

Filed on behalf of: CMS Cepcor Ltd., and
CMS Cepcor Americas LLC

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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

v.

SANDVIK INTELLECTUAL PROPERTY AB,
Patent Owner.

Case No. IPR2024-01381
Patent No. 11,014,090

**PETITION FOR INTER PARTES REVIEW OF
U.S. PATENT NO. 11,014,090**

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<i>Yeda Research v. Mylan Pharm. Inc.</i> , 906 F.3d 1031 (Fed. Cir. 2018)	2

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PETITIONERS' EXHIBIT LIST

Ex. 1001	US Patent 11,014,090
Ex. 1001-1	File History for US Patent 11,014,090
Ex. 1002	Declaration of David Smith MSME, MBA, PE, CSP
Ex. 1002-1	<i>Curriculum Vitae</i> of David Smith MSME, MBA, PE, CSP
Ex. 1002-2	Deposition and Trial Testimony of David Smith MSME, MBA, PE, CSP
Ex. 1002-3	Documents considered by David Smith MSME, MBA, PE, CSP in creating Declaration
Ex. 1003	https://www.linkedin.com/in/mikael-k-larsson-12728827
Ex. 1004	https://www.linkedin.com/in/patric-malmqvist-19bb3110
Ex. 1005	https://www.linkedin.com/in/anders-hallberg-3bba713a
Ex. 1006	https://www.nature.com/articles/d41586-021-02612-5
Ex. 1007	https://www.drivesphalt.org/why-asphalt
Ex. 1008	https://pubs.usgs.gov/periodicals/mcs2022/mcs2022-stone-crushed.pdf
Ex. 1009	https://i.ytimg.com/vi/vQCgnGrSz7M/hqdefault.jpg
Ex. 1010	https://aggregates.seprosystems.com/history-of-rock-crushers/
Ex. 1011	https://ogden_images.s3.amazonaws.com/www.mininggazette.com/images/2022/04/01160835/4-2-CCPP.gj-.jpg
Ex. 1012	U.S. Patent Publication No. 3,813,047
Ex. 1013	https://aggregates.seprosystems.com/history-of-rock-crushers/
Ex. 1014	https://savree.com/en/encyclopedia/gyratory-crusher
Ex. 1015	https://savree.com/en/encyclopedia/gyratory-crusher
Ex. 1016	International patent publication WO2014/019765
Ex. 1017	U.S. Patent Publication No. 4,410,143
Ex. 1018	U.S. Patent Publication No. 6,270,026
Ex. 1019	U.S. Patent Publication No. 4,060,205
Ex. 1020	https://pbase.com/mainecruising/fitting_a_prop
Ex. 1021	https://www.surpluscenter.com/Hydraulics/Hydraulic-Pumps/Clutch-Pumps-Hydraulic/2-32-cu-in-Hydraulic-Pump-w-Tapered-Shaft-for-Electric-Clutch-Rexroth-AZPN10036RXR12MA-9-1738-P.axd
Ex. 1022	https://img.directindustry.com/images_di/photo-g/20030-2339083.jpg
Ex. 1023	https://www.brandnewengines.com/cdn/shop/products/SAM_3681_1024x.jpg

Ex. 1024	https://ashdowntooling.co.uk/products/1-5mm-13mm-lathe-tail-stock-drill-chuck-morse-taper-3-mt3-to-b16-arbor
Ex. 1025	Machine Design Data Handbook, K. Lingaiah, c1994
Ex. 1026	https://www.cgtek.co.uk/metalwork/data/morse
Ex. 1027	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3779551/
Ex. 1028	SAE J755
Ex. 1029	SAE J1419
Ex. 1030	ASME B18.8.2
Ex. 1031	U.S. Patent Publication No. 4,019,344
Ex. 1032	U.S. Patent Publication No. 3,343,376
Ex. 1033	U.S. Patent Publication No. 2,840,399
Ex. 1034	U.S. Patent Publication No. 3,228,102
Ex. 1035	U.S. Patent Publication No. 4,829,718
Ex. 1036	U.S. Patent Publication No. 2,764,437
Ex. 1037	“Accurate mounting of bearings, propellers and gears has never been quicker...” by SKF (3603e_skf_hydraulic_bearing_techniques.pdf)
Ex. 1038	“Hydraulically Fitted Hubs, Theory and Practice” by Michael M. Calistrat (T91-10.pdf)
Ex. 1039	“Hydraulic Removal of Coupling Hubs – Keyed and Keyless” by Michael Calistrat and Robert Parker (T22153-160)
Ex. 1040	U.S. Patent Publication No. 8,302,754
Ex. 1041	U.S. Patent Publication No. 7,048,214

1. INTRODUCTION

Pursuant to 35 U.S.C. §§ 311, 314(a), and 37 C.F.R. § 42.100, CMS Cepcor Ltd. and CMS Cepcor Americas LLC (“CMS Cepcor”) (“Petitioners”) respectfully request that the Board review and cancel as unpatentable under 35 U.S.C. §103 claims 1-14 (the “Challenged Claims”) of the ’090 Patent (Exhibit 1001).

Claims 1–14 of the ’090 patent are not patentable claims. Patent Owner copied a foreign patent application **that Patent Owner already owned**¹ and made a minor change to such prior patent as the basis the prosecution of the ’090 Patent. During such prosecution, Patent Owner **did not disclose** its own foreign patent application also covering gyratory crushers, albeit naming mostly different inventors, of which it undoubtedly had knowledge. Such lack of disclosure displays a callous disregard for the transparency required for a patent prosecution and calls into questions the bona fides of this prosecution.

Nonetheless, even without knowledge of the Patent Owner’s foreign patent application, the Examiner rightly rejected Patent Owner’s claims as both anticipated and rendered obvious by prior art. However, after the Patent Owner made superficial revisions in its claims, the Examiner accepted such claims without further review and any further substantive examination. The Examiner’s acts of granting the ’090

¹ By referencing such foreign patent, Petitioner does not admit the validity of such foreign patent. Petitioner merely references it (1) to show a pattern of gathering obvious, non-novel patents by Patent Owner and (2) to show that the claims in the ’090 patent are widely known by persons of ordinary skill in the art.

Patent without explanation of how Patent Owner overcame the original rejection calls into question the scope and thoroughness and suggests the result was an incomplete review of the '090 claims. Declaration of David Smith (Exhibit 1002) ¶¶ 80–82.

Putting aside the art considered by the Examiner, as explained below, other relevant art NOT presented to the Examiner further renders the claims of the '090 patent invalid. Doing so is the textbook definition of obviousness: combining “known” components to yield “predictable results.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 401 (2007).

Petitioners also cite to additional prior art (*See, e.g.*, U.S. Patent No. 7,048,214 to Johnson (Ex. 1041), U.S. Patent No. 2,840,399 to C.A. Harless et al. (Ex. 1033), U.S. Patent No. 8,302,754 to Yagi (Ex. 1040), and U.S. Patent No. 4,829,718 to Behm (Ex. 1035)) as evidence of a POSITA’s background knowledge and to provide contemporaneous context to support Petitioner’s assertions regarding what a POSITA would have understood from the prior art in the area. *Yeda Research v. Mylan Pharm. Inc.*, 906 F.3d 1031, 1041-1042 (Fed. Cir. 2018); 37 C.F.R. §42.104(b).

Presently, Petitioners show that, considering evidence not disclosed to the Examiner, Claims 1–14 of the '090 Patent were all obvious to a POSITA. Thus, such claims are not patentable under 35 U.S.C. § 103.

2. STATEMENT OF THE PRECISE RELIEF REQUESTED FOR EACH CLAIM CHALLENGED

CMS Cepcor requests review of claims 1–14 of the '090 patent under 35 U.S.C. § 311 on the ground that such claims are unpatentable under 35 U.S.C. § 103 as rendered obvious by prior art according to a person of ordinary skill in the art.

3. LEVEL OF ORDINARY SKILL IN THE ART

For purposes of this Petition, a person having ordinary skill in the art 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. A 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. Ex. 1002, ¶ 29.

4. STANDING (§ 42.104(a))

CMS Cepcor Ltd. and CMS Cepcor Americas LLC (collectively “CMS Cepcor”) certify that that U.S. Patent No. 11,014,090, titled “Gyratory Crusher Main Shaft and Assembly” (hereinafter the “'090 patent”) is available for *inter partes* review (“IPR”), and that CMS Cepcor is not barred or estopped from requesting *inter partes* review of the grounds identified in this Petition. Neither CMS Cepcor, nor any party in privity with CMS Cepcor: (a) has filed a civil action challenging the validity of claims 1–14 of the '090 patent; (b) has been served a complaint alleging infringement of the '090 patent more than one year prior to the present date; or (c)

is estopped from challenging the claims on the grounds identified in this Petition. Claims 1–14 of the '090 patent also have not been the subject of a prior *inter partes* review or a finally concluded district court litigation.

5. THE APPLE/FINTIV FACTORS SUPPORT INSTITUTION OF AN *INTER PARTES* PROCEEDING, SO DISCRETIONARY DENIAL IS NOT APPROPRIATE

In the U.S. District Court for the District of Delaware, there is a parallel proceeding involving the '090 Patent in front of The Honorable Jennifer Lynne Hall. *See generally Sandvik Mining & Construction, et al. v. CMS Cepcor Ltd., et al.*, Case No. 1:24-481-JLH (the “Delaware Litigation”). However, the Apple/Fintiv factors support institution despite the existence of the Delaware litigation, *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020). The Board should not exercise its discretion to deny institution under 35 U.S.C. § 314(a). If the Board considers exercising its discretion to deny institution, Petitioners respectfully request leave to file a reply to address any discretionary denial arguments Patent Owner makes in its preliminary response.

Factor 1: Whether the Court granted a stay or evidence exists that one may be granted if a proceeding is instituted. This factor is neutral or weighs in favor of institution. Petitioner is about to file a motion with the Delaware Litigation to request a stay, so at worst this factor is neutral. Attorney Docket No. 48100-0004IP1 IPR of U.S. Patent No. 9,550,223. *Sand Revolution II, LLC v. Continental Intermodal Group⁵ Trucking LLC*, IPR2019-01393, Paper 24 at 7 (PTAB June 16,

2020) (informative). Congress intended for district courts to be liberal in granting stays pending PTAB proceedings, especially in cases where petitioners moved quickly after service of a complaint. 157 Cong. Rec. S1363 (Mar. 8, 2011) (Sen. Schumer) (Congress placed “a very heavy thumb on the scale in favor of a stay being granted”). Because Petitioners have moved expeditiously (see Factor 2, *infra*), this factor favors institution. Delaware Courts have recently granted a stay pending IPR in a case where a stay is requested. *See, e.g., Dental Monitoring v. Get-Grin, Inc.*, No. 22-647-WCB, 2024 WL 1603403 (D. Del. Apr. 9, 2024).

Factor 2: Proximity of the Court’s trial date to the Board’s projected statutory deadline for a final written decision. This factor weighs in favor of institution. The time for Defendants to answer or move against the Complaint has not yet run. That answer date is September 23, 2024. In fact, the Court has not issued any schedule at all. And, even in the unlikely case that Judge Hall does not grant a stay, any trial is likely to be set no earlier than 18 months from the time scheduled for an answer—i.e., March 2026. The PTAB will issue an institution decision significantly earlier than that date. The PTAB’s governing procedures thus provide a reasonable certainty that the PTAB will resolve the issues raised by this Petition in advance of the Court’s trial date.

The gap widens considering that trial dates are commonly subject to delays and should not support discretionary denial. The *Sand Revolution* decision properly

questioned anchoring denial of institution on such an inherently unreliable schedule. IPR2019-01393, Paper 24 at 8–9 (PTAB June 16, 2020) (“It is unclear that the court in the related district court litigation will adhere to any currently scheduled jury trial date or, if it is changed, when such a trial will be held.”). The certainty that the PTAB would issue a final written decision well in advance of the district court’s trial date combined with the definite uncertainty of when trial will occur weighs strongly in favor of institution.

Factor 3: Investment in the parallel proceeding by the Court and the parties. The third factor favors institution. The Delaware litigation has not even begun, much less has any discovery been sought, and will still be in the early stages by the time the Board issues an institution decision. It is unlikely that any fact depositions will have taken place by then. Further, Court will not have addressed invalidity in light of prior art. The district court litigation is likely to be stayed once the present Petition is instituted. Furthermore, as part of a holistic analysis, the Board considers the speed with which the petitioner acted. *Apple Inc. v. Seven Networks, LLC*, IPR2020-00156, Attorney Docket No. 48100-0004IP1 IPR of U.S. Patent No. 9,550,223 8 Paper 10 at 11–12 (PTAB June 15, 2020). Where the petitioner acted diligently and without delay, as here, investment of the parties in the parallel district court litigation is minimized. *HP Inc. v. Neodron LTD*, IPR2020-00459, Paper 17 at 40 (PTAB Sept. 14, 2020). Petitioners here are notably more diligent by filing this

Petition within 2 months of having been served with the Complaint in the Delaware litigation and before their time to answer or otherwise respond has expired. Such diligence by Petitioners favors institution.

