

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CMS CEP COR LTD. and CMS CEP COR AMERICAS LLC,
Petitioner,

v.

SANDVIK INTELLECTUAL PROPERTY AB,
Patent Owner.

Patent No.
9,827,568

Inter Partes Review No. IPR2024-01380

**PATENT OWNER'S REPLY TO PETITIONER'S OPPOSITION TO
REVISED NON-CONTINGENT MOTION TO AMEND**

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PATENT OWNER’S EXHIBIT LIST

Exhibit #	Exhibit Description
2001	Declaration of Harri Kytömaa, Ph.D.
2002	Curriculum Vitae and Publications of Dr. Kytömaa
2003	EP Application No. 12179089.3
2004	U.S. Application No. 14/418,535
2005	PCT Application No. PCT/EP2013/062861
2006	Deposition Transcript of David Smith dated June 11, 2025
2007	Declaration of David G. Smith in Support of Petition for <i>Inter Partes</i> Review of U.S. Patent 11,014,090
2008	Merriam-Webster’s Collegiate Dictionary, 11th ed. (2012) (definition of “end”)
2009	Sandvik CH440 Webpage at https://www.rockprocessing.sandvik/en/products/stationary-crushers/stationary-cone-crushers/ch440-cone-crusher/ (accessed on June 23, 2025)
2010	CMS Cepercor Webpage at https://www.cmscepcor.com/us/crusher-parts/brands/sandvik-hydrocone-superior/ch-series/ch440/ (accessed on June 23, 2025)
2011	CMS Cepercor Webpage at https://www.cmscepcor.com/us/crusher-parts/brands/sandvik-hydrocone-superior/ (accessed on June 23, 2025)
2012	Richard G. Budynas & J. Keith Nisbett, <i>Shigley’s Mechanical Engineering Design</i> , Ninth Edition (2011)

Exhibit #	Exhibit Description
2013	John H. Bickford, <i>An Introduction to the Design and Behavior of Bolted Joints</i> , 3rd ed. (1995)
2014	Robert C. Juvinall & Kurt M. Marshek, <i>Fundamentals of Machine Component Design</i> , 3rd Edition (2000)
2015	Stipulation to Stay Pending <i>Inter Partes</i> Review with exhibits
2016	Signed Stipulation to Stay Pending <i>Inter Partes</i> Review
2017	Board’s email of October 15, 2025, extending DUE DATE 3 and portion of DUE DATE 5 pertaining to Petitioner’s sur-reply related to the motion to amend
2018	Second Deposition Transcript of David Smith dated October 24, 2025
2019	Sandvik CH440 Crusher Maintenance Instructions
2020	Second Declaration of Harri Kytömaa, Ph.D.
2021 [NEW]	Third Deposition Transcript of David Smith dated December 3, 2025
2022 [NEW]	Third Declaration of Harri Kytömaa, Ph.D.
2023 [NEW]	Innovative Combustion Technologies, Inc. “Optimum Operation and Maintenance of EL Pulverizers”
2024 [NEW]	https://www.rockprocessing.sandvik/en/products/stationary-crushers/stationary-cone-crushers/ch440-cone-crusher/ (Last accessed Dec. 15, 2025)

Patent Owner Sandvik submits that the substitute claims in the Revised Motion to Amend (“RMTA”) (Paper 23) are patentable.

I. THE NEW GROUNDS RELY ON NON-ANALOGOUS ART

All of Petitioner’s new grounds combine Torrence (Ex. 1011) with Piepho (Ex. 1016). Both the ’568 patent and Torrence relate to gyratory crushers, but Piepho is directed to a coal pulverizer. A coal pulverizer differs so much in function and structure from a gyratory crusher that no POSITA would consider Piepho as pertinent art. (Ex. 2022, ¶ 13.) Indeed, a prerequisite for obviousness is that the art must be analogous to the subject matter of the claimed invention. *In re Clay*, 966 F.2d 656, 658 (Fed. Cir. 1992). The art must be either from the same field of endeavor or reasonably pertinent to the particular problem which the ’568 inventors were involved. *Id.*, at 658–59. Although Petitioner’s expert, Mr. Smith, sets out these tests, he fails to establish that Piepho is analogous art. (Ex. 1049, ¶ 13.) Nor could he, because Piepho does not qualify under either test.

