CMS Cepcor LTD and CMS Cepcor Americas LLC v. Sandvik Intellectual Property AB

IPR2024-01380—U.S. Patent No. 9,827,568 (‘568 Patent)

CMS Cepcor LTD and CMS Cepcor Americas LLC (Petitioners) Demonstrative Exhibits

Oral Hearing

USPTO, Alexandria, VA

January 13, 2026

Agenda

- Sandvik ‘568 Patent — Slides 2
- Level of Skill & Field of Endeavor — Slides 3
- Prior Art — Slides 4
- Motivation to Combine — Slides 5-6
- Reasonable Expectation of Success (Amended Claims) — Slides 7-19
- Analogous Art — Slides 20 - 24
- Secondary Considerations — Slides 25

The ‘568 Patent

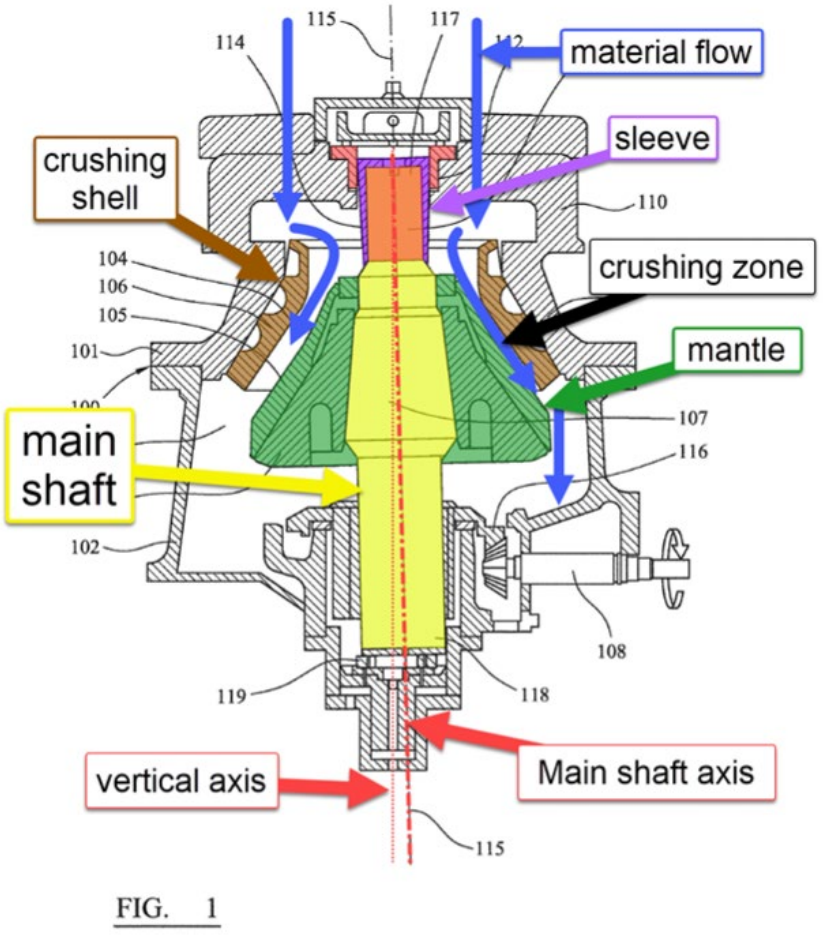


FIG. 1

Ex. 1002, ¶ 61.