Factor 4: Overlap between issues raised in the Petition and in the parallel proceeding. This factor weighs in favor of institution. All Challenged Claims are asserted in the district court action. (See generally IS1018.) But, while the Petition challenges the same claims asserted in the parallel district court proceeding, there is a high likelihood that Judge Hall will grant a stay. Even without a stay, a final written PTAB decision will still issue before the beginning of a district court trial. The final written decision, once issued, will trigger estoppel in the district court litigation for grounds that were raised or reasonably could have been raised during IPR. See 35 U.S.C. § 315(e)(2). Petitioners intend to file in the parallel district court litigation a stipulation that, if IPR is instituted, they will not pursue in the parallel litigation any ground that is raised or that could have been reasonably raised in an IPR or any subsequent appeal if pursued. *See Sotera*, IPR2020- 01019, Paper 12, at 19.

Factor 5: Whether the Petitioner and the defendant in the parallel proceeding are the same party. The fifth factor, whether the parties are the same, weighs against institution as is typical when, as here, the Petitioners here are the Defendants in the parallel district court case brought by Patent Owner. *Sotera*, IPR2020-01019, Paper 12, at 19.

Factor 6: Other circumstances that impact the Board’s exercise of discretion, including the merits. Finally, other circumstances strongly favor institution. The strength of the present Petition strongly weighs in favor of institution. Petitioners advance a targeted Petition with art which had not been previously presented in prosecution. The primary references, Aberg, WO 2014/019765 (Ex. 1016) and C.A. Harless (Ex. 1033), teach almost all of the limitations of all the Challenged Claims. The allowed claims and prosecution history of the ’090 Patent evidence an incomplete examination. (Ex. 1002 ¶ 80–82; *see also* § 6, *infra*.) For example, Applicant did not submit known prior art references with the application. (*See generally* Exs. 1001, 1002) The Examiner allowed what were in essence the cancelled claims without explanation. (Ex. 1002 ¶ 80–82) Given the strength of the prior art as detailed below, and the concerns surrounding the prosecution of the ’090 Patent, it is in the public interest to address invalidity, especially by considering prior art known to Applicant but never submitted during prosecution. As the Supreme Court recently explained, there is a significant public interest against “leaving bad patents enforceable.” *Thryv, Inc. v. Click-To-Call Techs., LP*, 140 S. Ct. 1367, 1374 (2020). The Board’s policy is to “not deny institution of an IPR or PGR under Fintiv (i) when a petition presents compelling evidence of unpatentability.” Director Vidal Memorandum (June 21, 2022) (“Memo”), 9. “Compelling, meritorious challenges are those in which the evidence, if unrebutted in trial, would plainly lead to a conclusion that

one or more claims are unpatentable by a preponderance of the evidence.” Memo, 4. The prosecution examiner allowed the claims without evaluating their unpatentability in view of any of these prior art references. Thus, the evidence of unpatentability is compelling here, and the PTAB should not deny institution under Fintiv.

6. PROSECUTION HISTORY

In the original prosecution of the ’090 patent, there were 14 claims. (Ex. 1001-1, at 26–28.) According to the first Office Action, **all 14 claims** were rejected. (*Id.* at 262.) Specifically, all 14 claims were anticipated by Johnson, U.S. Patent No. 7,048,214, which is a gyratory rock crusher with all the essential elements claimed in the ’090 Patent. (*Id.* at 264–65.) Furthermore, according to the Examiner, “It would have been obvious to one of ordinary skill in the art before the effective filing date of the claimed invention to provide the device ... with the grooves as taught by Johnson et al in order to deliver lubricating oil to the outside surface.” (*Id.* at 266.)

After the Office Action, Patent Owner made minimal changes to the claims of the ’090 patent. *See* Ex. 1002 at ¶ 80–82. Then, the Examiner approved the claims without question. *See* Ex. 1001-1, at 443. This shows an inadequate initial examination of the ’090 Patent, making the patent ripe for *inter partes* review. During the prosecution, Patent owner did not disclose Aberg to the Examiner, despite **Patent Owner owning Aberg** during and throughout the examination period.

7. HOW THE CLAIMS ARE UNPATENTABLE (37 C.F.R. § 42.104(b)(4))

An explanation of how claims 1–14 are unpatentable, including identification of how each claim feature is found in the prior art and the motivation to combine the prior art, is set forth below in Section 10 and explained in more detail in the accompanying Expert Declaration of David Smith (Ex. 1002).

8. SUPPORTING EVIDENCE (37 C.F.R. § 42.104(b)(5))

The List of Petitioners’ Exhibits is set forth above, and an Appendix of Exhibits supporting this Petition is attached. In addition to other art generally known by a POSITA, as explained in the Declaration of David Smith (Ex. 1002), the prior art that Petitioners claim specifically render the ’568 patent include:

Exhibit	Reference	Publication Date	Basis Prior Art
1017	U.S. Patent No. 4,410,143 (“Polinski”)	October 18, 1983	§ 102(a)(1) & § 102(b)
1018	U.S. Patent No. 6,270,026 (“Piepho”)	August 7, 2001	§ 102(a)(1) & § 102(b)
1033	U.S. Patent No. 2,840,399 (“C.A. Harless”)	September 25, 1956	§ 102(a)(1) & § 102(b)

9. CLAIM CONSTRUCTION

Claims are to be given their “broadest reasonable construction in light of the specification.” 37 C.F.R. § 42.100(b). Claims only need to be construed to the extent necessary to resolve a controversy. No terms need construction because the claims

read on the prior art identified below under any construction consistent with *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2004). The claim terms should thus be given their plain and ordinary meaning under *Phillips*. Pursuant to 37 C.F.R. § 42.100(b), claims subject to IPR are construed according to their plain and ordinary meaning. Petitioner does not waive, and expressly reserves, its claim scope arguments, constructions, and evidence that it may raise in other proceedings.² The preambles in the independent claims “a gyratory crusher comprising” or “a gyratory crusher main shaft of a crusher comprising” are not limitations of the claims. *Poly-America LP v. GSE Lining Tech. Inc.*, 383 F.3d 1303, 1310, 72 USPQ2d 1685, 1689 (Fed. Cir. 2004).

10. CLAIMS 1–14 ARE NOT PATENTABLE UNDER 35 U.S.C. § 103.

As explained in detail in this section, claims 1–14 are not patentable because they are obvious to a person of ordinary skill in the art. Such claims are rendered obvious by Polinski, U.S. Patent No. 4,410,143 (“Polinski,” Ex. 1017), in view of Piepho, U.S. Patent No. 6,270,026 (“Piepho,” Ex. 1018), and in further view of Harless, U.S. Patent No. 2,840,399 (“C.A. Harless,” Ex. 1033). Specifically, Polinski discloses a gyrating rock crusher, Piepho is a rock crushing apparatus, and C.A.

² Petitioners submit that no construction of any terms is necessary for the institution phase of this proceeding. As discussed below, the prior art teaches each and every feature of the claims of the ’090 Patent under any reasonable construction. However, Petitioners note that nothing in this Petition should be construed as Petitioner’s acquiescence that the claims meet the requirements of 35 U.S.C. § 112.

Harless discloses a method of fixedly attaching components to tapered shaft ends, as facilitated by the use of fluid power elements.

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, at ¶ 85. Further, Piepho teaches the interchangeability between a cylindrical joint and a tapered joint. Ex. 1002, at ¶ 85. Piepho also teaches that a tapered joint is preferable. Ex. 1002, at ¶ 85.

A POSITA would be motivated to combine the tapered joint of Piepho with the teachings of Polinski based on the explicit teachings of the prior art. Ex. 1002, at ¶ 86. In addition to this, a POSITA would understand the advantages afforded by the use of a tapered joint as compared with a cylindrical joint. Ex. 1002, at ¶ 86. Tapered interference fits have significant and important benefits over straight fits, that would motivate a POSITA to incorporate them into the design of equipment, including in the design of rock crushing apparatuses. Ex. 1002, at ¶ 87.

Other benefits that would motivate a POSITA to implement the well-known tapered interference fits taught in the prior art include the ease of removal and ability to prevent damage,³ they are able to be used in more locations as they do not require presses and gear pullers,⁴ and make removing components on a tapered shaft

³ Exhibit 1035, 1:13-15, 1:35-42

⁴ Exhibit 1034, 1:15-24

particularly easy,⁵ particularly when combined with known hydraulic systems for making and breaking the interference fit. Ex. 1002, at ¶ 88.

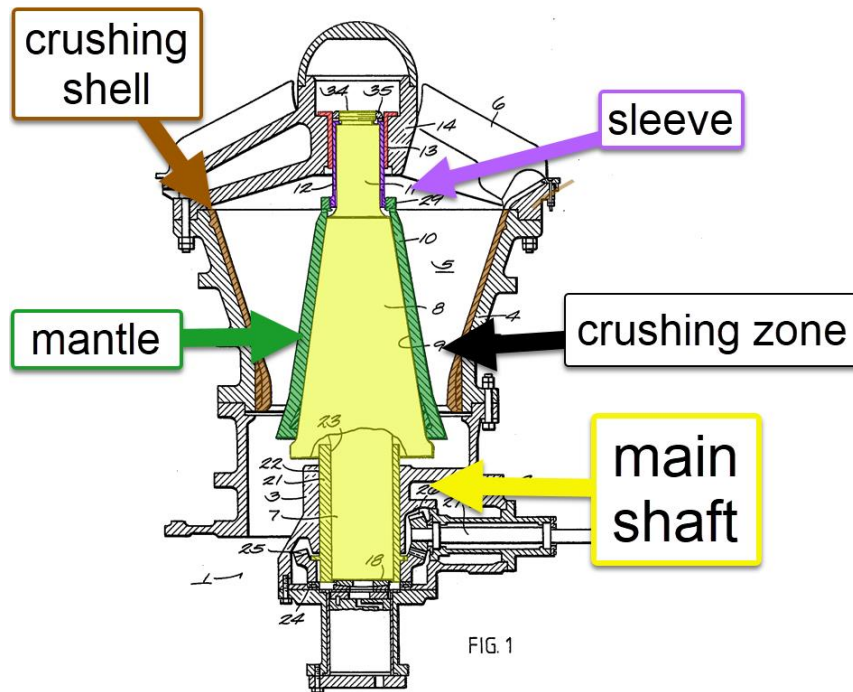
Therefore, a POSITA would be motivated to combine Polinski in view of Piepho, and further in view of Harless to gain multiple advantages as taught in the prior art. Ex. 1002, at ¶¶ 90-94. The following subsections utilize headers that correspond to designations included in the Declaration of David Smith, Exhibit 1002.

10.1. Claim 1P

A gyratory crusher main shaft of a crusher comprising: ...

Although the preamble is generally not considered limiting, Polinski discloses a gyratory crusher main shaft of a crusher. Specifically, Polinski teaches, “The present invention relates to **gyratory crushers** and, in particular, to the main shaft supporting the crusher head or mantle within the crusher.” Ex. 1017, at 1:6-8 (emphasis added). Such a gyratory rock crusher, with all essential components, can be seen in the figure from Polinski:

⁵ Exhibit 1033, 3:15-22



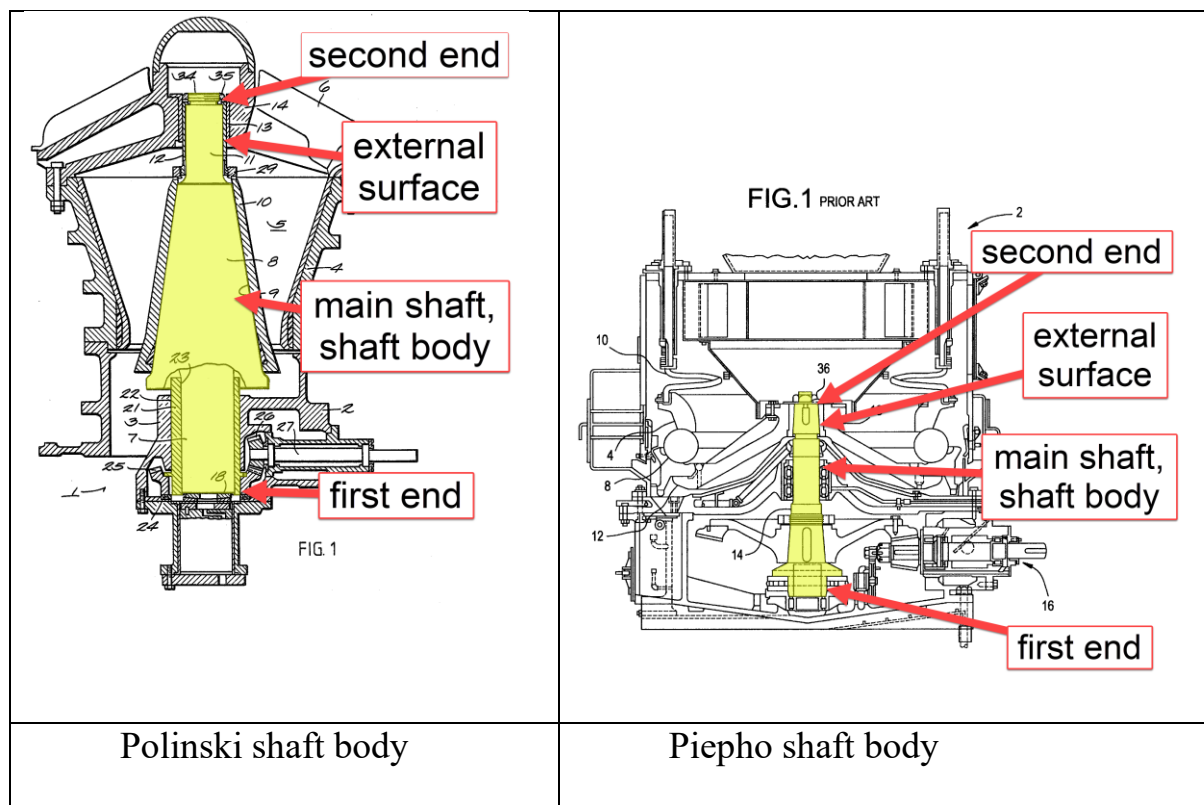
Accordingly, claim 1P the '090 patent is not patentable as containing the identical disclosures as are in Polinski.