A. Piepho Is Not In The Field Of Endeavor Of The ’568 Patent

The field of endeavor test considers the “explanations of the invention’s subject matter in the patent [], including the embodiments, function, and structure of the claimed invention.” *In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004).

1. Different subject matters

The '568 patent's field is a gyratory crusher. (Ex. 2022, ¶ 14.) It describes a wear sleeve for a gyratory crusher main shaft that enables convenient attachment and detachment at the shaft. (Ex. 1001, 1:66–2:2.) The '568 patent is entitled a “Gyratory Crusher Main Shaft Sleeve,” and its “Field of Invention” is directed to a “gyratory crusher main shaft sleeve.” (Ex. 1001, 1:1–15.) The “Background Art” section discusses only gyratory crushers and their protective sleeves. (Ex. 1001, 1:38–50.) Every reference cited there is a gyratory crusher patent. For its invention description, the '568 patent describes and illustrates a gyratory crusher with a tapered sleeve. (*See, e.g.*, Ex. 1001, 2:19–36, FIG. 1). During prosecution, the Examiner only cited gyratory crusher art. (Ex. 1001-1, References Cited (April 19, 2017).)

In contrast, Piepho is not directed to a gyratory crusher at all. (Ex. 2022, ¶ 15.) Piepho instead relates “to an improved main shaft for a coal pulverizer, and more particularly to an improved main shaft for use in B&W Type E and EL pulverizers.” (Ex. 1016, 1:5–8; *see also* Ex. 2006, 57:17–20.) Moreover, its purported invention is not a sleeve, but a coating layer for a coal pulverizer shaft: “the present invention comprises an intervening layer of a material such as a thermal sprayed ceramic coating . . . for reducing local stresses in the shaft within

the joint by reducing the relative movement.” (Ex. 1016, 2:16–25; *see also* 2:55–58, 3:24–27.) Mr. Smith also understood Piepho’s purported invention to be “a coating that can be placed on the shaft to reduce or eliminate fretting.” (Ex. 2006, 57:11–16.) As such, Piepho touts that its coating invention does not require changing the geometries of the shaft and its yoke in contrast to the ’568 patent’s focus on a wear sleeve’s geometry. (Ex. 1016, 4:24–26.)

2. Different functions and structures

The ’568 patent’s gyratory crusher is a starkly different apparatus than Piepho’s coal pulverizer. Mr. Smith repeatedly testified that he had little knowledge on the operation of Piepho’s coal pulverizer—putting into question his credibility as being knowledgeable on “industrial equipment design.” (*See, e.g.*, Ex. 2006, 57:21–58:7; Ex. 2021, 65:5–16, 65:23–66:4, 71:11–15, 76:18–77:9; Ex. 1002, ¶ 30.) In contrast, Dr. Kytömaa testifies that a POSITA would have readily understood that the two apparatuses are functionally and structurally different. (Ex. 2022, ¶¶ 14–31.)

Operation. The shaft of the ’568 patent’s gyratory crusher rotates eccentrically, or gyrates, about the crusher’s axis without a roller bearing. Piepho’s shaft does not gyrate. It, instead, rotates only about its own axis with the upper end of the shaft cantilevered above the upper bearing. The yoke and yoke bushing are

attached to the cantilevered region of the shaft. The shaft of the '568 patent is not cantilevered.

Loading. The crushing load of the '568 patent is not evenly distributed. Unlike a coal pulverizer, crushing forces in a gyratory crusher are always concentrated on one side of the shaft and not distributed around the circumference. In contrast, Piepho's balls 8 provide an evenly distributed crushing load.

Wear environment. Due to the eccentric motion of the main shaft in the '568 patent, there is a gap between the shaft and the bearing assembly. Rocks can enter this gap, creating an abrasive environment necessitating a wear sleeve on the main shaft. Piepho's yoke bushing is sealed and is not a wear member.

Rotation. The wear sleeve of the '568 patent is intended to have relative motion with respect to the bearing assembly, whereas Piepho's yoke bushing 18 is not intended to have relative motion with respect to main shaft 14 and yoke 12. Indeed, the purpose of the yoke bushing in Piepho is to *secure* the yoke to the main shaft. The yoke bushing must be able to transmit torque between the shaft and the yoke.

