

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 NON-CONTINGENT MOTION TO AMEND AND
REQUEST FOR PRELIMINARY GUIDANCE**

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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) (Chapter 8)

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) (excerpts from Chapter 10)
2015	Stipulation to Stay Pending <i>Inter Partes</i> Review with exhibits
2016	Signed Stipulation to Stay Pending <i>Inter Partes</i> Review

I. INTRODUCTION

Pursuant to 37 C.F.R. § 42.121 and the Board’s Institution Decision (Paper 8), Sandvik Intellectual Property AB (“Sandvik” or “Patent Owner”) submits this non-contingent Motion to Amend (“Motion” or “MTA”) with respect to the challenged claims of U.S. Patent No. 9,827,568 (the “’568 Patent”). Specifically, Patent Owner proposes cancelling challenged claims 1–10 and substituting claims 11–19. This Motion and the supporting Declaration of Harri Kytömaa, Ph.D (Ex. 2001) demonstrate that the substitute claims are patentable over the grounds in this proceeding, even though Patent Owner does not bear a burden of persuasion to demonstrate the patentability of the substitute claims. *Aqua Prod., Inc. v. Matal*, 872 F.3d 1290, 1327 (Fed. Cir. 2017). Patent Owner also requests that the Board provide preliminary guidance.

II. THE SUBSTITUTE CLAIMS MEET THE REQUIREMENTS OF 37 C.F.R. § 42.121

A. Reasonable Number Of Substitute Claims

As shown in Appendix A, Sandvik proposes, at most, only one substitute claim for each challenged claim. This Motion is thus consistent with the general presumption that “only one substitute claim would be needed to replace each challenged claim.” 37 C.F.R. § 42.121(a)(3).

B. The Substitute Claims Are Responsive To The Instituted Grounds

Substitute claims 11–19 are responsive to the instituted grounds. 37 C.F.R. § 42.121(a)(2)(i). Sandvik proposes one substitute independent claim—claim 11—with recitations that overcome the grounds as described *infra*. Substitute dependent claims 12–19 are also responsive to the instituted grounds based at least on their dependence from the substitute independent claim.

C. The Substitute Claims Do Not Enlarge The Scope Of The Original Claims

Substitute independent claim 11 *adds* further recitations to challenged independent claim 1 and thus does not enlarge the scope of the claims. 37 C.F.R. § 42.121(a)(2)(ii). Specifically, Sandvik offers substitute independent claim 11 to add limitations, including that the external facing surface from the first sleeve end to the second sleeve end is parallel to a longitudinal axis of the main shaft such that the external facing surface of the sleeve when viewed externally has a cylindrical geometry. As discussed *infra*, the amendments to substitute claim 11 are supported by the original disclosures. (*See also* Ex. 2006, 36:24–37:3 (Petitioner’s expert, Mr. Smith, agreeing that FIG. 2 of the ’568 Patent discloses that the external facing surface 201 of sleeve 114 is aligned substantially parallel with the longitudinal axis 115 of the shaft).)

D. The Substitute Claims Are Supported By The Original Disclosures And Do Not Introduce New Matter

The '568 Patent issued from U.S. App. No. 14/418,535 (Ex. 2004, the "'535 application"), filed on January 30, 2015. The '535 application is a national stage entry of PCT/EP2013/062861 (Ex. 2005), filed on June 20, 2013, which claims priority to EP Application No. 12179089.3 (Ex. 2003), filed August 2, 2012. As set forth below, Sandvik submits that the originally filed disclosures (Exs. 2003 & 2004) support each substitute claim and make clear that no new matter has been introduced. 37 C.F.R. §§ 42.121(a)(2)(ii) and (b)(1); Ex. 2001, ¶ 24. The left column of the chart below shows the substitute independent claim in comparison to the challenged independent claim, with added recitations underlined and any deleted recitations with strikethroughs. The right column shows exemplary support in the original disclosure—first with respect to the recitations of the challenged independent claims and then for the newly added recitations.

Substitute Independent Claim	Support in EP Application No. 12179089.3 (Ex. 2003) and the '535 Application (Ex. 2004)
11. [11pre] A gyratory crusher comprising: [11a] a main shaft including a shaft body having a first end for positioning at a lower region of the crusher and a second end for positioning at an upper region of the crusher relative to the first end, a thickness of the shaft body being tapered in an axial direction of the main shaft at a <u>tapered</u> region of the	<u>'568 Patent claim 1</u> Exs. 2003 & 2004: 3:12–23; 4:23–29; FIGS. 1–2. [11a] “a thickness of the shaft body being tapered in an axial direction of the main shaft at a <u>tapered</u> region of the second end so as to <u>taper and decrease</u> in cross-sectional area”

second end so as to taper and decrease in cross-sectional area; and

[11b] a sleeve fitted over the tapered region at the second end of the main shaft, the sleeve including an elongate axial wall extending around a longitudinal axis of the sleeve, the axial wall having an internal facing surface for positioning in contact with an outward facing surface of the main shaft, and an external facing surface relative to the longitudinal axis, the axial wall extending between the internal and external facing surfaces, the axial wall having a first sleeve end for positioning at a lower region of the main shaft and a second sleeve end for positioning at an upper region of the main shaft relative to the lower region,

[11c] wherein a thickness of the axial wall at a region between the first and second sleeve ends tapers and decreases in a direction from the second sleeve end to the first sleeve end,

[11d] in the axial direction the internal facing surface at said region between the first and second sleeve ends extending transverse to the longitudinal axis so as to taper inwardly towards the longitudinal axis of the sleeve in the direction from the first sleeve end to the second sleeve end, and

[11e] wherein the external facing surface from the first sleeve end to the second sleeve end is parallel to the longitudinal axis of the sleeve such that the external facing surface of the sleeve

Exs. 2003 & 2004: 3:5; 6:1–3; FIG. 1–2.

[11b] “the axial wall extending between the internal and external facing surfaces, the axial wall having a first sleeve end for positioning at a lower region of the main shaft and a second sleeve end for positioning at an upper region of the main shaft relative to the lower region”

Exs. 2003 & 2004: 3:1–3; 6:14–20; 6:24–27; FIG. 2.