10.2. Claim 1a

... a shaft body having a radially outward facing external surface, and a first end and a second end ...

Polinski and Piepho each disclose a shaft body having a radially outward facing external surface, and a first end and a second end. Specifically, Polinski teaches, “[T]he gyratory crusher 1 embodying the invention includes a lower frame 2 provided with a vertical hub 3, an upper frame 4 forming the outer shell of the crusher chamber 5, a top frame or spider 6 mounted on the upper frame 4, and **a centrally located gyratable main shaft 7**” (Ex. 1017, at 2:32-37), and Piepho teaches “The bottom ring 6 is driven by the yoke 12 which is attached to a **vertical main shaft**

assembly 14 of the pulverizer.” (Ex. 1018, at 1:26-27 (emphasis added)). Such a main body shaft can be seen from the figures in Polinski and Piepho:



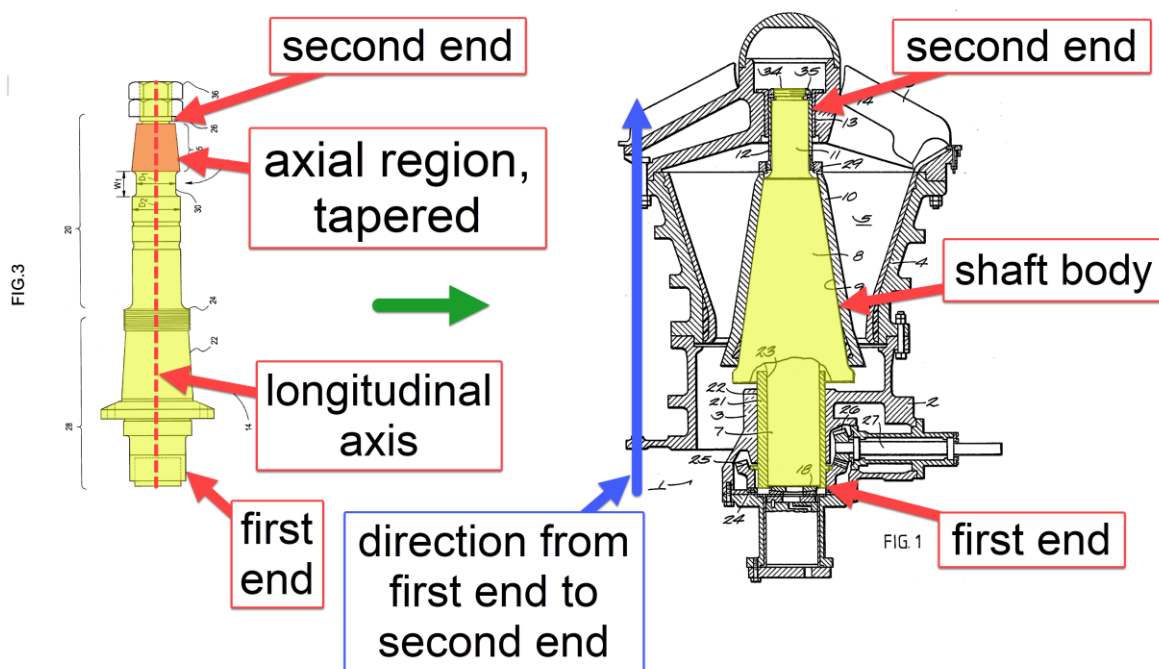
Accordingly, Claim 1a of the '090 Patent is not patentable as containing the identical disclosures as those in Polinski and Piepho.

10.3. Claim 1b

... an axial region of the shaft body extending from the second end and being tapered relative to a longitudinal axis of the shaft body such that a cross sectional area of the shaft body at the tapered axial region decreases in a direction from the first end to the second end ...

Polinski in view of Piepho discloses an axial region of the shaft body extending from the second end and being tapered relative to a longitudinal axis of the shaft

body such that a cross section area of the shaft body at the tapered axial region decreases in a direction from the first end to the second end. Such axial region is best exhibited in the figures of Polinski and Piepho:



As shown above, the shaft body of Piepho has a tapered region that extends from the second end. The taper of this portion is relative to the longitudinal axis of the shaft body. Due to this taper, the cross-sectional area of the shaft body decreases as shown by the orange highlighted area above. This decrease in cross-sectional area occurs in the direction from the first (bottom) end of the main shaft to the second (top) end of the main shaft.

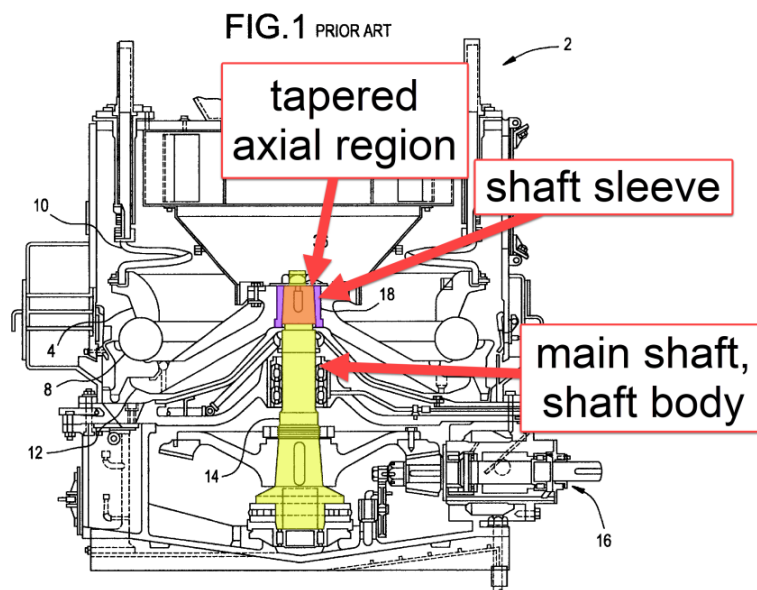
A POSITA would have been motivated to incorporate the tapered end on the main shaft of Piepho with the main shaft on Polinski. Ex. 1002, at 59. As Piepho

describes, the tapered shaft aids in accurate alignment which is notoriously more difficult with purely cylindrical shafting. Incorporating the tapered portion of the Piepho shaft with Polinski would be a combination of known elements, in known ways, producing predictable results. Ex. 1002, at 59. Therefore, Aberg contains the identical disclosures as in claim 1b of the '090 Patent, making it unpatentable.

10.4. Claim 1c

... a shaft sleeve mounted on the tapered axial region ...

Polinski in view of Piepho discloses a shaft sleeve mounted on the tapered axial region. Specifically, Piepho teaches “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. **Preferably, the joint (21) is a tapered joint with the tapered end (25) of shaft (14).**” Ex. 1018, at 3:27-31. Such wear sleeve can be seen in purple, below:



The main shaft of Polinski also has a sleeve. The sleeve of Polinski is fitted over a cylindrical portion of the main shaft body of Polinski, however, a POSITA would be motivated to use the tapered sleeve of Piepho as it aids in alignment and fit-up. Ex. 1002, at 61. A POSITA would be motivated to combine Polinski's shaft with a sleeve fitted onto the second end with Piepho's teachings of a sleeve fitted over the tapered section of second end of the main shaft. Ex. 1002, at 61. A POSITA would have a reasonable expectation of success in making the combination as it is nothing more than combining prior art elements according to known methods to yield predictable results. Ex. 1002, at 61. A POSITA would be further motivated to use a tapered sleeve on a tapered shaft as it aids in alignment and makes it easier to install and detach as the distance the sleeve needs to travel while expanded is smaller compared to a sleeve with a cylindrical interference fit. Ex. 1002, at 61.

Accordingly, Polinski, in view of Piepho, render obvious this claim of the '090 Patent and, thus, unpatentable.

10.5. Claim 1d1

... at least one groove indented at the external surface and positioned at the tapered axial region ...

Polinski in view of Piepho, and in further view Harless discloses at least one groove indented at the external surface and positioned at the tapered axial region. As shown in the figure below, Harless discloses at least one groove indented at the external surface and positioned at the tapered axial region:

combining known elements using known methods to produce predictable results. Ex. 1002, at 63.

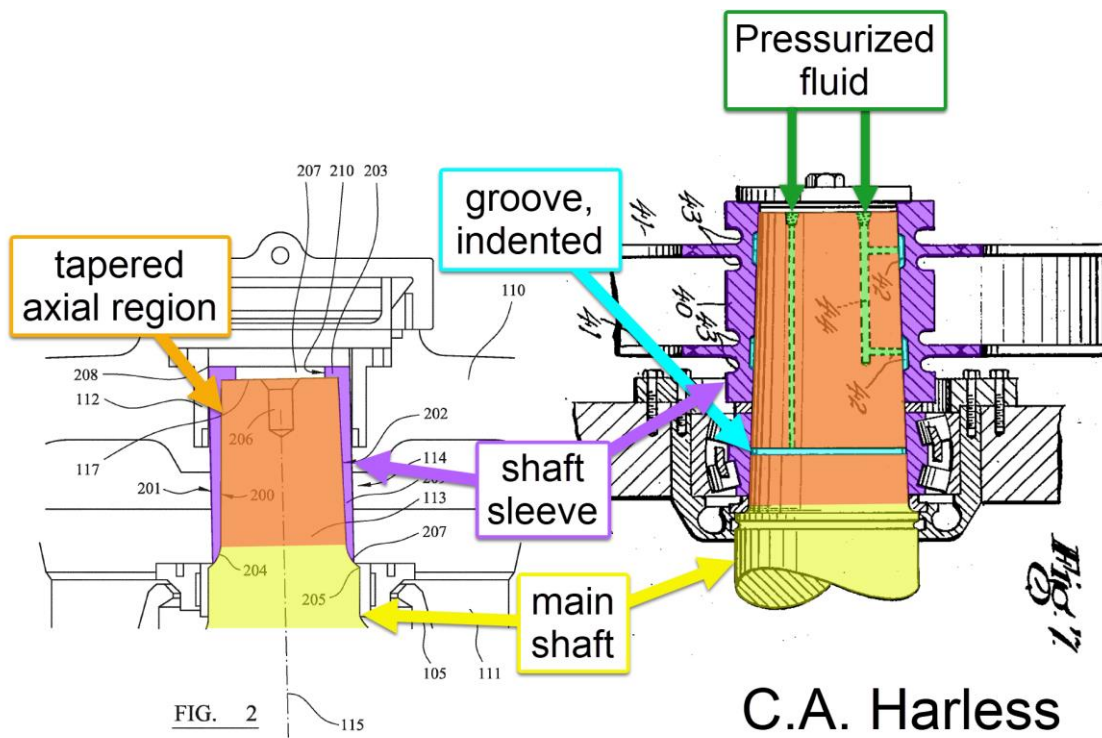
During prosecution, the Examiner herself found that such prior art, in that case the Johnson reference (Ex. 1041), also dealt with the same issues a decade before the alleged inventors of the '090 patent.

Accordingly, claim 1d1 of the '090 Patent is rendered obvious by Polinski in view of Piepho, and in further view of C.A. Harless.

10.6. Claim 1d2

... the at least one groove being arranged to receive a pressurized [sic] fluid to facilitate mounting and dismounting of the shaft sleeve at the shaft body ...