Assembly/Disassembly. The wear sleeve of the '568 patent is a sacrificial member that needs to be replaced, but Piepho has no disclosure or suggestion that its yoke bushing is a sacrificial member that needs to be replaced.

Each of these differences on its own would be sufficient to functionally and structurally distinguish a gyratory crusher from a coal pulverizer, but collectively they underscore that the apparatuses are not only different but also operate in entirely different ways. No POSITA would consider a gyratory crusher of the '568 patent to be in the same field as Piepho's coal pulverizer. (Ex. 2022, ¶ 31.)

3. Petitioner's and Mr. Smith's analysis is lacking, error-filled or conclusory

Petitioner's new grounds are legally deficient, because Petitioner does not attempt to make the prerequisite showing that Piepho is analogous art. *See Clay*, 966 F.2d at 658. In his declaration accompanying the Opposition, Mr. Smith sets forth the "field of endeavor" test and even mentions it for a prior art reference (MacLeod). (Ex. 1049, ¶¶ 13, 51.) But Mr. Smith makes no mention of the test for Piepho, let alone provide any analysis. Petitioner's Opposition is even more lacking. It provides no discussion of analogous art at all. (*See also* Paper 20, 8–9 (prohibiting incorporation by reference).)

Even if one were to consider Mr. Smith's earlier declarations, which related to different claims and grounds, those declarations were error-filled or conclusory on the field of endeavor. For example, in his first declaration, Mr. Smith states: "As a rock crushing apparatus, Piepho is in the same field of endeavor as Polinski and thus (being analogous art) would easily be within[] the purview of a POSITA."

(Ex. 1002, ¶ 80.) But the analogous art test requires that Mr. Smith compare Piepho to the '568 patent—not other art. *Sanofi-Aventis Deutschland GmbH v. Mylan Pharms. Inc.*, 66 F.4th 1373, 1377 (Fed. Cir. 2023) (“In evaluating whether a reference is analogous, we have consistently held that a patent challenger must compare the reference to the challenged patent.”).

In the only two occasions when Petitioner or Mr. Smith did reference Piepho and the '568 patent together, their analysis was wrong or conclusory—perhaps because Mr. Smith’s lack of experience with coal pulverizers. (Ex. 2006, 57:21–23.) Petitioner incorrectly refers to Piepho as a “gyratory rock crusher.” (Paper 2, 16.) And Mr. Smith simply relies on Piepho being a “rock crushing apparatus” like the '568 patent. (Ex. 1043, ¶ 29.) But Mr. Smith’s threadbare statement is insufficient under Federal Circuit authority. For example, in *Clay*, the Court held that the prior art reference (Sydansk) “cannot be considered to be within Clay’s field of endeavor merely because both relate to the petroleum industry.” *Clay*, 966 F.2d at 659. In *Wang Lab ’ys, Inc. v. Toshiba Corp.*, 993 F.2d 858 (Fed. Cir. 1993), the patent at issue and the art (Allen-Bradley) both related to memory modules. The Court, however, found that Allen-Bradley was not in the same field of endeavor “merely because it relates to memories.” *Wang*, 993 F.2d at 864. Treating the '568 patent and Piepho as being in the same field because they merely reside

within the broad universe of comminution equipment improperly elevates a high-level industrial label over the actual field of endeavor defined by the '568 patent.

(Ex. 2022, ¶ 31.)

B. Piepho Is Not Reasonably Pertinent To The Particular Problem Of The '568 Patent

Mr. Smith explained the pertinence test in his third declaration (Ex. 1049, ¶ 13), and he even sought to apply it to other references in the related proceeding. (IPR2024-01381, Ex. 1051, ¶¶ 46, 56, 60, 64, 68.) But he never relied on this test to qualify Piepho. Nor did Petitioner. It is thus foreclosed from arguing that Piepho is analogous art through this test.