[11c] “a thickness of the axial wall at a region between the first and second sleeve ends tapers and decreases in a direction from the second sleeve end to the first sleeve end”

Exs. 2003 & 2004: 3:19–21; 6:24–27; FIG. 2.

[11d] “in the axial direction the internal facing surface at said region between the first and second sleeve ends extending transverse to the longitudinal axis so as to taper inwardly towards the longitudinal axis of the sleeve in the direction from the first sleeve end to the second sleeve end”

Exs. 2003 & 2004: 3:1–3; 6:18–20; FIG. 2.

[11e] “wherein the external facing surface from the first sleeve end to the second sleeve end is parallel to the longitudinal axis of the sleeve such that the external facing surface of the sleeve

<u>when viewed externally has a cylindrical geometry.</u>	<u>when viewed externally has a cylindrical geometry.”</u> Exs. 2003 & 2004: 6:14-24; FIGS. 1–2.
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The chart below shows the exemplary support for the substitute dependent claims.

Substitute Dependent Claims	Support in the '535 Application (Ex. 2004) and EP Application No. 12179089.3 (Ex. 2003)
Claim 12 (corresponding to claim 2)	“wherein the region over which the thickness of the axial wall <u>tapers and decreases</u> extends <u>substantially</u> the full axial length of the sleeve” Exs. 2003 & 2004: 3:19–21; 25–26; 6:24–27; FIGS. 1–2.
Claim 13 (corresponding to claim 3)	Exs. 2003 & 2004: 3:28–30.
Claim 14 (corresponding to claim 5)	Exs. 2003 & 2004: 4:1–2.
Claim 15 (corresponding to claim 6)	Exs. 2003 & 2004: 4:2–3.
Claim 16 (corresponding to claim 8)	Exs. 2003 & 2004: 4:4–5.
Claim 17 (corresponding to claim 9)	Exs. 2003 & 2004: 4:10–11.
Claim 18 (corresponding to claim 10) The gyratory crusher as claimed in claim 11, wherein at a <u>curved</u> region <u>proximal to the first sleeve end</u> , <u>the thickness of the axial wall reduces at an increased rate relative to a region of the axial wall proximal to the second sleeve end</u> ~~the internal facing surface is curved radially outward relative to the longitudinal axis in a direction towards the external facing surface such that the axial wall thickness decreases to zero at the curved region.~~ (corresponding to claim 10)	“wherein at a <u>curved</u> region <u>proximal to the first sleeve end</u> , <u>the thickness of the axial wall reduces at an increased rate relative to a region of the axial wall proximal to the second sleeve end</u> ” Exs. 2003 & 2004: 4:19–21; 7:1–5; FIG. 2.
Claim 19. The gyratory crusher as claimed in claim 18, wherein the thickness of the axial wall reduces at a uniform rate along an entire axial	Exs. 2003 & 2004: 7:18–20; FIG. 2.

length of the sleeve other than the region proximal to the first sleeve end.	
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III. THE SUBSTITUTE CLAIMS ARE PATENTABLE OVER THE PRIOR ART OF THE INSTITUTED GROUNDS

Substitute independent claim 11, and the claims that depend therefrom, are patentable over the instituted grounds in this trial.

A. Claim Construction

The Board construes claims under *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc), with claim terms given their plain and ordinary meaning unless otherwise noted. For the purposes of this Motion, Sandvik submits that the Board need not construe any claim terms other than “end.” Substitute claim 11 refers to, *inter alia*, an “axial wall [of a sleeve] having a *first sleeve end* for positioning at a lower region of the main shaft and a *second sleeve end* for positioning at an upper region of the main shaft relative to the lower region.” Sandvik submits that the “end” of a sleeve is properly construed as an extremity of the sleeve under its plain and ordinary meaning. The proposed construction is consistent with the claim language, the specification of the ’568 Patent, and a common dictionary definition. (Ex. 2001, ¶¶ 26–29.)

First, substitute claim 11 recites that “the external facing surface *from the first sleeve end to the second sleeve end* is parallel to the longitudinal axis of the sleeve such that the external facing surface of the sleeve when viewed externally

has a *cylindrical geometry*.” The sleeve would only have a cylindrical geometry when viewed externally *if the first sleeve end and the second sleeve end were respective extremities of the sleeve*. The dependent claims are consistent with Patent Owner’s proposed construction.

Second, the specification of the ’568 Patent describes that the sleeve has “a thickness that tapers and reduces in a direction from second upper end 208 to first lower end 207.” (Ex. 1001, 4:29–33.) FIG. 2 of the ’568 Patent, in turn, points to the upper extremity of the sleeve for 208 and to the lower extremity of the sleeve for 207.

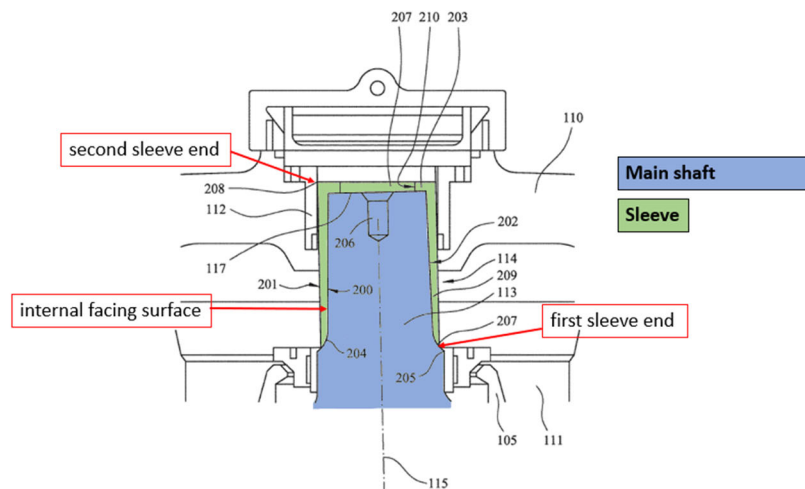


FIG. 2

Finally, Merriam-Webster’s Collegiate Dictionary (2012) provides that a definition of end is “the extreme or last part lengthwise: TIP.” (Ex. 2008, 411 (definition 1c).) This definition is consistent with the use of “end” in the claim

language and the specification and supports Sandvik's construction of "end" as an extremity of the sleeve.