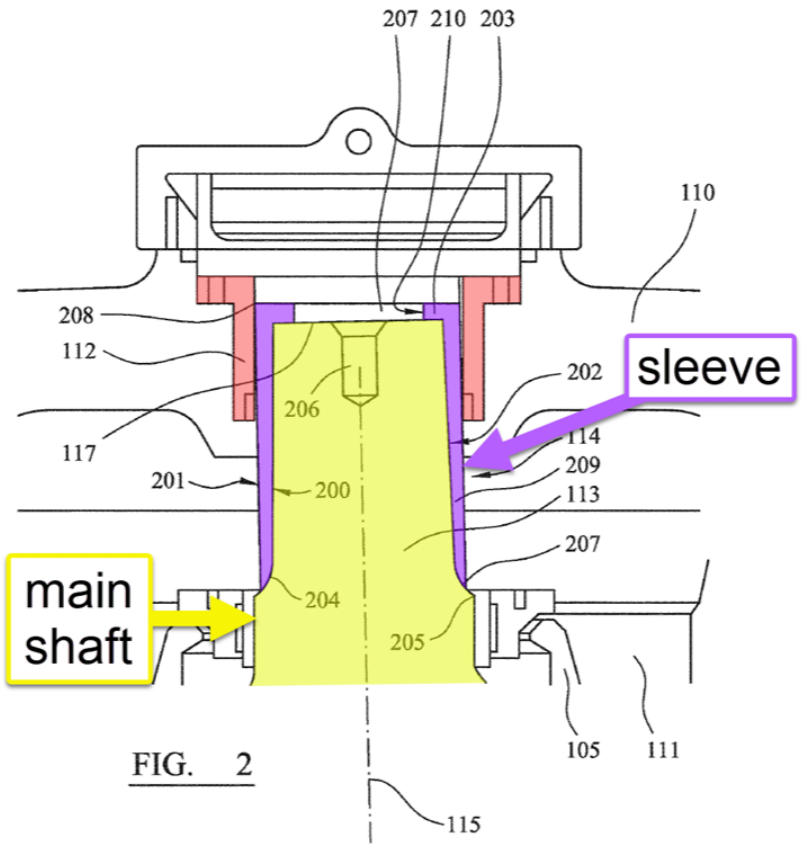


FIG. 2

Ex. 1002, ¶ 62.

Level of Skill & Field of Endeavor

- 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. 1049, at ¶ 16.
- Patent Owner's Expert does not object to the above level of skill.
- Field of endeavor is main shaft assemblies for rock crushers. Paper 43, p. 3; Ex. 1001 at 1; Ex. 1016 at 1.

Representative Prior Art

Primary Claims:

- Patent Owner did not file a response. Patent Owner instead pursued a Non-Contingent Motion to Amend and Request for Preliminary Guidance

Revised Substitute Claims:

- U.S. Patent No. 3,813,047 ("Torrence," Ex. 1011): Torrence discloses a gyratory crusher with wear sleeves
- U.S. Patent No. 6,270,026 ("Piepho," Ex. 1018): Piepho discloses a rock crushing apparatus (coal pulverizer)

Motivation

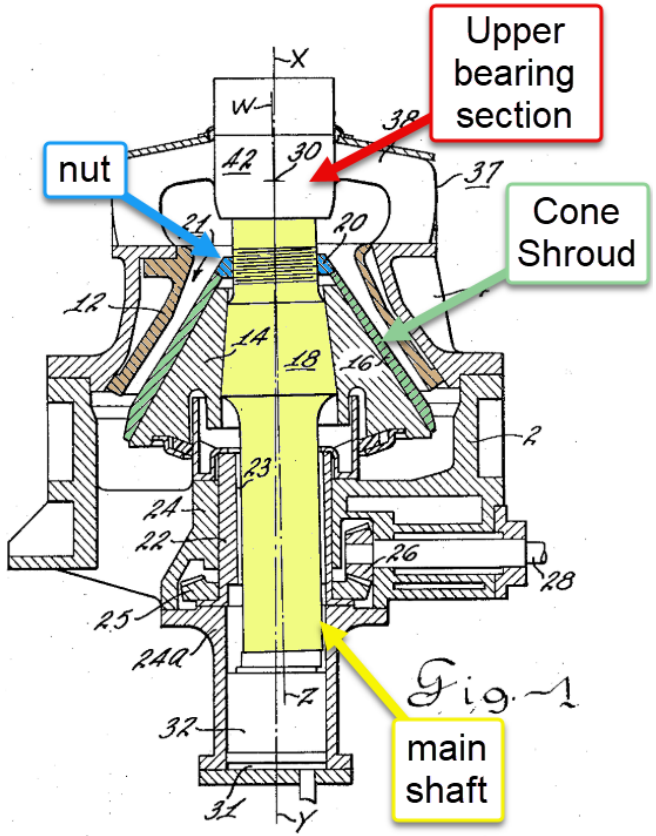
- A POSITA would be motivated to combine the tapered joint of Piepho with the sleeve and shaft of Torrence as Piepho teaches it is preferable. In addition to this, a POSITA would understand that a tapered joint is preferable to a cylindrical joint at least because they are easier to install and remove. A POSITA would have reasonable expectation of success in making the combination as both cylindrical and tapered interference fit joints were common in the prior art and both had been used for decades. This combination is nothing more than a simple combination of known elements according to known methods to yield predictable results. Ex. 1049, at ¶ 61.