Polinski in view of Piepho and Harless discloses that at least one groove is arranged to receive a pressurized fluid to facilitate mounting and dismounting of the shaft sleeve at the shaft body. As shown below, Harless discloses that each of the three grooves are arranged to received pressurized fluid which is used to facilitate both mounting and dismounting of components such as shaft sleeves at the shaft body:



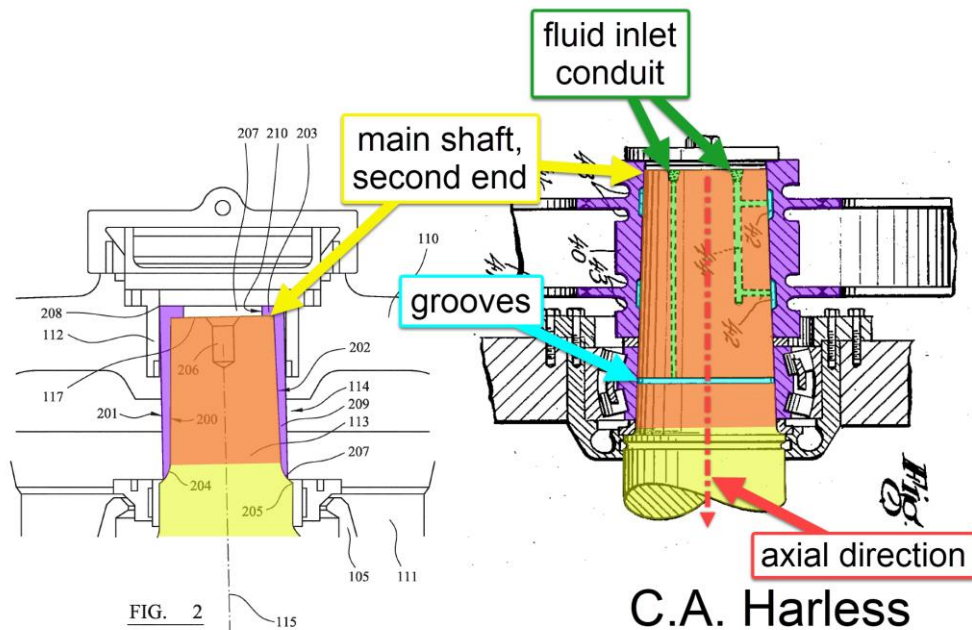
Harless discloses at least one groove (three grooves in Figure 7) which are arranged to receive pressurized fluid (oil) to facilitate mounting or dismounting a shaft sleeve element at the shaft body. This combination of Polinski in view of Piepho and Harless is the result of combining known elements using known methods to produce predictable results. Ex. 1002, at 64. A POSITA would be further motivated to combine these elements to simplify the equipment and process for making and breaking interference fits as discussed above, and would have every expectation of success as the technology was already well developed and documented. Ex. 1002, at 64.

Accordingly, Claim 1d2 of the '090 Patent is not patentable as rendered obvious by Polinski, in view of Piepho and C.A. Harless.

10.7. Claim 2

The main shaft as claimed in claim 1, further comprising a fluid inlet conduit extending axially from the second end and provided in fluid communication with the at least one groove to allow a fluid to be supplied to the at least one groove from the second end.

Polinski in view of Piepho and Harless discloses that the main shaft further comprises a fluid inlet conduit extending axially from the second end and provided in fluid communication with the at least one groove to allow a fluid to be supplied to the at least one groove from the second end. A POSITA would understand that the fluid would ordinarily be delivered through a fluid inlet conduit as is customary and well-known. Ex. 1002, at 65. In addition to this, Harless describes these conduit features in greater detail. The fluid inlet conduits of Harless are highlighted in green below, which connect an inlet port at the end of the main shaft to a respective groove.



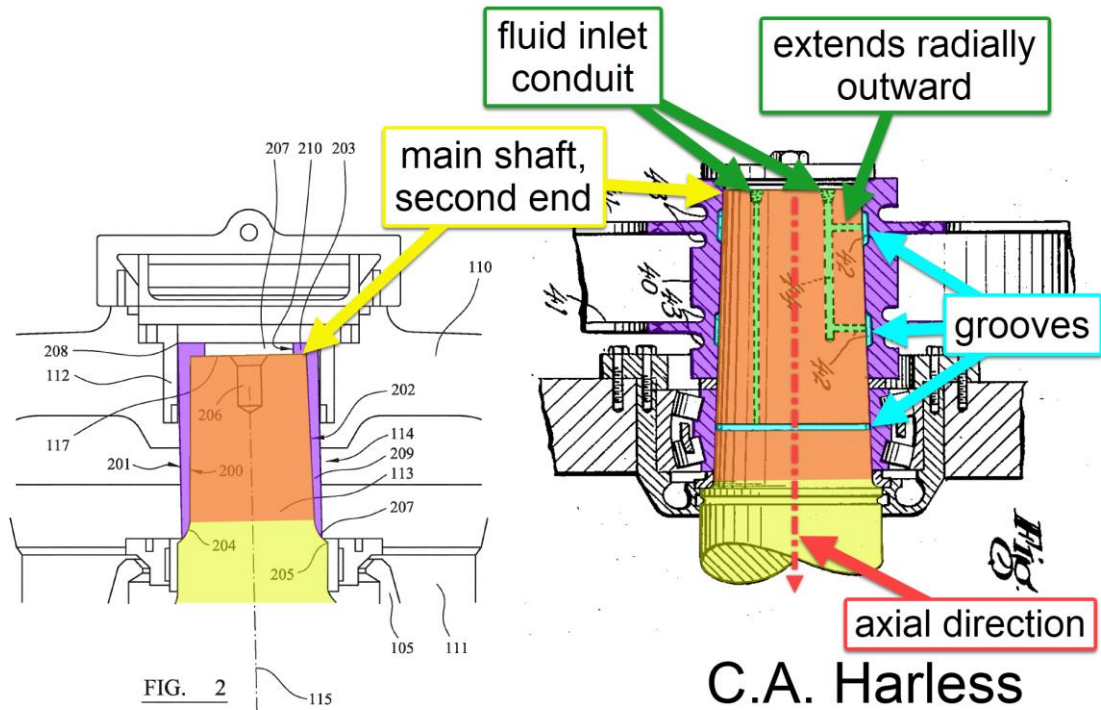
This combination of Polinski in view of Piepho and Harless is the result of combining known elements using known methods to produce predictable results. Ex. 1002, at 66. A POSITA would be further motivated to combine these elements to simplify the equipment and process for making and breaking interference fits as discussed above, and would have every expectation of success as the technology was already well developed and documented. Ex. 1002, at 66.

Accordingly, Claim 2 is not patentable as rendered obvious by Polinski, in view of Piepho and C.A. Harless.

10.8. Claim 3

The main shaft as claimed in claim 2, wherein the fluid inlet conduit extends internally within the shaft body such that a part of the fluid inlet conduit extends radially outward to the at least one groove.

Polinski in view of Piepho and Harless discloses that the fluid inlet conduit extends internally within the shaft body such that a part of the fluid inlet conduit extends radially outward to the at least one groove. Specifically, C.A. Harless teaches that an “oil bore 44 has branches for supplying oil to both of the grooves 42 as indicated” (Ex. 1033, 4:21–22):



C.A. Harless, 2:44–45.

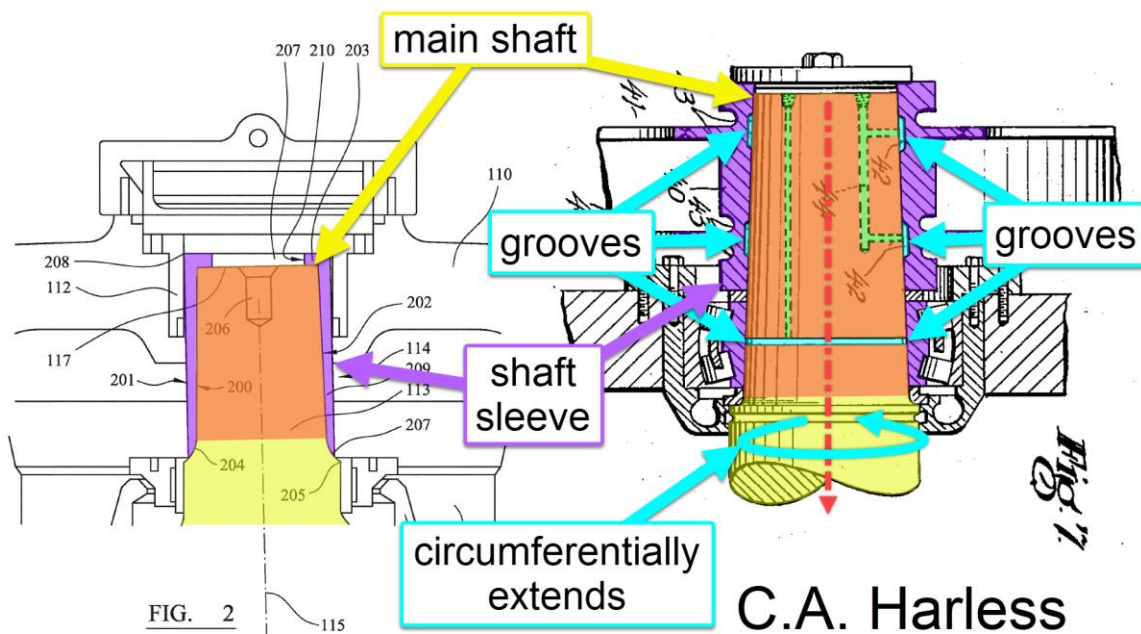
Such branches, as seen in the figure above, extend in the radial direction. Ex. 1002, at 67. A POSITA would understand that C.A. Harless discloses a typical and ordinary way in which fluid conduits are created, such as would be consistent to accomplish the described fluid power elements of Aberg. Ex. 1002, at 67. This combination of Polinski in view of Piepho and Harless is the result of combining known elements using known methods to produce predictable results. Ex. 1002, at 68. A POSITA would be further motivated to combine these elements to simplify the equipment and process for making and breaking interference fits as discussed above, and would have every expectation of success as the technology was already well developed and documented. Ex. 1002, at 68.

Therefore, Claim 3 of the '090 Patent is not patentable as rendered obvious by Polinski, in view of Piepho and C.A. Harless.

10.9. Claim 4

The main shaft as claimed in claim 3, wherein the at least one groove extends in a circumferential direction around the shaft body.

Polinski in view of Piepho and Harless discloses that the at least one groove extends in a circumferential direction around the shaft body. First, C.A. Harless shows these circumferential groove very clearly as highlighted in turquoise below (Ex. 1002, at 69):



C.A. Harless describes the grooves that extend circumferentially around the shaft body. Ex. 1002, at 69. Not only is the lowermost groove circumferential, a POSITA would understand that groove 42 extend circumferentially as is ordinary and customary in machine design. Ex. 1002, at 69. This allows the fit-up of

components to be made reliably without having to align a small cavity in the sleeve with a small bore in the shaft. Ex. 1002, at 69. That the section of the sleeve shows the groove elements on both sides further demonstrates that the groove elements extend circumferentially.

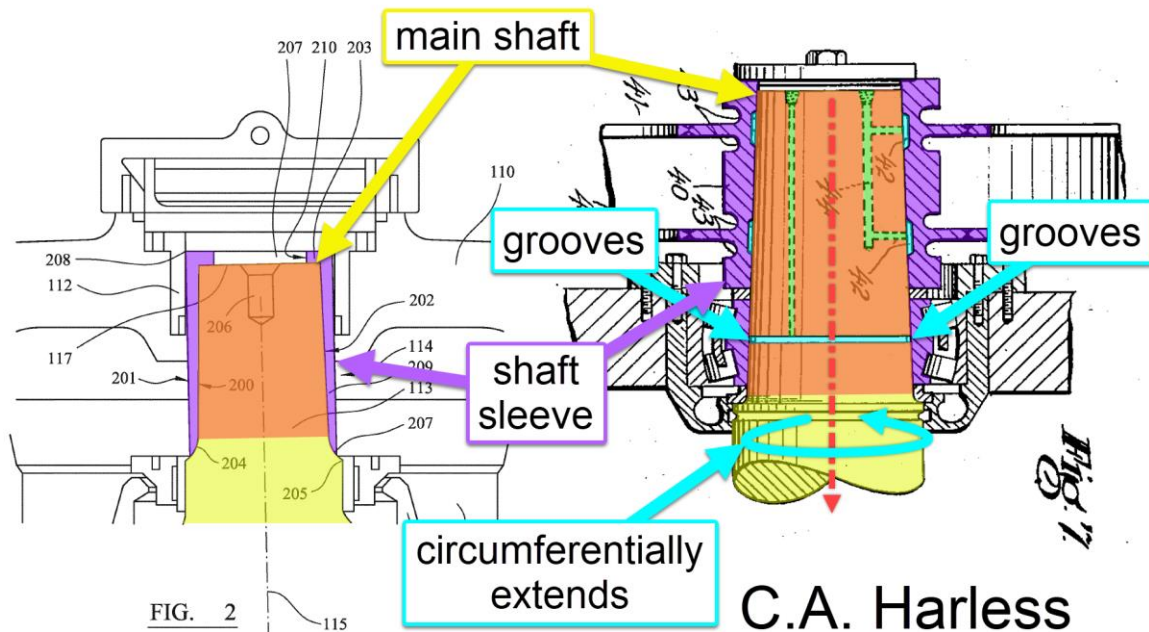
This combination of Polinski in view of Piepho and Harless is the result of combining known elements using known methods to produce predictable results. Ex. 1002, at 69. A POSITA would be further motivated to combine these elements to simplify the equipment and process for making and breaking interference fits as discussed above, and would have every expectation of success as the technology was already well developed and documented. Ex. 1002, at 69.