B. Level Of A Person Of Ordinary Skill In The Art

Petitioner contends that "a person having ordinary skill in the art [POSITA] would be a person who has a bachelor's degree in mechanical engineering or a related field, and at least 2 years of experience with industrial equipment design and development." (Paper 2, 5; *see also* Ex. 2006, 38:25–39:24 (Mr. Smith testifying that the two years of experience is not limited to rock crushers and that "industrial equipment" is a "broad category").) This POSITA "may also have a combination of more formal education and less work experience or a combination of less/different formal education and more work experience." (*Id.*; *see also* Ex. 2006, 49:3–7.) For the purposes of this Motion, Sandvik does not object to the defined level of skill in the art. (Paper 2, 3.)

Sandvik's technical expert, Harri Kytömaa, Ph.D., readily meets this definition. He has a Ph.D in Mechanical Engineering. (Ex. 2001, ¶¶ 5, 31.) And, unlike Mr. Smith who has no experience designing and developing rock crushers (Ex. 2006, 39:8–10), Dr. Kytömaa's research at MIT focused on, among other things, comminution and methods of efficient particle size reduction through crushing, and he has worked on coal handling equipment including crushers. (Ex. 2001, ¶¶ 7, 11, 31–32.)

The level of skill here supports the patentability of the substitute claims. (*Id.*, ¶ 33.) As discussed *infra*, a POSITA would not have been motivated to modify Polinski and Piepho to meet the claimed inventions of the substitute claims. Such modifications, aside from being unsupported by the disclosures of the references, would have been beyond the level of skill here, especially given that Mr. Smith testified that “rock crushers are fairly complex machines” and their successful design requires understanding of a number of fields, such as “tribology, fracture mechanics, and fluid mechanics.” (Ex. 1002, ¶ 27.)

C. The Substitute Claims Are Patentable Over The Instituted Grounds

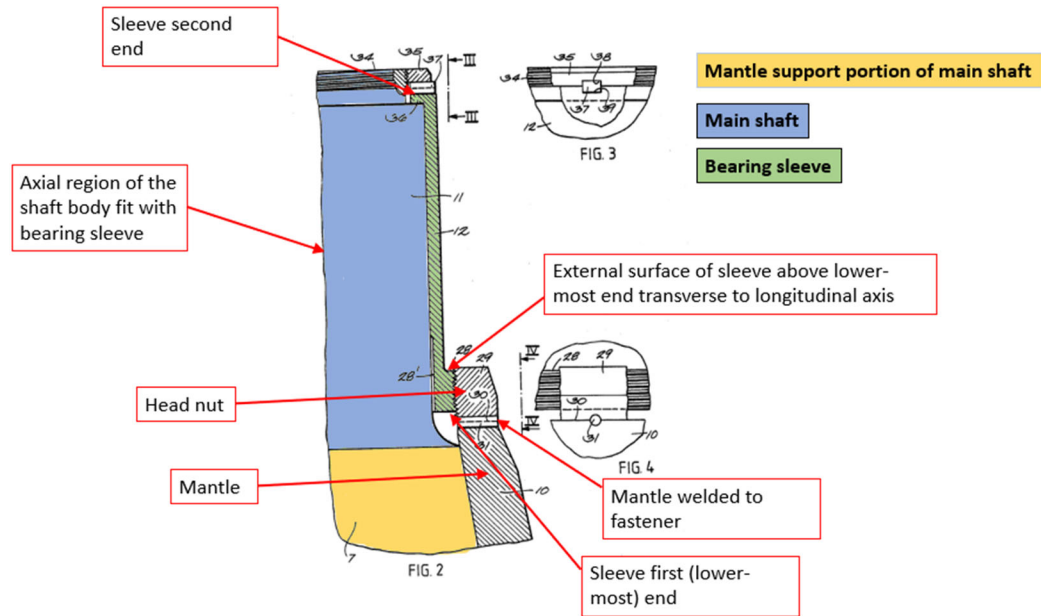
Substitute independent claim 11, and the claims that depend therefrom, are patentable over the instituted grounds in this trial.

1. Substitute claim 11

Polinski and Piepho, taken both alone and in combination, fail to disclose or suggest the limitations of substitute claim 11. Neither Polinski nor Piepho discloses a shaft sleeve in which the external facing surface from the first sleeve end (the lower-most end of the sleeve) to the second sleeve end (the top-most end) is parallel to a longitudinal axis of the sleeve such that the external facing surface of the sleeve, when viewed externally, has a cylindrical geometry as recited in [11e].

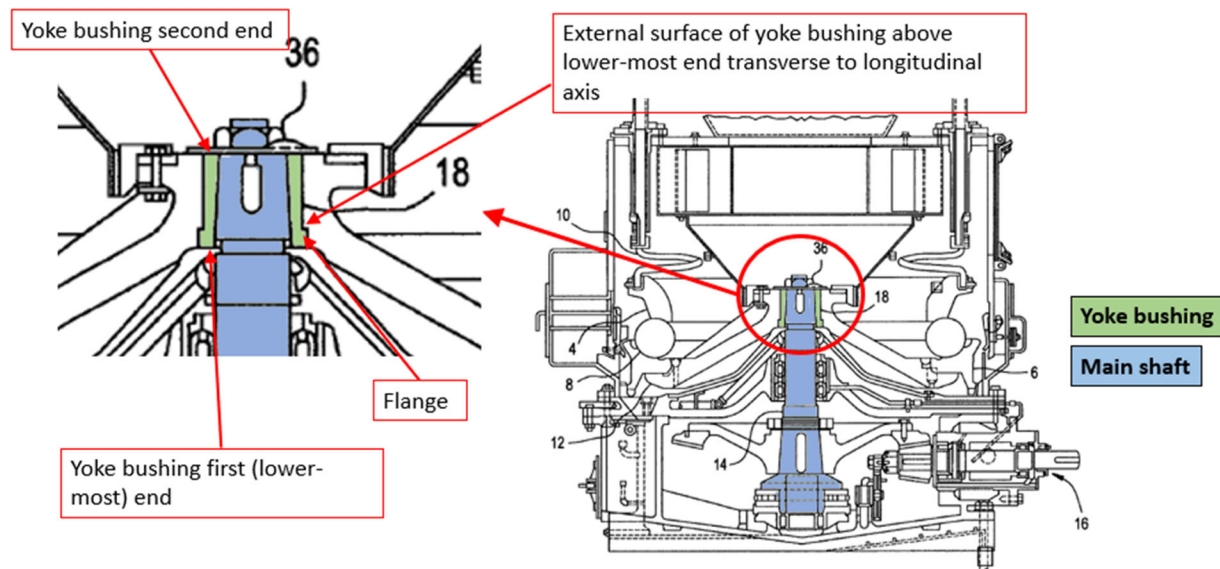
Petitioner cites sleeve 12 of Polinski to meet the sleeve recited in challenged claim 1. (Paper 2, 22–23.) But Polinski discloses that its sleeve 12 includes a