Motivation

- Motivation to combine may be found explicitly or implicitly in market forces; design incentives; the 'interrelated teachings of multiple patents'; 'any need or problem known in the field of endeavor at the time of invention and addressed by the patent'; and the background knowledge, creativity, and common sense of the person of ordinary skill. (Paper 43, p. 9 – 10; MPEP 2143.01).
- A POSITA trying to increase the life of a main shaft, and/or reduce down time when performing maintenance on a main shaft assembly would be motivated to combine the straight shaft and wear sleeve of Torrence with the preferable tapered shaft and tapered sleeve of Piepho as tapered shafts improve the ease of removal and prevent damage to the shaft, they are able to be used in more locations as they do not require presses and gear pullers, and they make removing components on a tapered shaft particularly easy, particularly when combined with known hydraulic systems for making and breaking the interference fit. (Paper 43, p. 9 – 10; Ex. 1033 Behm, 1:13-15, 1:35-42; Ex. 1032 Sillett, 1:15-24; Ex. 1031 Harless, 3:15-22).

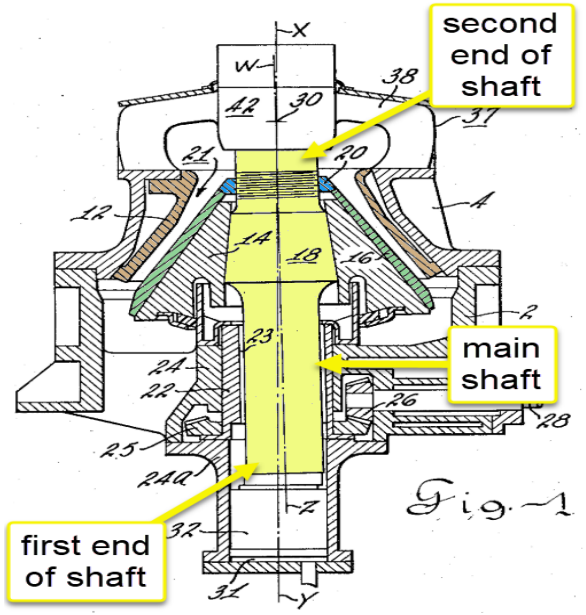
Claim 11 is Obvious (*See* Ex. 1049, pp. 45-61)