Accordingly, Claim 4 of the '090 Patent is not patentable as rendered obvious by Polinski, in view of Piepho and C.A. Harless.

10.10.Claim 5

The main shaft as claimed in claim 4, wherein the at least one groove extends substantially or completely circumferentially around the shaft body.

Polinski in view of Piepho and Harless discloses that the at least one groove extends substantially or completely circumferentially around the shaft body Harless describes the grooves that extend circumferentially around the shaft body:



Not only is the lowermost groove circumferential, a POSITA would understand that groove 42 extend circumferentially as is ordinary and customary in machine design. Ex. 1002, at 70. This allows the fit-up of components to be made reliably without having to align a small cavity in the sleeve with a small bore in the shaft. Ex. 1002, at 70. That the section of the sleeve shows the groove elements on both sides further demonstrates that the groove elements extend completely or substantially circumferentially. Ex. 1002, at 70. A POSITA will further understand that manufacturing methods to cut such grooves will commonly be made using a lathe or similar rotating machinery. Ex. 1002, at 70. As such, a POSITA would expect that these grooves would extend completely circumferentially. Ex. 1002, at 70.

This combination of Polinski in view of Piepho and Harless is the result of combining known elements using known methods to produce predictable results. Ex.

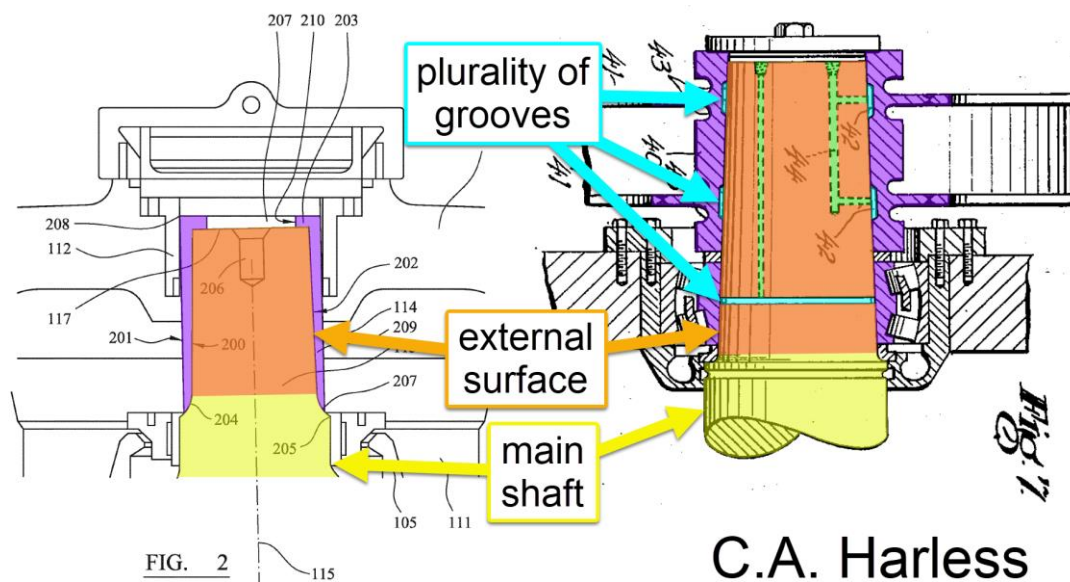
1002, at 70. A POSITA would be further motivated to combine these elements to simplify the equipment and process for making and breaking interference fits as discussed above, and would have every expectation of success as the technology was already well developed and documented. Ex. 1002, at 70-71.

Accordingly, Claim 5 of the '090 Patent is not patentable as rendered obvious by Polinski, in view of Piepho and C.A. Harless.

10.11.Claim 6

The main shaft as claimed in claim 5, further comprising a plurality of grooves at the external surface.

Polinski in view of Piepho and Harless discloses further comprising a plurality of grooves at the external surface. C.A. Harless discloses three grooves in the embodiment of Figure 7, each of which are located at the tapered external surface (Ex. 1033):



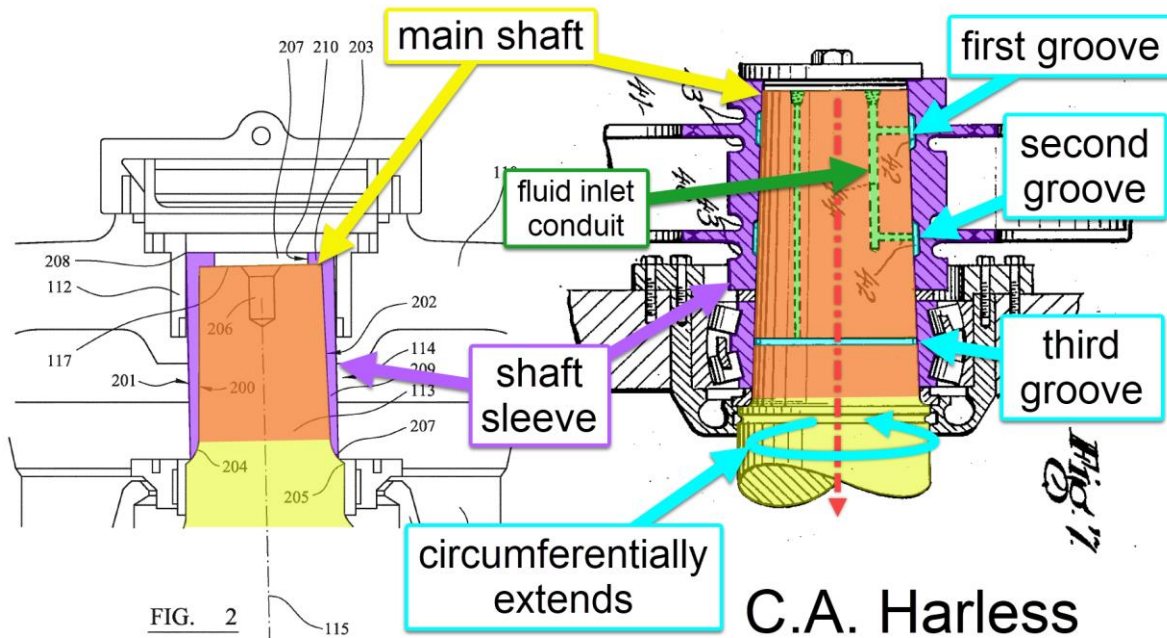
A POSITA would understand that it is desirable to more evenly distribute the oil pressure over the surface of the sleeve. Ex. 1002, at 72. This way, the oil pressure causes a more even expansion of the joint, which makes the fit-up easier to accomplish. Ex. 1002, at 72. Particularly over longer sleeves, a singular groove can cause the sleeve to expand in one locale, but not in others. Ex. 1002, at 72. Consequently, a POSITA would be motivated to include a plurality of groove on a length sleeve such as would be typical on a gyratory crusher main shaft. Ex. 1002, at 72. Thus, a POSITA would be motivated to combine the teachings of Harless with that of Polinski and Piepho. Ex. 1002, at 72.

Therefore, Claim 6 of the '090 Patent is not patentable as rendered obvious by Aberg, in view of C.A. Harless.

10.12.Claim 7

The apparatus as claimed in claim 6, further comprising a first groove extending in a circumferential direction around the shaft body and a second groove extending in a circumferential direction around the shaft body, the first groove being separated axially from the second groove and coupled in fluid communication.

Polinski in view of Piepho and Harless discloses further comprising a first groove extending in a circumferential direction around the shaft body and a second groove extending in a circumferential direction around the shaft body. Further the first groove is separated axially from the second groove and coupled in fluid communication. Harless Figure 7 shows that the first and second groove (*see* Ex. 1033):



As discussed previously, each of these grooves extend circumferentially. See § 10.9, *supra*. Further, each of these grooves are axially displaced from one another. The first groove is closer to the topmost portion of the main shaft while the second groove is spaced away below the first groove as shown in the figure above. A POSITA will recognize that these grooves are spaced from one another to more evenly distribute the oil pressure of the length of the sleeve element so as to facilitate making or breaking the tapered interference joint. Ex. 1002, at 74. A POSITA would be similarly motivated to distribute the oil pressure evenly over the long sleeve elements of Polinski and Piepho using a plurality of axially distributed grooves. Ex. 1002, at 74.

Further, the first and second groove are in fluid communication with one another as shown by the fluid inlet conduit (highlighted in green) which branches to

both the first groove and the second groove from a single inlet point. Ex. 1002, at 75. This combination of Polinski in view of Piepho and Harless is the result of combining known elements using known methods to produce predictable results. Ex. 1002, at 75. Oil pathways are commonly cut into machine components in a manner consistent with the disclosure of Harless. Ex. 1002, at 75. A POSITA would be further motivated to combine these elements to simplify the equipment and process for making and breaking interference fits as discussed above, and would have every expectation of success as the technology was already well developed and documented. Ex. 1002, at 75.

Therefore, Claim 7 of the '090 Patent is not patentable as rendered obvious by Aberg, in view of C.A. Harless.

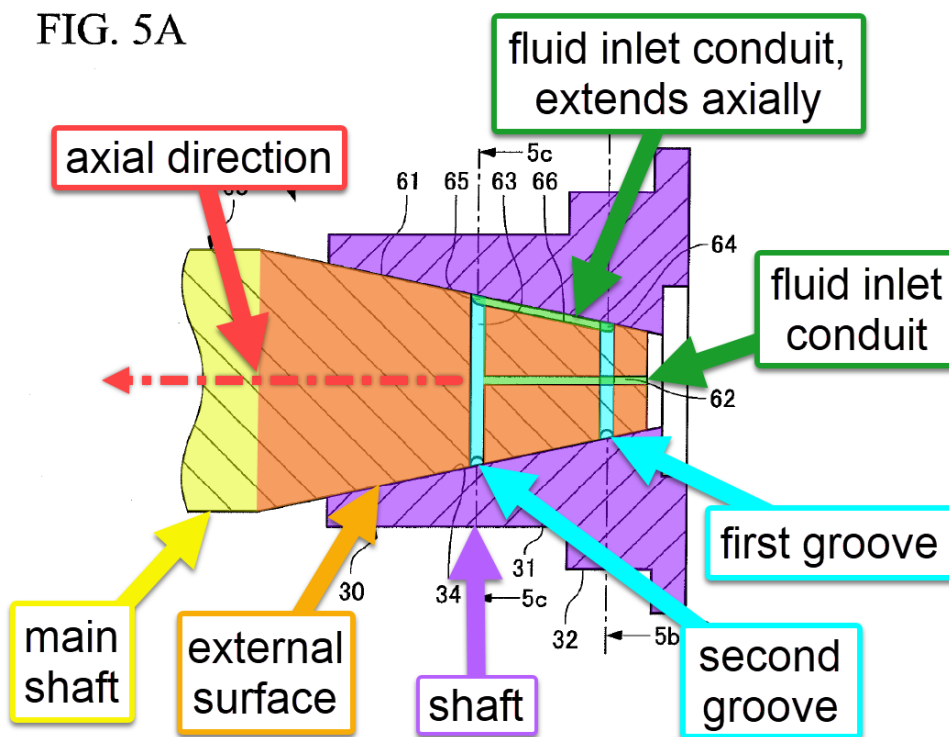
10.13.Claim 8

The main shaft as claimed in claim 7, wherein at least a part of the fluid inlet conduit is indented and extends axially at the external surface as a channel to couple the first and second grooves in fluid communication.

Polinski in view of Piepho and Harless discloses that at least part of the fluid inlet conduit is indented and extends axially at the external surface as a channel to couple the first and second grooves in fluid communication While Harless discloses that the fluid inlet conduit extends within the main shaft, a POSITA would recognize this as a design choice. Ex. 1002, at 76. Further, a POSITA would be motivated to make the fluid communication between the first and second groove extend axially

along the surface of either the main shaft itself or the sleeve on the shaft. Ex. 1002, at 76. This would gain the advantage of making it easier to clear debris should a portion of the fluid inlet conduit become clogged. Ex. 1002, at 76. Nevertheless, a POSITA would recognize that the manner of fluid communication between the first and second grooves is a design choice and there are multiple options that will work. Ex. 1002, at 76. Such a design choice would amount to nothing more than combining known elements together in known ways to produce known results. Ex. 1002, at 76.