threaded shoulder 28 extending from the bottom end of the sleeve for securing a mantle 10 to a tapered mantle support portion 8 of the shaft 7. (Ex. 1015, 3:1–8; FIG. 2; *see also* Ex. 2006, 54:3–55:4.)



As illustrated in annotated FIG. 2 of Polinski above, the external facing surface from the first sleeve end (the lower-most end of the sleeve) to the second sleeve end (the top-most end) is *not* parallel to a longitudinal axis of the sleeve. The threaded shoulder 28 is at least partially transverse to the longitudinal axis of the sleeve. (Ex. 2001, ¶¶ 37–38, 53–54.)

Piepho also fails to disclose [11e]. Petitioner relies upon yoke bushing 18 of Piepho to meet the recited sleeve. (Paper 2, 22–23.) But Piepho discloses a flange extending from the lower-most end of a yoke bushing 18. (Ex. 1016, FIG. 1; *see also* Ex. 2006, 78:6–8 (Mr. Smith referring to Piepho’s flange).)



As illustrated in annotated FIG. 1 of Piepho above, the external facing surface from the first end of the yoke bushing 18 (the lower-most end) to the second end of the yoke bushing 18 (the top-most end) is not parallel to a longitudinal axis of the yoke bushing 18. The external surface of the yoke bushing 18 is at least partially transverse to the longitudinal axis of the yoke bushing 18 at the flange extending from the first end. (Ex. 2001, ¶¶ 42–43, 55–56.)

Moreover, it would not have been obvious to modify Polinski in view of Piepho to meet [11e], because such a modification would change Polinski's principle of operation. *In re Ratti*, 270 F.2d 810, 813, 123 USPQ 349, 352 (CCPA 1959). Polinski states that “the present invention relates to gyratory crushers and, in particular, to a main shaft and bearing sleeve arrangement supporting the crusher head or mantle within the crusher.” (Ex. 1015, 1:44–47.) To that end, Polinski

discloses a sleeve with a threaded annular shoulder 28 that receives a head nut 29 to secure the crushing mantle 10 to the tapered portion of the main shaft 7. (Ex. 1015, 3:1–9; *see also* Ex. 2006, 54:3–55:4.)

Modifying Polinski to have a cylindrical geometry would eliminate the sleeve's threaded shoulder 28 that is used to secure, via head nut 29, the mantle 10 to a tapered mantle support portion 8 of the shaft 7. (Ex. 2001, ¶¶ 57–61.) But, as Mr. Smith admits, Polinski's design rests on engagement of the sleeve's threaded shoulder 28 with head nut 29:

Q. Based on your understanding of Polinski, how does it describe the removal of abrupt structural discontinuities in the normally high stress regions of the main shaft?

A. So based on my understanding, Polinski adds the threads to the lower portion of the sleeve that fits over the shaft. And the mantle attaches to those threads, rather than directly to the shaft. (Ex. 2006, 53:20–54:2.)

To eliminate the threaded shoulder 28 of Polinski's sleeve would thus change the very principle of operation of Polinski's purported invention and would not have been obvious to a POSITA. (Ex. 2001, ¶ 59.)

Nor would it have been obvious to modify Polinski to reduce the thickness of the threaded shoulder 28. The threads in the shoulder 28 would introduce stress concentrations into the sleeve if the thickness of the shoulder were reduced to align

with the remainder of the sleeve's axial wall. That would significantly increase the likelihood that the sleeve would fail during operation. (*Id.*, ¶¶ 57–63.) Indeed, the additional material provided by the shoulder 28 relative to the remainder of the sleeve's axial wall is needed to distribute the stresses exerted on the sleeve by the mantle. Stated differently, the threaded shoulder is a core feature of Polinski's disclosure that a POSITA, with two years of experience, would not be motivated to remove or change. (*Id.*)

The remaining applied references in the Petition, Bratt (Ex. 1034) and Pollak (Ex. 1017), are merely cited for dependent claim limitations and cannot undo that the modification to Polinski would change Polinski's principle of operation. (*Id.*, ¶¶ 63–65.)

2. Substitute claim 12

Neither Polinski nor Piepho discloses a sleeve with an axial wall, wherein the thickness of the axial wall tapers and decreases over the full axial length of the sleeve, as required by substitute claim 12. Polinski's sleeve 12 does not include any taper—thus the thickness of its axial wall does not taper and decrease whatsoever. Moreover, as discussed *supra*, Polinski's sleeve 12 includes a threaded shoulder 28 extending from its bottom end configured to secure a crusher mantle 10 to the mantle support portion 8 of main shaft 7. (Ex. 1015, 3:1–8; *see also* Ex. 2001 ¶ 66.)

Piepho's yoke bushing 18 discloses a taper, but as discussed *supra* the bushing includes a structural flange at the lower-most end of the sleeve. Petitioner defines the lower-most end of the sleeve as *above* the flange. (Paper 2, 29.) This is an nonsensical designation of the end of Piepho's sleeve and is inconsistent with the understanding of "end" based on intrinsic and extrinsic evidence as discussed *supra*. In any event, it is clear from FIG. 1 of Piepho that its yoke bushing does not taper and decrease "the full axial length of the sleeve," as required by substitute claim 12. (Ex. 2001, ¶ 67.)