In any event, under this test, the focus is on the purposes or problems of the claimed invention and the reference. *Clay*, 966 F.2d at 659. Piepho does not qualify under this test, because the '568 patent and Piepho are directed to different problems. The '568 patent concerns the problem of assembling and disassembling a wear sleeve from a main shaft of a gyratory crusher. (Ex. 1001, 1:51–2:2; Ex. 2006, 21:9–22:1.) Piepho, on the other hand, addresses the problem of a coal pulverizer shaft failing due to fretting-induced bending fatigue at the joint between the yoke bushing and the main shaft. (Ex. 1016, 1:45–2:14.) The wear components in Piepho are its balls and rings—not a sleeve (which Piepho does not disclose) or even the yoke bushing. And there is no discussion on the yoke bushing being

assembled or disassembled from the yoke or the shaft. Indeed, the reason that Piepho is concerned with *fretting-induced* fatigue is because the yoke bushing remains assembled with the main shaft, such that fretting wear would not be readily identifiable during machine maintenance. (Ex. 2022, ¶¶ 32–33.)

Petitioner and Mr. Smith emphasize that Piepho discloses a tapered yoke bushing and main shaft. (Paper 29, 16; Ex. 1049, p. 59.) But Piepho also discloses that the shaft/yoke bushing interface may be cylindrical as well. (Ex. 1016, 3:33–35; Ex. 1002, ¶ 80 (Mr. Smith testifying on the “interchangeability” of cylindrical and tapered joints in Piepho).) That is, Piepho does not consider a cylindrical fit to be a problem, unlike the ’568 patent. Accordingly, there is no discussion in Piepho on the tapered fit with respect to disassembly, because Piepho’s problem is with fretting *during operation* as opposed to disassembling the yoke bushing. (Ex. 2022, ¶ 34.)

Petitioner and Mr. Smith also emphasize that a tapered shaft aids in sleeve-shaft alignment. But fretting-induced fatigue—not yoke bushing-shaft alignment—is the problem on which Piepho focuses. To be sure, Piepho describes “accurate alignment” but that is with respect to the *yoke*—not the yoke bushing. (Ex. 1016, 3:27–29 (“For accurate alignment and for reliable support of the *yoke*, this joint (21) must be capable of accepting radial, axial, and bending or overturning loads.”))

(emphasis added).) The yoke must be aligned accurately to drive the pulverizer’s balls—something that Mr. Smith with his limited understanding of Piepho’s coal pulverizer missed. (Ex. 1016, 1:25–26.) Thus, under either test, Piepho is not analogous art. (Ex. 2022, ¶ 35.)

II. THERE IS NO MOTIVATION TO COMBINE

The fact that Piepho is non-analogous art underscores that Petitioner’s new combinations are without motivation. *Clay*, 966 F.2d at 659 (“If [the reference] is directed to a different purpose, the inventor would accordingly have had less motivation or occasion to consider it.”). Mr. Smith plucks isolated snippets from Piepho and applies them to Torrence. Mr. Smith testified that he did not consider Piepho beyond its disclosure of a tapered shaft. (Ex. 2021, 65:5–16.) His approach thus suggests that he improperly used the tapered shaft claim language of the ’568 patent as a blueprint to select Piepho—a non-analogous reference. *In re Oetiker*, 977 F.2d 1443, 1447 (Fed. Cir. 1992) (“The combination of elements from non-analogous sources, in a manner that reconstructs the applicant’s invention only with the benefit of hindsight, is insufficient to present a *prima facie* case of obviousness.”).

Petitioner and Mr. Smith’s use of hindsight is also reflected in their limited motivation analysis. They either provide generic *KSR* language without explication

or say that it would have been “notoriously more difficult” to align with a cylindrical joint. (Paper 29, 11–12, 16; Ex. 1049, pp. 48, 59.) But Piepho itself notes a cylindrical joint is an alternative to a tapered joint. (Ex. 1016, 3:33–35.) Only by ignoring Piepho’s field and focus—in other words, everything other than Piepho’s disclosure of a tapered shaft—could Petitioner and Mr. Smith conclude obviousness. *Impax Lab ’ys Inc. v. Lannett Holdings Inc.*, 893 F.3d 1372, 1379 (Fed. Cir. 2018) (prior art reference “as a whole[] is not about intranasal formulations of zolmitriptan, which is barely mentioned”). (Ex. 2022, ¶¶ 36–37.)