For example, a POSITA could easily look to Yagi, U.S. Patent No. 8,302,754 (“Yagi,” Ex. 1040) which shows another option for how to connect two axially spaced circumferential groove in fluid communication:



As shown above, Yagi discloses a tapered interference joint just the same as Aberg and C.A. Harless. Ex. 1002, at 77. Yagi describes a tapered shaft and a correspondingly tapered hub which may be coupled together and separated through the use of pressurized oil. Ex. 1040, at 1:6–10, 2:24–28. Further, as shown above, Yagi shows a fluid inlet conduit between two axially spaced circumferential grooves. This portion of the fluid inlet conduit extends axially along the outer surface of the tapered portion of the main shaft. Ex. 1002, at 77. A POSITA would be motivated to combine the teachings from Harless (exemplified by Yagi) with Piepho. Ex. 1002, at 77.

Accordingly, Claim 8 of the '090 Patent is not patentable as rendered obvious by Piepho, in view of C.A. Harless (and in further view of Yagi).

10.14.Claim 9P, a1–a6

A gyratory crusher main shaft assembly for a crusher comprising: a shaft body having a radially outward facing external surface, and a first end and a second end, an axial region of the shaft body extending from the second end and being tapered relative to a longitudinal axis of the shaft body such that a cross sectional area of the shaft body at the tapered axial region decreases in a direction from the first end to the second end, a shaft sleeve mounted on the tapered axial region, and at least one groove indented at the external surface and positioned at the tapered axial region, the at least one groove being arranged to receive a pressurized [sic] fluid to facilitate mounting and dismounting of the sleeve at the shaft body ...

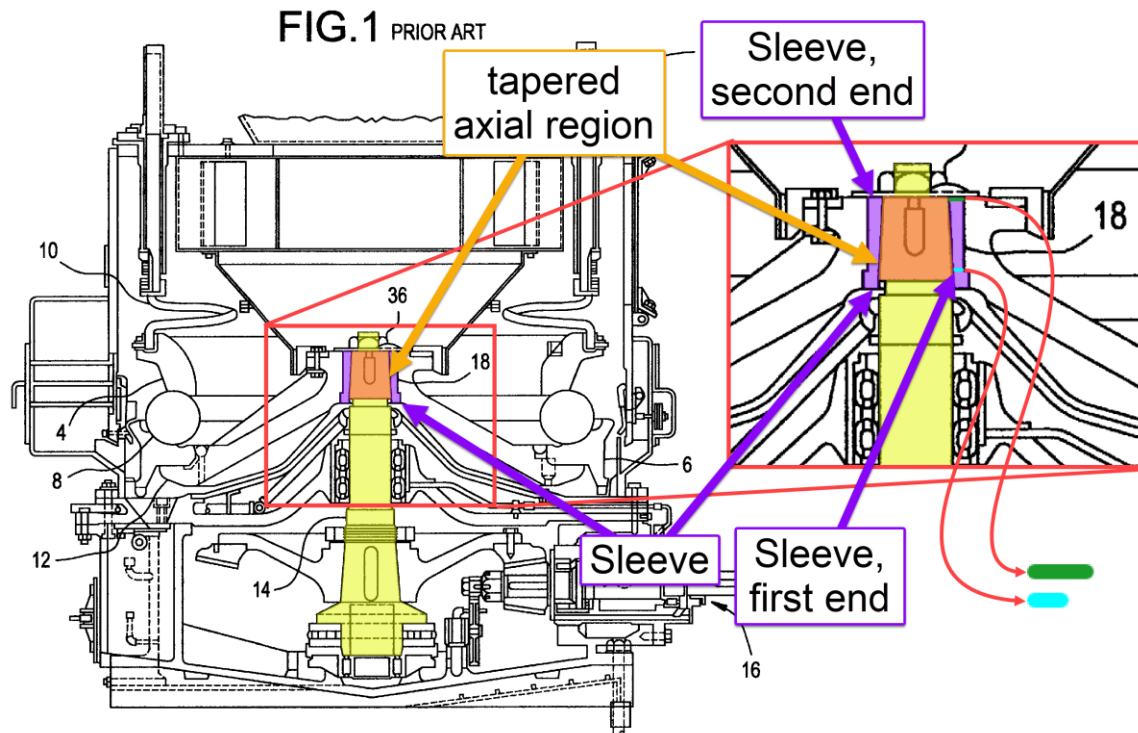
The above portion of Claim 9 is virtually identical to a significant portion of Claim 1. *See* Ex. 1002, at 78. Accordingly, just like Claim 1, this portion of Claim 9

of the '090 is not patentable as rendered obvious by Polinski, in view of Piepho and C.A. Harless. *See* §§ 10.1–10.6, *supra*.

10.15.Claim 9b

... a sleeve fitted over the tapered axial region, the sleeve having a tapered wall thickness, such that the wall thickness at a second end of the sleeve is greater than the wall thickness at a first end of the sleeve.

Polinski in view of Piepho and Harless discloses a sleeve fitted over the tapered axial region, the sleeve having a tapered wall thickness, such that the wall thickness at a second end of the sleeve is greater than the wall thickness at a first end of the sleeve. Both Polinski and Piepho disclose a sleeve fitted over the region at the second (top) end of the main shaft. In Piepho, this portion is tapered inwards and thus the sleeve that is fitted to it is also tapered. Ex. 1002, at 78-79. Further, the external surface of the sleeve is cylindrical which makes it so the wall thickness of the sleeve is greater at the second end of the sleeve than it is at the first end of the sleeve. Ex. 1002, at 79. The tapered sleeve is clearest in Piepho:



As shown above, Piepho discloses a sleeve fitted over the tapered region. The sleeve is cylindrical on its outermost surface but mates with the tapered shaft internally. In order to accomplish this, the sleeve wall itself must be tapered. Ex. 1002, at 79.

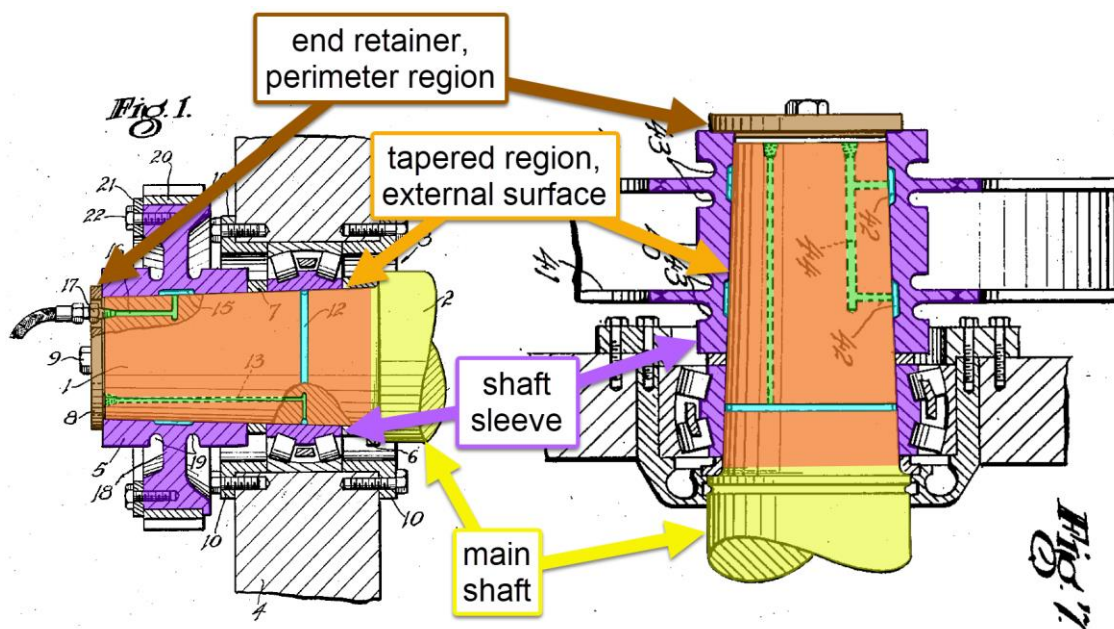
This combination of Polinski in view of Piepho and Harless is the result of combining known elements using known methods to produce predictable results. Ex. 1002, at 80. A POSITA would understand that a bushing that on one side mates with a cylindrical bore and on the other side mates with a tapered 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. 1002, at 80. A POSITA would expect success in combining these elements as it had been done in the prior art. Ex. 1002, at 80.

Therefore, Claim 9b of the '090 Patent is not patentable as containing the identical disclosures as those in Aberg.

10.16.Claim 10a1

The assembly as claimed in claim 9, further comprising an end retainer releasably mounted at the second end of the shaft body and having a perimeter region extending radially outward beyond the external surface at the tapered region ...

Polinski in view of Piepho and Harless discloses a main shaft assembly further comprising an end retainer releasably mounted at the second end of the shaft body and having a perimeter region extending radially outward beyond the external surface at the tapered region. As shown below, C.A. Harless discloses an end retainer mounted at the second end (topmost as previously shown) of the main shaft (*see* Ex. 1033):



C.A. Harless

As can be seen in the figure, the end retainer is fastened to the end of the tapered region of the main shaft and extends radially outward beyond the external surface of the tapered region. Ex. 1002, at 76. This design feature helps to retain and apply force to the sleeve components as shown above, consistent with the written specifications of C.A. Harless. Ex. 1002, at 81 (citing Ex. 1033, at 1:66-69, 4:16-18, 22-23).

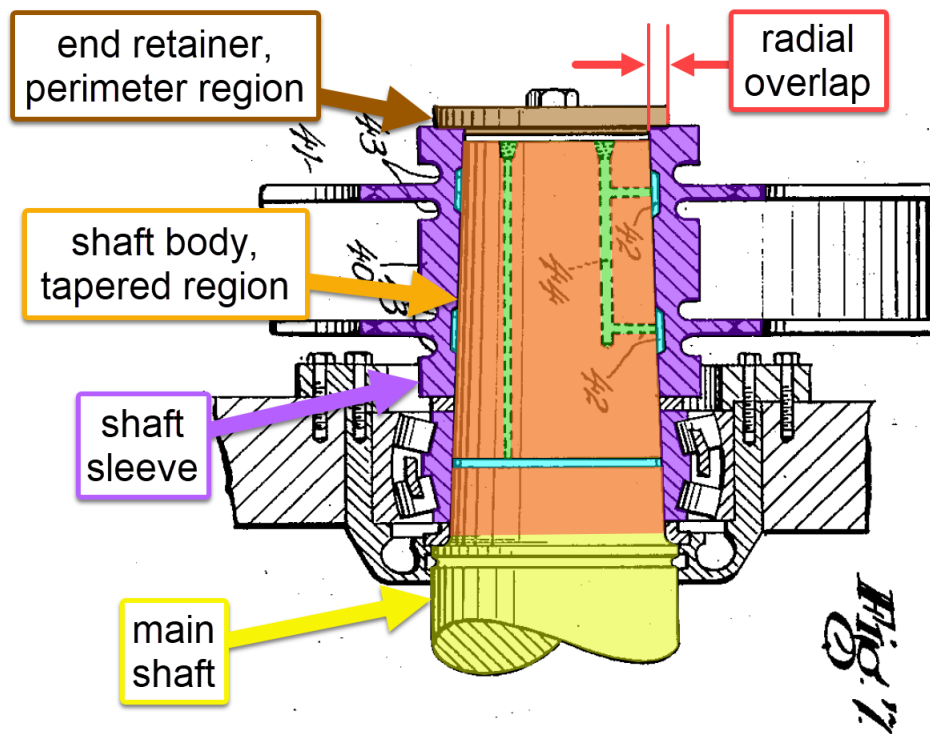
This combination of Polinski in view of Piepho and Harless is the result of combining known elements using known methods to produce predictable results. Ex. 1002, at 81. It is well-known and customary to include a retainer such as shown in Harless in an assembly using a tapered interference joint. Ex. 1002, at 81.

Accordingly, Claim 10a1 of the '090 Patent is not patentable as rendered obvious by Aberg, in view of C.A. Harless.

10.17.Claim 10a2

... the perimeter region positioned to radially overlap the sleeve at the second end of the sleeve to inhibit axial separation of the sleeve from the shaft body.