Nor would it have been obvious to modify Polinski in view of Piepho to arrive at substitute claim 12. Modifying the purported sleeve of Polinski to meet claim 12 would require changing Polinski's sleeve such that the region, over which the thickness of the axial wall *tapers and decreases*, extends the full axial length of the sleeve. (*Id.*, ¶ 68.) If Polinski's sleeve were modified to include a taper along its entire length, the thickness of Polinski's sleeve would be greater at the region associated with the threaded shoulder 28. The thickness of Polinski's sleeve could only *decrease* along the entire axial length of the sleeve from the second (top-most) sleeve end to the first (lower-most) sleeve end if there was no threaded shoulder 28 for securing the crusher mantle 10. (*Id.*) As discussed *supra*, removing or even reducing the threaded shoulder 28 from Polinski to meet this limitation would change the principle of operation of Polinski's purported invention. (*Id.*)

Similarly, a POSITA looking to Piepho would not be motivated to modify Polinski's sleeve to meet claim 12. As discussed *supra*, the yoke bushing includes a flange extending from its bottom end that increases the thickness of the yoke bushing. As Petitioner and Mr. Smith admit, the flange "provide[s] a shoulder bearing surface which can transmit axial loads," thus acting as a structural support for the yoke. (Paper 2, 32; Ex. 1002, 64.) Removal of the flange from the yoke bushing would remove a structural support from the coal pulverizer in Piepho, similar to the way that removing the threaded shoulder from Polinski would remove a structural support for the crusher mantle. Thus, such a modification would not have been obvious. (Ex. 2001, ¶ 69.)

3. Substitute claims 13–17

Polinski and Piepho fail to disclose or suggest the limitations of substitute claims 13–17 for at least the reasons set forth above based on their respective dependencies. (*Id.*, ¶ 70.)

4. Substitute claim 18

Polinski, Piepho, and Pollack fail to disclose or suggest that "at a region proximal to the first sleeve end, the thickness of the axial wall reduces at an increased rate relative to a region of the axial wall proximal to the second sleeve end, as required by substitute claim 18. As discussed *supra*, Polinski does not disclose a tapered sleeve. Although Piepho discloses a tapered yoke bushing, the

thickness of the yoke bushing *increases* proximal to its first end due to the flange. (*Id.*, ¶¶ 71–74.)

Moreover, Pollak does not disclose the limitations of substitute claim 18. At most, Pollak discloses a sleeve without a taper and a fillet or rounded edge at the bottom end of its sleeve. (Ex. 1017, FIG. 1.) Moreover, it would not have been obvious to modify Polinski's sleeve to incorporate Pollak's fillet. Removing Polinski's threaded shoulder, to replace it with the fillet, would alter the principle of operation of Polinski's purported invention. (Ex. 2001, ¶¶ 71–74.) Thus, this change would not have been obvious.

5. Substitute claim 19

Polinski and Piepho (and Pollak) fail to disclose or suggest a sleeve having an axial wall in which the thickness of the axial wall decreases at a uniform rate along the entire axial length of the sleeve, other than the region proximal to the first sleeve end, where the thickness decreases at an increased rate. As discussed *supra*, it would not have been obvious to modify Polinski in view of Piepho to eliminate or change Polinski's threaded shoulder such that the sleeve thickness decreases uniformly along its entire length. This modification would change Polinski's core principle of operation. For similar reasons, it would not have been obvious to modify Polinski such that the thickness of the axial wall reduces at a uniform rate along most of its axial length, with an increased rate of thickness reduction near the

first sleeve end (where the threaded shoulder is located), as required by substitute dependent claim 20. (Ex. 2001, ¶ 75.)

6. Objective Indicia of Non-Obviousness

“Evidence of objective indicia of nonobviousness, if present, must always be considered before reaching a determination on the issue of obviousness.”

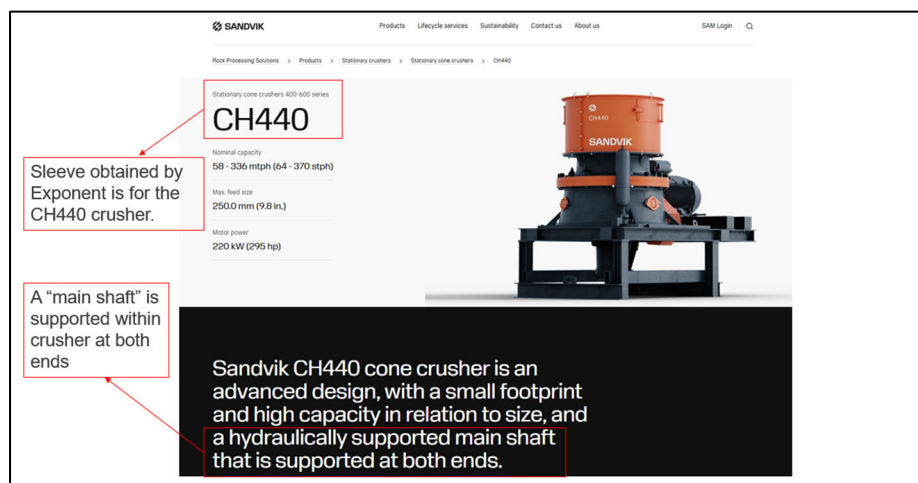
Quanergy Sys. v. Velodyne Lidar USA, Inc., 24 F.4th 1406, 1417 (Fed. Cir. 2022).

Objective indicia of non-obviousness “may often be the most probative and cogent evidence in the record.” *Medtronic, Inc. v. Teleflex Innovations Sarl*, 70 F.4th 1331, 1342 (Fed. Cir. 2023) (quotation and citation omitted). Nexus is presumed “when the patentee shows that the asserted objective evidence is tied to a specific product and that product embodies the claimed features, and is coextensive with them.” *Quanergy*, 24 F.4th at 1417 (quotation and citation omitted). The strong evidence of copying here supports the patentability of the substitute claims.

Beginning with nexus, the copying evidence is tied to Sandvik’s CH440 main shaft sleeve and accompanying main shaft. An example of the sleeve (referred to as Copying Ex. 1) was obtained by Dr. Kytömaa and his team as shown below:



This sleeve has a corresponding main shaft as shown below from Sandvik's website (annotated).