III. UNREBUTTED OBJECTIVE EVIDENCE SUPPORTS THE PATENTABILITY OF THE SUBSTITUTE CLAIMS

In its RMTA, Sandvik provided objective evidence of copying by Petitioner. (Paper 23, 28–37.) Petitioner, however, did not address the evidence at all in its Opposition. It did not challenge that Sandvik’s and Petitioner’s products embody and are coextensive with the claim recitations of substitute claim 11. Nor did Petitioner challenge Patent Owner’s assertion of copying through access and substantial similarity. Thus, Sandvik’s objective evidence is un rebutted and must be given weight evidence as “independent evidence of nonobviousness.” *Leo Pharm. Prods., LTD. v. Rea*, 726 F.3d 1346, 1358 (Fed. Cir. 2013) (quotation and citation omitted).

Indeed, Petitioner’s failure to address the objective indicia here reinforces that its obviousness analysis was deficient. It is hornbook law, as Mr. Smith admits, that such evidence must be considered in assessing obviousness. (*See, e.g.*, Ex. 1049, ¶ 12; *Leo*, 726 F.3d at 1357.) By conspicuously ignoring Sandvik’s evidence, Petitioner and Mr. Smith’s assertions of unpatentability ring hollow. So does Petitioner’s earlier belief that it can simply rely on a *prima facie* case of obviousness. (Paper 15, 25.) The present *prima facie* case is deficient as discussed above. In any event, objective evidence is sufficient to overcome a *prima facie* case, especially here where the evidence is unrebutted. *Tec Air, Inc. v. Denso Mfg. Michigan Inc.*, 192 F.3d 1353, 1360 (Fed. Cir. 1999); *Medtronic, Inc. v. Teleflex Innovations S.a.r.l.*, 70 F.4th 1331, 1343 (Fed. Cir 2023) (a “close” *prima facie* case overcome by “strong” objective evidence).

In its Preliminary Guidance, the Board indicated that copying may be “equivocal evidence of nonobviousness,” citing older Federal Circuit cases. (Paper 20, 7.) But more recent cases have held that such evidence “may often be the most probative and cogent evidence in the record.” *See, e.g., Medtronic*, 70 F.4th at 1342 (quotation and citation omitted). Moreover, Sandvik’s evidence is not simply a claim chart establishing infringement. Beyond substantial similarity, Sandvik explained that Petitioner had *access* and created a near identical product—

assertions that have been un rebutted. *Medtronic*, 70 F.4th at 1340 (“we [have] expressly recognized that evidence of copying may include access and similarity to a patented product.”) (citations and quotation omitted).

Petitioner’s choice of Torrence further supports Sandvik’s secondary considerations case. Torrence issued in 1974—about 40 years before the filing of the ’568 patent in 2012. It discloses a “replaceable wear sleeve.” (Ex. 1011, 3:48.) Thus, for at least 40 years or so, the field faced the problem of replacing wear sleeves in gyratory crushers until the ’568 patent’s solution. This supports a finding of non-obviousness. *Leo*, 726 F.3d at 1359 (“The length of [] time between the publication dates of the prior art and the claimed invention can also qualify as an objective indicator of nonobviousness.”); *Millennium Pharms., Inc. v. Sandoz Inc.*, 862 F.3d 1356, 1369 (Fed. Cir. 2017). Plus, during prosecution, the Examiner *cited* Torrence and *applied* Coxhill ’800 (Ex. 1039), which has a similar disclosure to Torrence on the sleeve (*see* Ex. 2021, 60:4–10). Yet she allowed the (broader) issued claims over them, underscoring the deficiency of the art. Petitioner is simply recycling considered art and arguments. *See* 35 U.S.C. § 325(d); Ex. 2022, ¶ 38.

IV. CLAIMS 13–17 ARE PATENTABLE

Petitioner does not address claims 13–17 in its Opposition, thereby foreclosing its challenge to the claims. (Paper 20, 8–9 (prohibiting incorporation).)

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Certificate of Service (37 C.F.R. § 42.6(e)(4))

I hereby certify that the attached “PATENT OWNER’S REPLY TO
PETITIONER’S OPPOSITION TO REVISED NON-CONTIGENT MOTION TO
AMEND” was served on the below date on the Petitioner via e-mail (by consent)
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Dated: December 16, 2025

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