board should not exercise its §325(d) discretion to deny institution based on any arguments herein. Indeed, as the Director recently noted in a notice of pending rulemaking, “application of section 325(d) should be limited to situations in which the prior art or arguments were meaningfully addressed by the Office”—meaning that the Office “articulated its consideration of the art or arguments in the record.” 89 Fed. Reg. 28,693, 28,700 (Apr. 19, 2024). The record here lacks any such articulation. *See* EX1002.

1. Ground 1-2 (Obviousness)

The obviousness arguments in Grounds 1-2 are not the same or substantially the same as arguments considered during prosecution. For this reason, the *Advanced Bionics* inquiry ends at the first step. The Examiner never conducted an obviousness analysis consistent with *Ex parte C*, 27 U.S.P.Q.2d 1492 (BPAI 1992). *See supra* §V.

Even if the Board reached part two of *Advanced Bionics* because Ross, Carlone, and Heffner were disclosed in an IDS (despite never being discussed on the record), “specific teachings [in the references] impact[ing] patentability of the Challenged Claims” were “misapprehend[ed] or overlook[ed].” *Cellco P’ship v. Huawei Device Co.*, IPR2020-01117, Paper 10 at 12 (Feb. 3, 2021). The “fact that [each of the references] was not [a] basis of rejection weighs strongly against

exercising [the Board’s] discretion to deny institution under 35 U.S.C. § 325(d).”

Id. at 13.

Indeed, the Office never “articulated its consideration” of Ross, Carlone, and Heffner. 89 Fed. Reg. at 28,700. The Office instead cited U.S. Patent No. 9,930,848 (EX1066) as the purportedly “closest prior art” while failing to cite Ross, Carlone, or Heffner even though (1) each share generic background with the claimed variety—Ross and Carlone as parents, Heffner as a full sibling, and (2) Heffner further has the exact same aleurone color that the Examiner viewed as distinguishing the claimed variety over the ’848 Patent. *See supra* §III.C. The Office likewise erred in stressing color while failing to assess whether the “differences between the claimed variety and the [prior art varieties] are so significant and unexpected that they should weigh more heavily than the numerous similarities between the claimed variety and the varieties of the cited prior art.” *Ex parte C*, 27 U.S.P.Q.2d at 1497 (affirming obviousness determination concerning plant utility claims). The Board in *Ex parte C* affirmed obviousness rejections over prior art plants that were similar to the claimed plant in many respects despite certain variations in “color” and resistance to a particular kind of rot. *Id.* at 1496-1498. Nothing in the record explained why such differences were “so significant and unexpected that they should weigh more heavily than the numerous similarities between the claimed variety and the varieties of the cited prior art.” *Id.* at 1497.

The specification offered no basis even for assessing whether the differences were “significant and unexpected”; it said nothing regarding the relevance of criteria such as “flower color.” *Id.* The same is true here, as detailed above.

2. Grounds 3-6 (Lack of Specific Utility or Sufficient Definiteness)

The lack of utility argument in Ground 3 and the indefiniteness arguments in Grounds 4-6 are not the same or substantially the same as arguments considered during prosecution.

Nothing in the record suggests any consideration of whether claims 1-20 satisfy the specific utility requirement under §101. *Cf. Hybrigenics v. Forma Therapeutics*, PGR2018-00098, 2019 WL 1308262, at *9 (PTAB Mar. 20, 2019) (instituting review based on written description ground: “[T]he mere absence of a written description rejection does not establish that the Examiner considered the arguments presented in the Petition.”).

Likewise, the only discussion in the file history concerning indefiniteness was specific to claims 3-8 and 18-20 and in particular antecedent basis questions raised by those claims. There is no indication the Examiner considered the above-discussed ambiguities related to “inbred maize variety 1PNZQ23” and “representative seed.”

X. CONCLUSION

Substantial, new, and noncumulative technical teachings have been presented for each Challenged Claim, which are unpatentable as obvious (Grounds 1-2), lacking substantial utility (Ground 3), and indefinite (Ground 4) for the reasons set forth above. It is more likely than not that Petitioner will prevail as to each of these Challenged Claims. In addition, the petition raises novel and unsettled legal questions related to indefiniteness (Grounds 5-6). PGR of claims 1-20 of the '033 Patent is accordingly requested in accord with §§321-329 and §42.200 et seq.

Dated: April 25, 2024

Respectfully submitted,
Inari Agriculture, Inc.

By: /Scott A. McKeown/
Scott A. McKeown, Reg. No. 42,866
WOLF, GREENFIELD & SACKS, P.C.

XI. MANDATORY NOTICES

A. Real Party-In-Interest

Pursuant to §42.8(b)(1), Petitioner identifies Inari Agriculture, Inc. as real party-in-interest. No other party had access to or control over the present Petition, and no other party funded or participated in preparation of the present Petition.

B. Related Matters

A decision in this proceeding could affect or be affected by the following:

1. United States Patent & Trademark Office

No U.S. patent applications claim the benefit of the priority of the filing date of U.S. Patent No. 11,707,033.

C. Counsel and Service Information - §42.8(b)(3) and (4)

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A power of attorney is submitted with the Petition. Counsel for Petitioner consents to service of all documents via electronic mail.