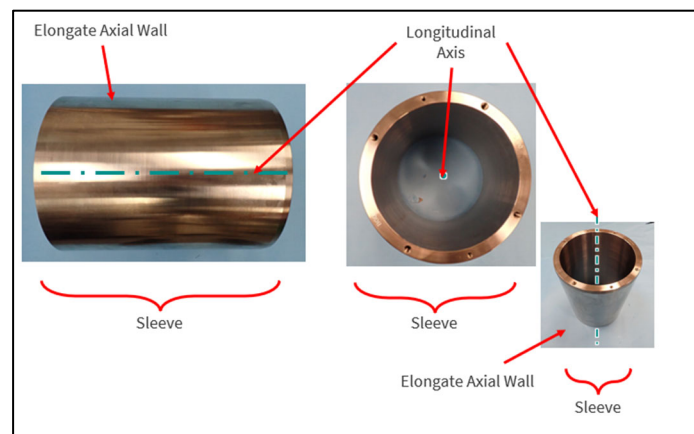


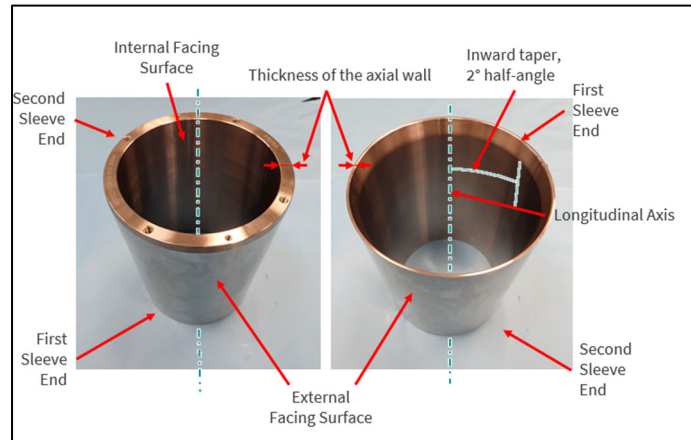
(Ex. 2009.) The CH440 main shaft sleeve and its shaft embody substitute claim 11 and are coextensive with the claim recitations as shown below. (Ex. 2001, ¶¶ 76–106.)

[11pre]: Patent Owner maintains, and Petitioner agrees, that the preamble to substitute claim 11 is not limiting. (Paper 2, 17.)

[11a]: As shown above from Sandvik’s website, the main shaft is supported “at both ends” within a cone crusher. (Ex. 2009.) The shaft body would necessarily be tapered to mate with the sleeve of Copying Ex. 1. (Ex. 2001, ¶ 86; *see also* Ex. 2007, 80 (Mr. Smith testifying in the related IPR proceeding that “a bushing that . . . mates with a tapered portion of shaft will naturally have a wall thickness that tapers from one end to the other in order to fill the space between the two surfaces.”).)

[11b]: The Sandvik CH440 main shaft sleeve includes an elongate axial wall extending around a longitudinal axis of the sleeve, as shown below in annotated images of Copying Ex. 1 by Dr. Kytömaa and his team. The sleeve includes a tapered internal facing surface. Thus, the sleeve is configured to be fit over a tapered region of the main shaft of the CH440 stationary cone crusher such that the internal facing surface is in contact with an outward facing surface of the main shaft. (Ex. 2001, ¶¶ 87–99.)





The Sandvik CH440 main shaft sleeve also includes an external facing surface positioned relative to the longitudinal axis, and an axial wall extends between the internal and external facing surfaces, as shown in the annotated images (above). Finally, the Sandvik CH440 main shaft sleeve includes a first end and a second end. The first end is at a lower-most end of the sleeve and would be positioned at a relatively lower region of the main shaft. The second end is at a top-most end and would be positioned at an upper region of the main shaft relative to the lower region. (*Id.*)

[11c]: As illustrated above with respect to Copying Ex. 1, a thickness of the axial wall at a region between the first and second sleeve ends of the Sandvik CH440 main shaft sleeve tapers and decreases in a direction from the second sleeve end to the first sleeve end. (*Id.*, ¶¶ 100–101.)

[11d]: As shown above, the internal facing surface at the region between the first and second sleeve ends of Copying Ex. 1 extends transverse to the

longitudinal axis so as to taper inwardly towards the longitudinal axis of the sleeve in the direction from the first sleeve end to the second sleeve end. (*Id.*, ¶¶ 102–103.)

[11e]: Copying Ex. 1, as shown below, has an essentially perpendicular measurement of the external facing surface relative to a substantially flat support surface on which the sleeve is positioned in the figure below. (*Id.*, ¶¶ 104–105.)

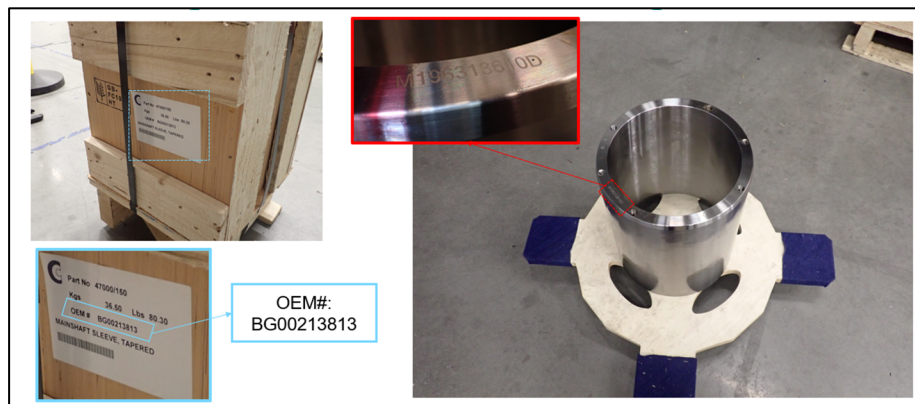


Thus, Sandvik’s CH440 main shaft sleeve, as exemplified by Copying Ex. 1, and its accompanying main shaft, as shown in Sandvik’s website (Ex. 2009), embody the claim recitations of substitute claim 11. Moreover, they are coextensive with those recitations. The coextensive requirement “does not require a patentee to prove perfect correspondence between the product and a patent claim.” *Quanergy*, 24 F.4th at 1418. Rather, it “requires the patentee to demonstrate that the product is essentially the claimed invention.” *Id.* (quotations omitted). That is the case here: as shown above, the CH440 main shaft sleeve and