Aberg in view of C.A. Harless discloses the perimeter region of the end retainer overlaps the sleeve components at the second end of the sleeve to inhibit axial separation of the sleeve from the shaft body. Such perimeter region overlap can be seen in the figure from C.A. Harless (*see* Ex. 1033):



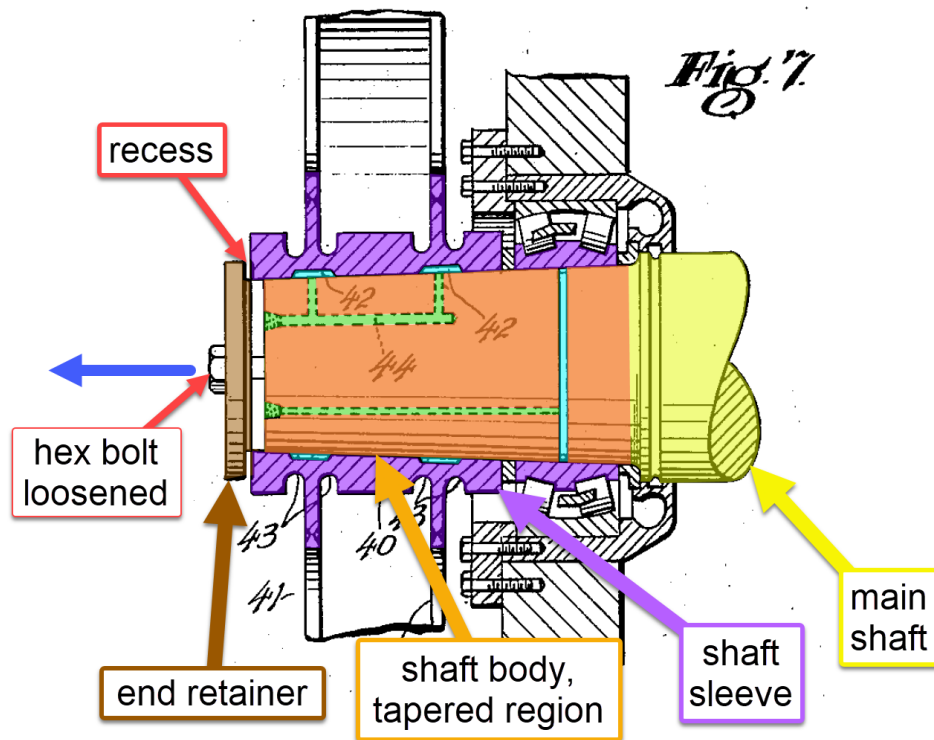
C.A. Harless

This combination of Polinski in view of Piepho and Harless is the result of combining known elements using known methods to produce predictable results. Ex. 1002, at 82. As discussed previously, it is ubiquitous to provide a retainer such as Harless shows for a tapered interference joint. Ex. 1002, at 82. A retainer will not retain anything unless it has radial overlap as shown in the Harless reference. Ex. 1002, at 82. Accordingly, Claim 10a2 of the '090 is not patentable as rendered obvious by Aberg, in view of C.A. Harless.

10.18.Claim 11

The assembly as claimed in claim **10**, wherein the end retainer includes a recess extending circumferentially at the perimeter region to allow axial movement of the sleeve into the recess.

Harless discloses that the end retainer includes a recess extending circumferentially at the perimeter region to allow axial movement of the sleeve into the recess. As articulated in C.A. Harless, in order to remove a component such as a sleeve or a bearing, a user must first partially back off the retaining bolt in the end retainer. Ex. 1033, at 3:18–22. As shown in the figures of the patent, below, the end retainer has an undercut shoulder or, in other words, a recess:



A POSITA would understand that this undercut shoulder allows the end retainer to seat itself in a centered condition. Ex. 1002, at 84. As shown above, when

the hex bolt is partially loosened (as described in the specification), it allows the end retainer to shift away from the sleeve. When this shift happens, a recess is left between the end retainer and the sleeve. Ex. 1002, at 84. A POSITA would understand that this recess extends circumferentially at the perimeter region of the end retainer. Ex. 1002, at 84.

As a user continues to follow the instructions outlined in the specification of C.A. Harless, pressurized oil will be pumped into the bore (marked “44” in the figure, above). Ex. 1002, at 84. The pressurized oil will act to release the interference fit between the sleeve and the tapered portion of the shaft and shift it into the recess under the end retainer. Ex. 1002, at 84. A POSITA would be motivated to follow these instructions, not only because they are given in conjunction with the apparatus of C.A. Harless, but because it is well-known that partially backing off the end retainer allows the tapered interference fit to be broken but keeps the components from falling off the shaft itself and potentially being damaged from striking the ground. Ex. 1002, at 84.

This combination of Polinski in view of Piepho and Harless is the result of combining known elements using known methods to produce predictable results. Ex. 1002, at 84. Accordingly, Claim 11 of the '090 Patent is not patentable as rendered obvious by Aberg, in view of C.A. Harless.

10.19.Claim 12

The assembly as claimed in claim 9, further comprising a fluid inlet conduit extending axially from the second end of the shaft body in fluid communication with the at least one groove to allow a fluid to be supplied to the at least one groove from the second end of the shaft body.

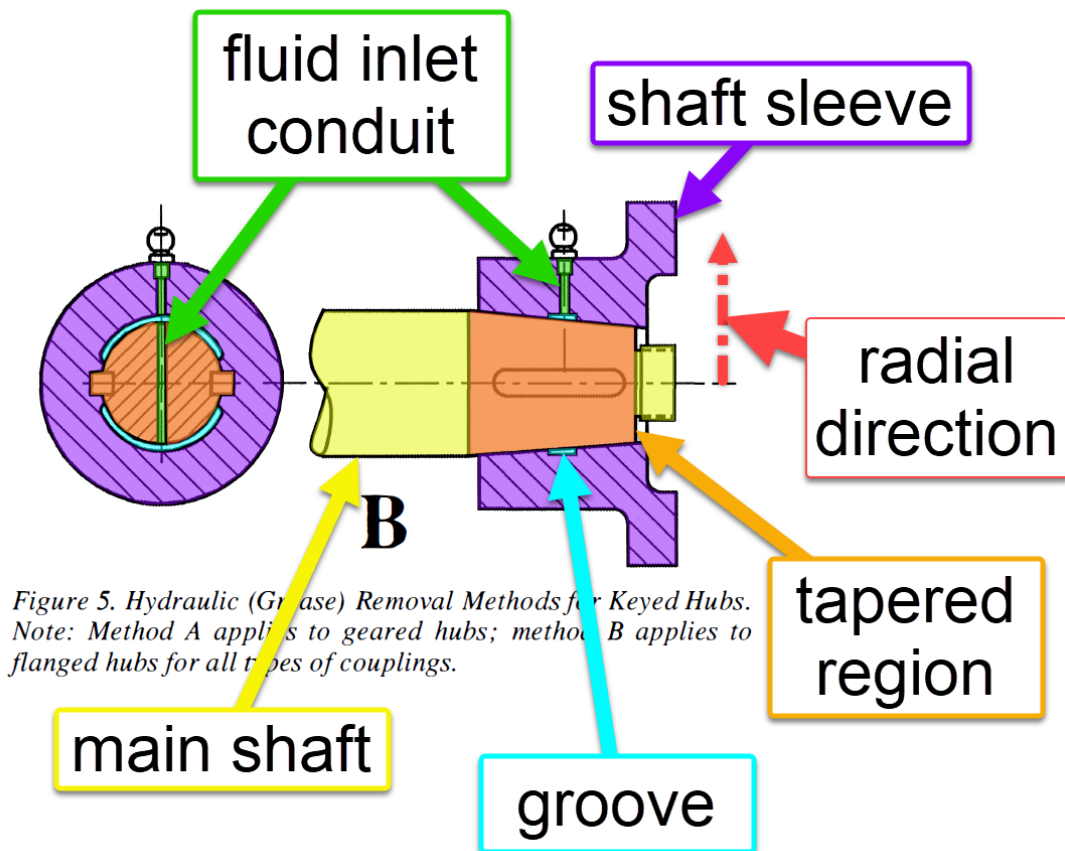
Such limitation in claim 12 is identical as the claim in Claim 2. Ex. 1002, at 85. Accordingly, for the same reasons, Claim 12 of the '090 Patent is not patentable as rendered obvious by Polinski, in view of Piepho and C.A. Harless. *See* § 10.7, *supra*.

10.20.Claim 13

The assembly as claimed in claim 9, further comprising a fluid inlet conduit extending radially through the wall thickness of the sleeve in fluid communication with the at least one groove to allow a fluid to be supplied to the at least one groove through the sleeve.

In view of the combination of Polinski in view of Piepho and Harless, a POSITA would recognize an optional ordinary design choice of including a fluid inlet conduit extending radially through the wall thickness of the sleeve in fluid communication with the at least one groove to allow a fluid to be supplied to the at least one groove through the sleeve. Ex. 1002, at 85. A designer such as a POSITA has many teachings in the prior art regarding the different design choices available to them. Ex. 1002, at 85. The manner in which fluid is delivered to the grooves is commonly implemented through either the shaft or through the sleeve mounted on the shaft. Ex. 1002, at 85.

For example, a technical paper dating back to 1993, titled “Hydraulic Removal of Coupling Hubs – Keyed and Keyless” shows both the option of feeding fluid through the sleeve as shown below:



As shown above, a main shaft is provided with a tapered region. A sleeve element is fit onto the tapered portion of the main shaft. A fluid inlet conduit is provided which is oriented to pass through the wall of the sleeve in the radial direction. From there, fluid is delivered to the at least one circumferential groove which substantially encompasses the entirety of the shaft.

A POSITA would recognize that it is a design choice as to whether the fluid is routed through the shaft or through the sleeve. Ex. 1002, at 86. Further, a POSITA would have an expectation of success as making this design choice would amount to nothing more than combining known elements using known methods to produce predictable results. Ex. 1002, at 86-87.

Accordingly, Claim 13 of the '090 Patent is not patentable as rendered obvious by Aberg, in view of C.A. Harless.

10.21.Claim 14P

A gyratory crusher comprising ...

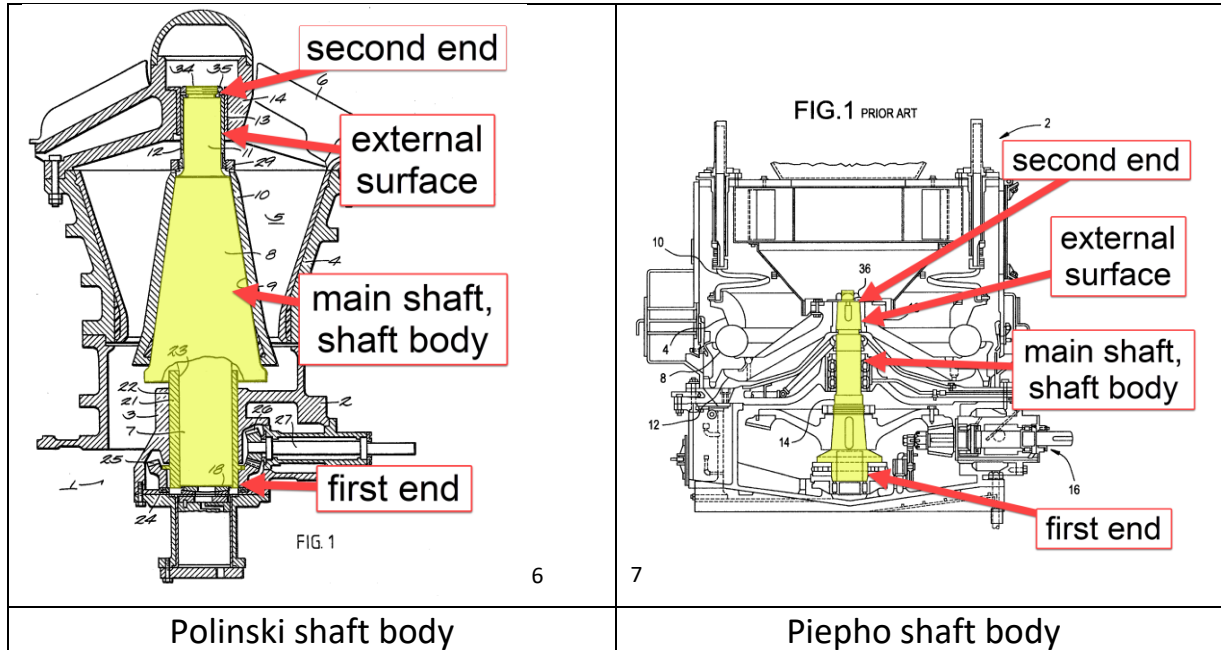
While the preamble is generally not considered limiting, Polinski discloses a gyratory crusher. Specifically, Polinski teaches: “The present invention relates to **gyratory crushers** and, in particular, to the main shaft supporting the crusher head or mantle within the crusher.” Ex. 1017, 1:6-8 (emphasis added). Accordingly, Claim 14P is not patentable as containing the identical disclosures as those in Polinski.

10.22.Claim 14a1

... a main shaft including a shaft body having a radially outward facing external surface, 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 ...