XII. CLAIM LISTING

Claim 1
A seed, plant, plant part, or plant cell of inbred maize variety 1PNZQ23, representative seed of the variety having been deposited under NCMA accession number 202301024.
Claim 2
The plant part of claim 1, wherein the plant part is an ovule or pollen.
Claim 3
An F1 hybrid maize seed of 1PNZQ23 produced by crossing the plant or plant part of claim 1 with a different maize plant.
Claim 4
An F1 hybrid maize plant or plant part produced by growing the maize seed of claim 3, wherein the plant part comprises at least one somatic cell of the F1 hybrid maize plant of 1PNZQ23.
Claim 5
A method for producing a second maize plant, the method comprising applying plant breeding techniques to the F1 plant or plant part of claim 4 to produce the second maize plant.
Claim 6
A method for producing a second maize plant or plant part, the method comprising doubling haploid seed generated from a cross of the plant or plant part of claim 4 with an inducer variety, thereby producing the second maize plant or plant part.
Claim 7
A method of making a commodity plant product comprising silage, starch, fat, syrup or protein, the method comprising producing the commodity plant product from the maize plant or plant part of claim 4.
Claim 8
A method of producing a maize seed derived from the variety 1PNZQ23, comprising:
a) crossing the plant of claim 1 with itself or a second plant to produce progeny seed; and
b) growing the progeny seed to produce a progeny plant and crossing the progeny plant with itself or a different plant to produce maize seed derived from the variety 1PNZQ23.

Claim 9
A method for producing nucleic acids, the method comprising isolating nucleic acids from the seed, plant, plant part, or plant cell of claim 1.
Claim 10
A converted seed, plant, plant part or plant cell of inbred maize variety 1PNZQ23, representative seed of the maize variety 1PNZQ23 having been deposited under NCMA accession number 202301024,
wherein the converted seed, plant, plant part or plant cell comprises a locus conversion, and
wherein the plant or a plant grown from the converted seed, plant part or plant cell comprises the locus conversion and otherwise comprises all of the physiological and morphological characteristics of maize variety 1PNZQ23 when grown under the same environmental conditions.
Claim 11
The converted seed, plant, plant part or plant cell of claim 10, wherein the locus conversion confers a property selected from the group consisting of male sterility, site-specific recombination, abiotic stress tolerance, altered phosphate, altered antioxidants, altered fatty acids, altered essential amino acids, altered carbohydrates, herbicide tolerance, insect resistance and disease resistance.
Claim 12
A maize seed produced by crossing the plant or plant part of claim 10 with a different maize plant.
Claim 13
A hybrid maize plant or plant part produced by growing the seed of claim 12, wherein the plant part comprises at least one cell of the hybrid maize plant.
Claim 14
A method for producing a second maize plant, the method comprising applying plant breeding techniques to the plant or plant part of claim 13 to produce the second maize plant.
Claim 15
A method for producing a second maize plant or plant part, the method comprising doubling haploid seed generated from a cross of the plant or plant part of claim 13 with an inducer variety, thereby producing the second maize plant or plant part.

Claim 16
A method of making a commodity plant product comprising silage, starch, fat, syrup or protein, the method comprising producing the commodity plant product from the maize plant or plant part of claim 13.
Claim 17
A method for producing nucleic acids, the method comprising isolating nucleic acids from the seed, plant, plant part, or plant cell of claim 10.
Claim 18
An F1 hybrid seed of 1PNZQ23 produced by crossing a plant or plant part of inbred maize variety 1PNZQ23
further comprising a transgene, representative seed of the inbred maize variety 1PNZQ23 having been deposited under NCMA accession number 202301024 with a different maize plant,
wherein the transgene is inherited by the F1 hybrid seed,
wherein the transgene was introduced into inbred maize variety 1PNZQ23 by backcrossing or genetic transformation.
Claim 19
A method of producing progeny seed, the method comprising crossing a plant grown from the seed of claim 18 with itself or a second plant to produce progeny seed.
Claim 20
A method of making a commodity plant product comprising silage, starch, fat, syrup or protein, the method comprising producing the commodity plant product from a maize plant or plant part of grown from the F1 hybrid seed of claim 18.

CERTIFICATE OF SERVICE UNDER 37 C.F.R. § 42.6 (E)(4)

I certify that on April 11, 2024, I will cause a copy of the foregoing document, including any exhibits or appendices filed therewith, to be served via Priority Mail Express at the following correspondence address of record for the patent:

Pioneer Hi-Bred International, Inc.
7250 NW 62nd Avenue
PO Box 552
Johnston, IA 50131-0552

Date: April 25, 2024

/MacAulay Rush/
MacAulay Rush
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WOLF, GREENFIELD & SACKS, P.C.

CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24, the undersigned certifies that the foregoing Petition for Post-Grant Review contains 18,669 words excluding a table of contents, a table of authorities, Mandatory Notices under § 42.8, a certificate of service or word count, or appendix of exhibits or claim listing. Petitioner has relied on the word count feature of the word processing system used to create this paper in making this certification.

Date: April 25, 2024

/MacAulay Rush/
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