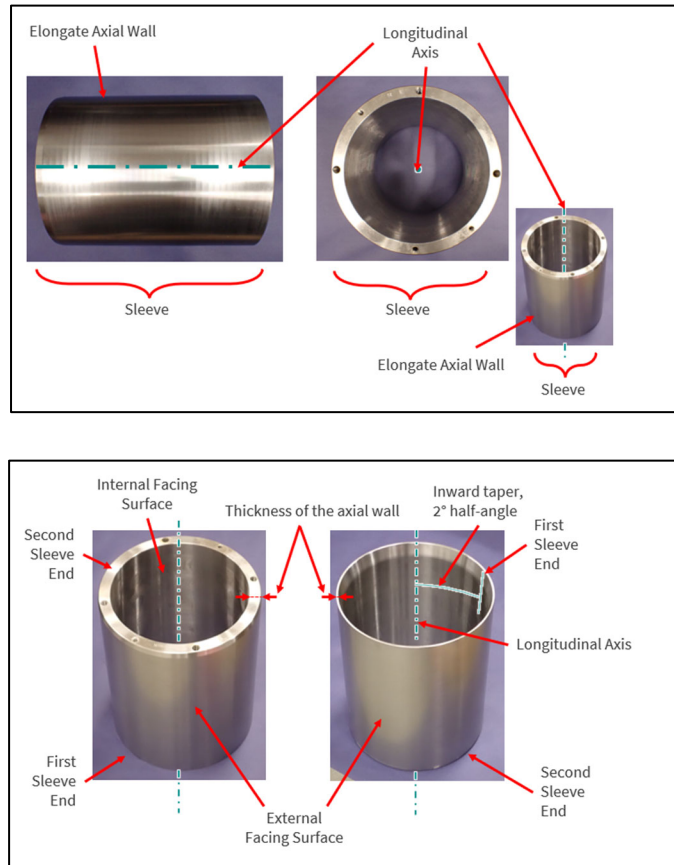
its accompanying shaft are essentially the claimed invention. (Ex. 2001, ¶¶ 76–106.) Accordingly, nexus should be presumed here.

Even if nexus is not presumed, Sandvik is still afforded an opportunity to prove nexus “via a showing that the evidence is the direct result of the unique characteristics of the claimed invention.” *Volvo Penta of the Americas, LLC v. Brunswick Corp.*, 81 F.4th 1202, 1210 (Fed. Cir. 2023)). Petitioner’s copying of Sandvik’s product is a direct result of the unique characteristics of the claimed invention.

Dr. Kytömaa and his team obtained an example of Petitioner’s shaft sleeve (referred to as Copying Ex. 2) as shown below. (Ex. 2001, ¶¶ 78–82, 107–131.)



Petitioner’s product—its main shaft sleeve with an accompanying main shaft—also embody the claim recitations of substitute claim 11 and are coextensive with them. The annotated images below of Copying Ex. 2 show all the recitations of claim 11, with the exception of [11pre] (which the parties agree is not limiting) and [11a]. (*Id.*, ¶¶ 107–131.)



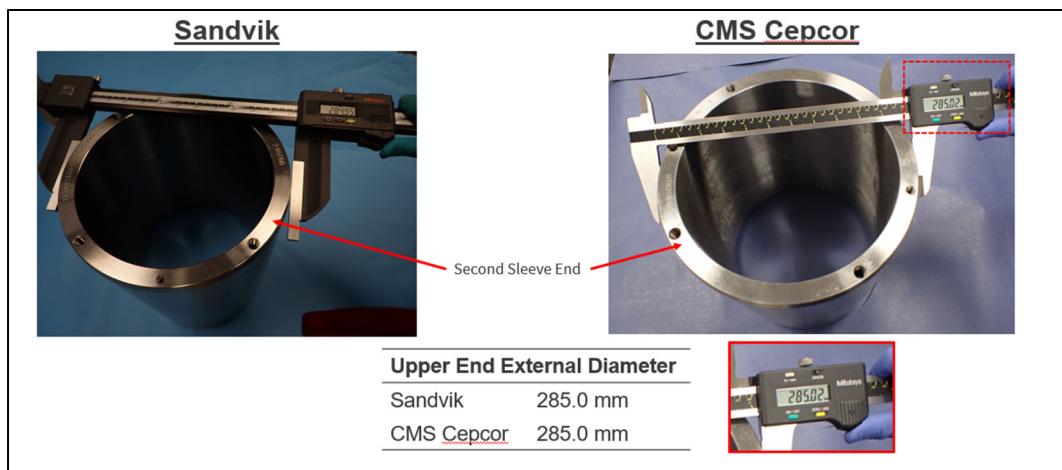
For [11a], Petitioner’s website states that it is selling “all of the replacement parts you need for [Sandvik’s] CH440,” indicating that Petitioner also sells a corresponding main shaft for the shaft sleeve depicted above. (Ex. 2010; *see also* Ex. 2001, ¶¶ 110–111; Ex. 2011.) Moreover, in the related IPR proceeding, Mr. Smith testified that a bushing mating with a “tapered portion of a shaft will naturally have a wall thickness that tapers from one end to the other in order to fill the space between the two surfaces.” (Ex. 2007, 80.)

Furthermore, there is strong evidence that Petitioner’s copying is due to the unique characteristics of the claimed invention, particularly with respect to the

merits of the sleeve in achieving convenient assembly of the sleeve to the shaft.

(See also Ex. 1001, 1:66–2:2; Ex. 2001, ¶¶ 79, 132.) Copying Ex. 2 is substantially **identical** to Sandvik’s sleeve. As an initial matter, the Original Equipment Manufacturer (OEM) number for the Petitioner’s sleeve in Copying Ex. 2 is the **same** as Sandvik’s Copying Ex. 1. The matching OEM numbers indicates that Petitioner is selling the same product as Sandvik. (Ex. 2001, ¶¶ 81, 133.)