Polinski and Piepho disclose a main shaft including a shaft body having a radially outward facing external surface, 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. As shown below in the figures from Polinski and Piepho, the main shaft is a shaft body (*see* Ex. 1002, at 8



The main shaft (or, main shaft body) has a radially outward facing external surface. Ex. 1002, at 88. Further, it has a first end and a second end. The first end is at a lowermost position and the second end is at a topmost position. Ex. 1002, at 88. The first end is at a lowermost position and the second end is at a topmost position. Accordingly, Claim 14a1 of the '090 Patent is not patentable as containing the identical disclosures as those in by Polinski and Piepho.

10.23.Claim 14a2

... an axial region of the shaft body extending from the second end and being tapered relative to a longitudinal axis of the shaft body such that

⁶ Exhibit 1017, Figure 1, annotated

⁷ Exhibit 1018, Figure 1 annotated

a cross sectional area of the shaft body at the tapered axial region decreases in a direction from the first end to the second end ...

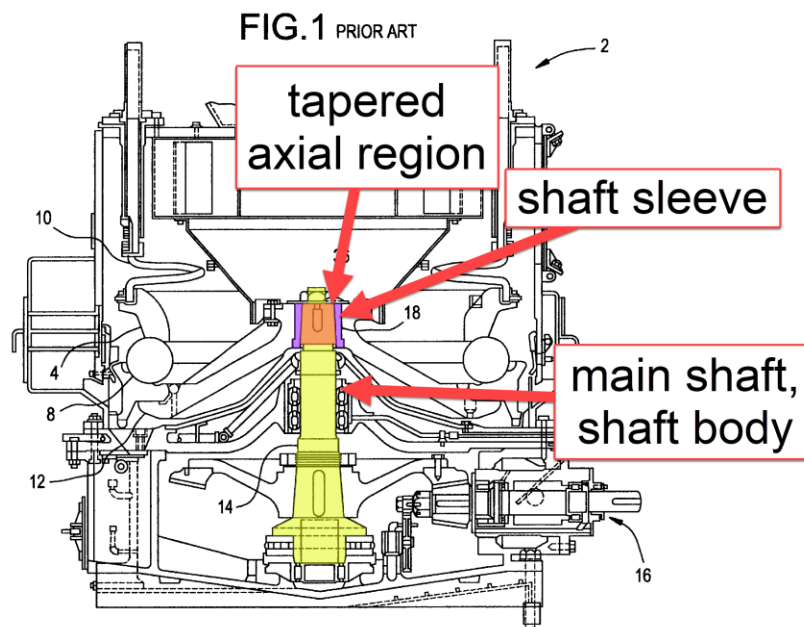
Claim 14a2 is virtually identical to the claim in Claim 1b. Ex. 1002, at 8.

Therefore, for the same reasons, Claim 14a2 of the '090 Patent is not patentable as containing the identical disclosures as those in Polinski and Piepho. *See* § 10.3, *supra*.

10.24.Claim 14a4

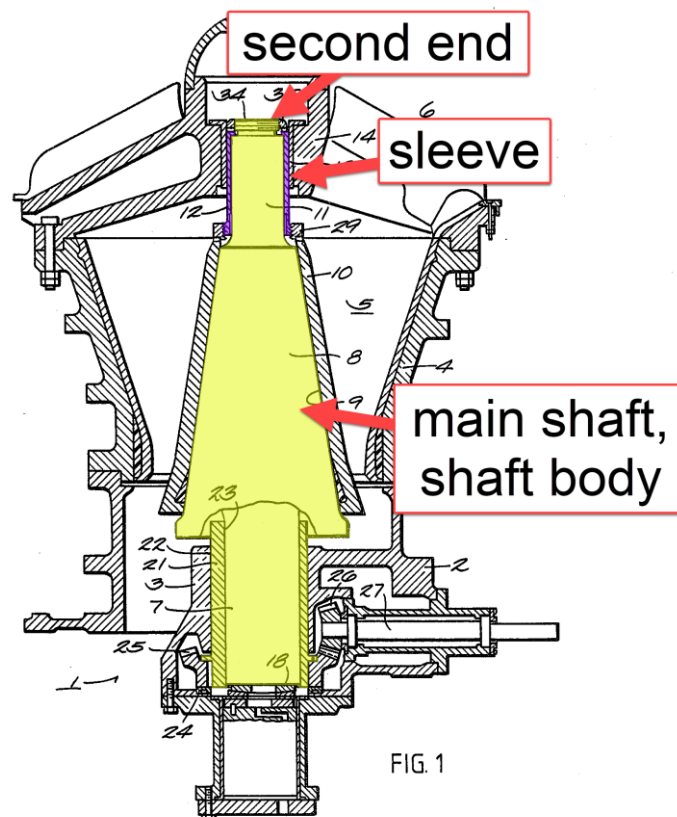
... the tapered axial region being configured to mount a shaft sleeve ...

Polinski in view of Piepho discloses that the tapered axial region is configured to mount a shaft sleeve. As shown below, Piepho teaches a sleeve mounted on the tapered axial region at the second end of the main shaft (this sleeve is the bushing 18, highlighted in purple).



A POSITA would understand that as Piepho demonstrates mounting a sleeve on the tapered region of the main shaft, this would necessarily mean that the tapered region of the main shaft is configured to mount a sleeve as demonstrated. Ex. 1002, at 90.

Further, the main shaft of Polinski also has a sleeve. The sleeve of Polinski is fitted over a cylindrical portion of the main shaft body of Polinski, however, a POSITA would be motivated to use the tapered sleeve of Piepho as it aids in alignment and fit-up. Ex. 1002, at 90.



As shown above, Polinski already has a shaft with a sleeve fitted onto the second end. Ex. 1002, at 90. Thus, it would be very straightforward for a POSITA to

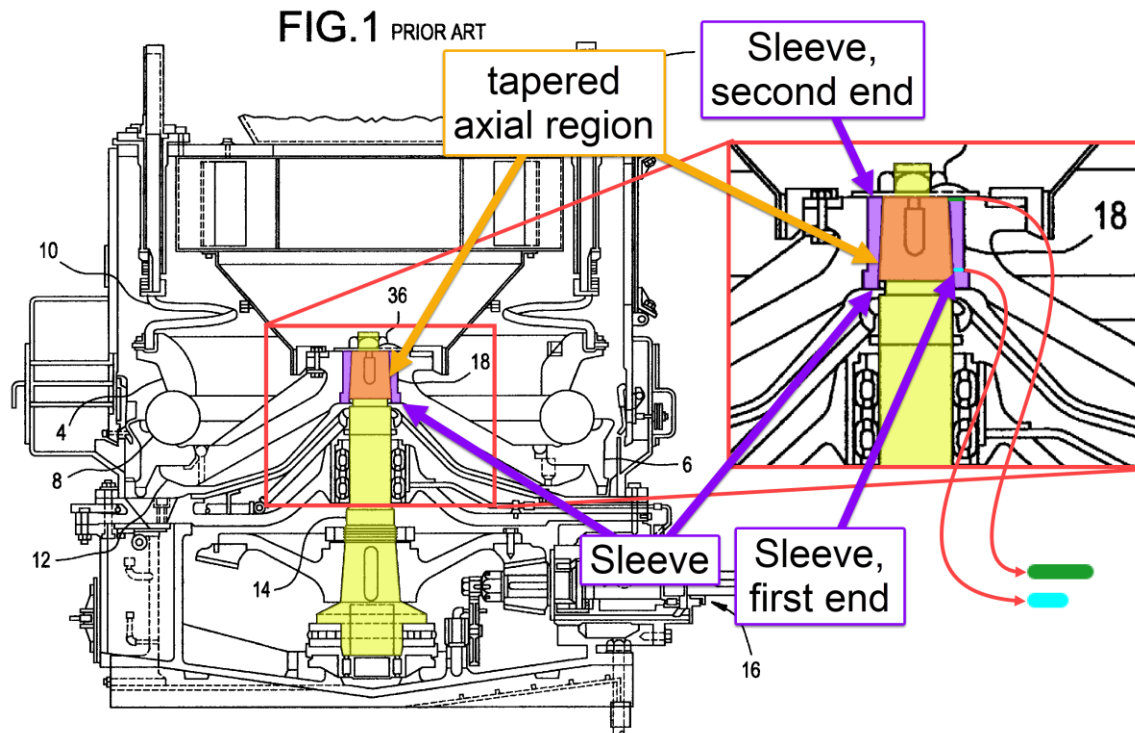
incorporate the tapered second end and sleeve of Piepho and thereby gain the benefits taught in the prior art and broadly understood by any POSITA. Ex. 1002, at 90.

A POSITA would have been motivated to combine the tapered end on the main shaft of Piepho with the main shaft on Polinski. Ex. 1002, at 90. This combination would have been nothing more than combining known elements according to known methods to yield predictable results. Ex. 1002, at 90. A POSITA would be further motivated, as Piepho describes, as the tapered shaft aids in accurate alignment which is notoriously more difficult with purely cylindrical shafting. Ex. 1002, at 90-91. Accordingly, Claim 14a3 of the '090 Patent is not patentable as containing the identical disclosures as those in Aberg.

10.25.Claim 14b

... a sleeve fitted over the tapered axial region, the sleeve having a tapered wall thickness such that a wall thickness at a second upper end of the sleeve is greater than a wall thickness at a first lower end of the sleeve ...

Polinski in view of Piepho discloses a sleeve fitted over the tapered axial region, the sleeve having a tapered wall thickness such that a wall thickness at a second upper end of the sleeve is greater than a wall thickness at a first lower end of the sleeve. As shown below, Piepho discloses a sleeve fitted over the tapered region:



Furthermore, Piepho teaches that “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. **Preferably, the joint (21) is a tapered joint with the tapered end (25) of shaft (14).**” Ex. 1018, at 3:27-31 (emphasis added).

As shown above, the sleeve is fitted over the tapered axial region using an interference fit. Ex. 1002, at 92. Further, it has a tapered internal surface matching that of the tapered axial region of the main shaft and a cylindrical external surface. Ex. 1002, at 92. Thus, the sleeve has a wall thickness that tapers from a thicker portion at the second end, to a thinner portion at the first end. Ex. 1002, at 92.

This combination of Polinski in view of Piepho is the result of combining known elements using known methods to produce predictable results. Ex. 1002, at

92. Accordingly, Claim 14b of the '090 Patent is not patentable as containing the identical disclosures as those in Peipho.

10.26.Claims 14c1–c2

... at least one groove indented at the external surface and positioned at the tapered axial region, the at least one groove being arranged to receive a pressurized [sic] fluid to facilitate mounting and dismounting of the sleeve at the shaft body.

Claims 14c1–c2 are virtually identical to the claims in Claims 1d1–d2. Ex. 1002, at 92. Accordingly, for the same reasons, Claims 14c1–c2 of the '090 Patent are not patentable as rendered obvious by Polinski, in view of Piepho and C.A. Harless. *See* §§ 10.5–10.6, *supra*.

11.CONCLUSION

For all of the reasons stated above, CMS Cepcor requests the cancellation of claims 1–14 of the '090 patent because such claims are unpatentable rendered obvious by prior art under 35 U.S.C. § 103, according to a person of ordinary skill in the art.

12.MANDATORY NOTICES UNDER 37 C.F.R. § 42.8(A)(1)

Pursuant to 37 C.F.R. § 42.8(a)(1), CMS Cepercor sets forth the following mandatory notices.

12.1. Real Party in Interest

CMS Cepercor Ltd. and CMS Cepercor Americas LLC are the real parties in interest for Petitioner.

12.2. Related Matters

The '090 patent is presently the subject of a patent infringement lawsuit brought by the assignee, Sandvik Intellectual Property AB, and licensee, Sandvik Mining and Construction USA LLC, and against CMS Cepercor, in the U.S. District Court for the District of Delaware, captioned *Sandvik Mining and Construction USA LLC, et al. v. CMS Cepercor Ltd., et al.*, Case No. 1:24-cv-00481-JLH.

12.3. Lead and Back-up Counsel

CMS Cepercor designates the following attorney as lead counsel:

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12.4. Service Information

Petitioner consents to electronic service. Service on CMS Cepcor may be made via email to:

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13. PAYMENT OF FEES UNDER 37 C.F.R. § 42.103

The required fees are submitted herewith in accordance with 37 C.F.R. §§ 42.103(a) and 42.15(a).

14. CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. §42.24(d), the undersigned certifies that this Petition complies with the type-volume limitation of 37 C.F.R. §42.24(a). The word count application of the word processing program used to prepare this Petition indicates

that the Petition contains 9,499 words, excluding the parts of the brief exempted by 37 C.F.R. §42.24(a).

Date: September 6, 2024

s/ Terry M. Sanks

Terry M. Sanks

Reg. No. 45,069

CERTIFICATE OF SERVICE

I hereby certify that, on September 6, 2024, a true and correct copy of the foregoing Petition (and accompanying exhibits) was served on the Patent Owner via electronic means (by agreement of the parties) at the address listed below:

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