There is more. Dr. Kytömaa and his team took corresponding measurements of Copying Exs. 1 and 2. The corresponding measurement included the upper (second end) external diameter, upper (second end) internal diameter, lower (first end) external diameter, lower (first end) internal diameter, and overall length. **Each** of these corresponding measurements are **within one millimeter** of one another as shown below. (Ex 2001, ¶¶ 132–141.)



Upper End Internal Diameter		Lower End External Diameter		Lower End Internal Diameter	
Sandvik	240.7 mm	Sandvik	285.1 mm	Sandvik	277.5 mm
CMS Cepcor	240.9 mm	CMS Cepcor	284.9 mm	CMS Cepcor	277.3 mm

Sleeve Length		Axial Wall Taper		Taper Near Lower End	
Sandvik	353.4 mm	Sandvik	2° half-angle	Sandvik	15° half-angle
CMS Cepcor	354.1 mm	CMS Cepcor	2° half-angle	CMS Cepcor	15° half-angle

The taper angles of the internal facing surface relative to the longitudinal axis of each sleeve is also substantially identical. (*Id.*, ¶ 139.) Finally, Petitioner markets their own products as identical replacements for Sandvik’s products, indicating that its replacement parts for Sandvik’s crushers are “manufactured in consideration of original tolerances.” (Ex. 2010.)

Given the above evidence, there can be no question that Petitioner had access to Sandvik’s CH440 main shaft sleeve and accompanying main shaft and created an essentially identical product—in short, Petitioner copied Sandvik. *Medtronic*, 70 F.4th at 1340 (Fed. Cir. 2023); *see also* Exs. 2015 and 2016 (Petitioner stipulating to an injunction against the CH440, including the shaft, if the Patent Owner prevails in this IPR). And such copying “may indeed be another form of flattering praise for inventive features.” *Id.*, at 1339 (quotation and citation omitted). In fact, copying can be one of the strongest indicia of non-obviousness. *Volvo Penta*, 81 F.4th at 1213. The evidence of copying here, along with the other *Graham* factors, squarely points to the patentability of the substitute claims.

IV. CONCLUSION

Patent Owner respectfully requests that the Board grant this Motion.

IPR2024-01380

Dated: June 24, 2025

Respectfully submitted,

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APPENDIX A – LISTING OF SUBSTITUTE CLAIMS

Patent Owner presents the following substitute claims in marked-up form with underling indicating inserted text and brackets or strikethrough indicating deleted text from the original patent claims.

11. (Substitute for claim 1) A gyratory crusher comprising:

a main shaft including a shaft body having a first end for positioning at a lower region of the crusher and a second end for positioning at an upper region of the crusher relative to the first end, a thickness of the shaft body being tapered in an axial direction of the main shaft at a tapered region of the second end so as to taper and decrease in cross-sectional area; and

a sleeve fitted over the tapered region at the second end of the main shaft, the sleeve including an elongate axial wall extending around a longitudinal axis of the sleeve, the axial wall having an internal facing surface for positioning in contact with an outward facing surface of the main shaft, and an external facing surface relative to the longitudinal axis, the axial wall extending between the internal and external facing surfaces, the axial wall having a first sleeve end for positioning at a lower region of the main shaft and a second sleeve end for positioning at an upper region of the main shaft relative to the lower region,

wherein a thickness of the axial wall at a region between the first and second sleeve ends tapers and decreases in a direction from the second sleeve end to the first sleeve end,

in the axial direction the internal facing surface at said region between the first and second sleeve ends extending transverse to the longitudinal axis so as to taper inwardly towards the longitudinal axis of the sleeve in the direction from the first sleeve end to the second sleeve end, and

wherein the external facing surface from the first sleeve end to the second sleeve end is parallel to the longitudinal axis of the sleeve such that the external facing surface of the sleeve when viewed externally has a cylindrical geometry.

12. (Substitute for claim 2) The gyratory crusher as claimed in claim 11, wherein the region over which the thickness of the axial wall tapers and decreases extends ~~substantially~~ the full axial length of the sleeve.

13. (Substitute for claim 3) The gyratory crusher as claimed in claim 11, further comprising a radial wall extending perpendicular or transverse to the axial wall, the radial wall being positioned at or towards the second end and extending inwardly towards the longitudinal axis.

14. (Substitute for claim 5) The gyratory crusher as claimed in claim 11, wherein a cross-sectional shape profile of the external facing surface is substantially circular.

15. (Substitute for claim 6) The gyratory crusher as claimed in claim 11, wherein a cross-sectional shape profile of the internal facing surface is substantially circular.

16. (Substitute for claim 8) The gyratory crusher as claimed in claim 11, wherein a shape profile of the internal facing surface defines a section of a cone in the axial direction.

17. (Substitute for claim 9) The gyratory crusher as claimed in claim 11, further comprising at least one bore provided through the axial wall to allow the passage of a fluid to the internal facing surface.

18. (Substitute for claim 10) The gyratory crusher as claimed in claim 11, wherein at a ~~curved~~ region ~~[[of]]~~ proximal to the first sleeve end, the thickness of the axial wall reduces at an increased rate relative to a region of the axial wall proximal to the second sleeve end ~~the internal facing surface is curved radially~~

~~outward relative to the longitudinal axis in a direction towards the external facing surface such that the axial wall thickness decreases to zero at the curved region.~~

19. (Substitute for claim 4)§The gyratory crusher as claimed in claim ~~[[3]]~~18, wherein the thickness of the axial wall reduces at a uniform rate along an entire axial length of the sleeve other than the region proximal to the first sleeve end~~the radial wall includes a through bore positioned at the longitudinal axis of the sleeve.~~

CERTIFICATE OF SERVICE

I hereby certify that the attached PATENT OWNER'S NON-CONTINGENT MOTION TO AMEND AND REQUEST FOR PRELIMINARY GUIDANCE was served as of the below date on the Petitioner via email (by agreement) to the following counsel of record:

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Dated: June 24, 2025

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