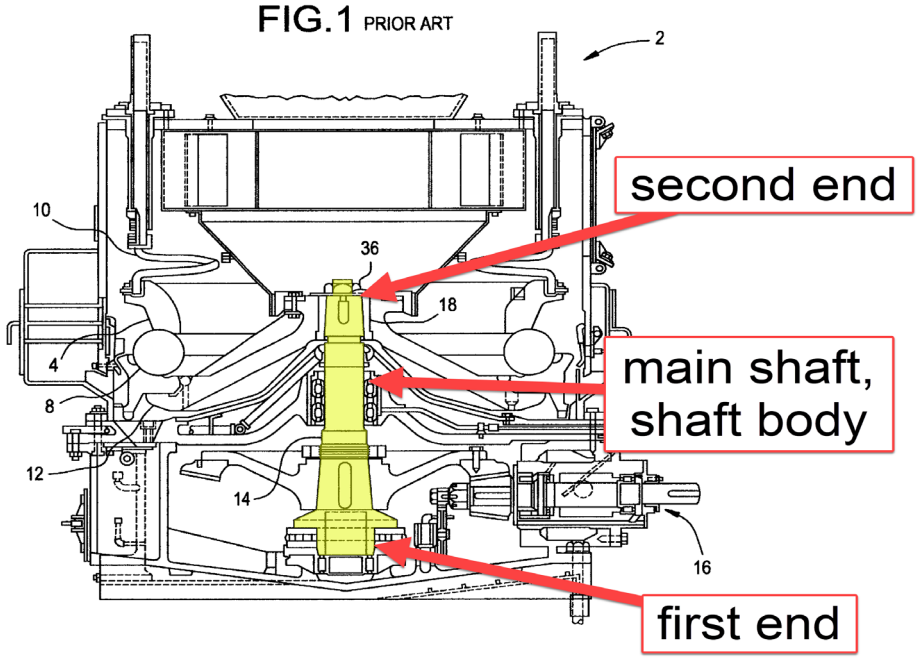
Challenged Claim Element Obvious by Prior Art?	
11P. A gyratory crusher comprising:	**YES:** Although the preamble is generally not considered limiting,



Element 11a1 of Claim 11 is Obvious

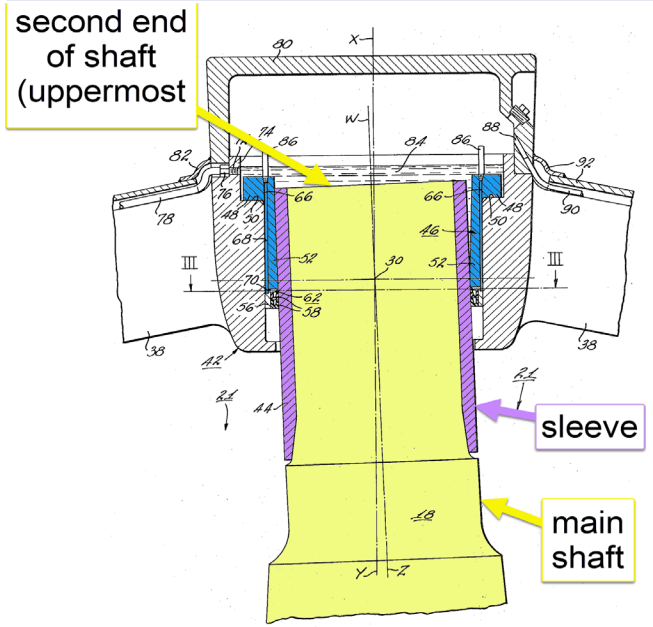
Challenged Claim Element Obvious by Prior Art?	
11a1. a main shaft including a shaft body having a first end for positioning at a lower region of the crusher and a second end for positioning at an upper region of the crusher relative to the first end,	**YES**: As shown below, both Torrence and Piepho disclose 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.

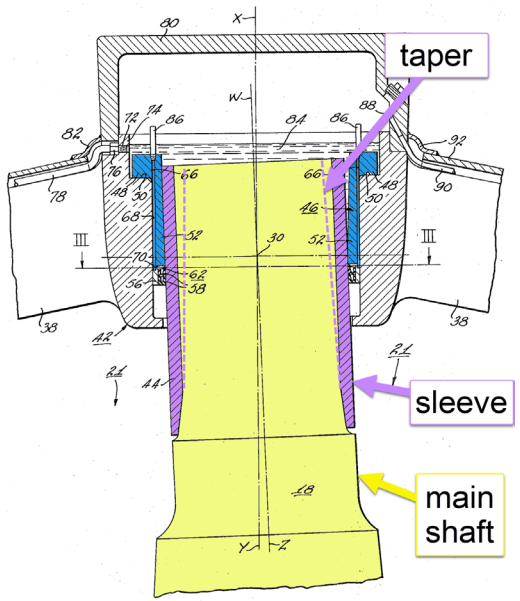


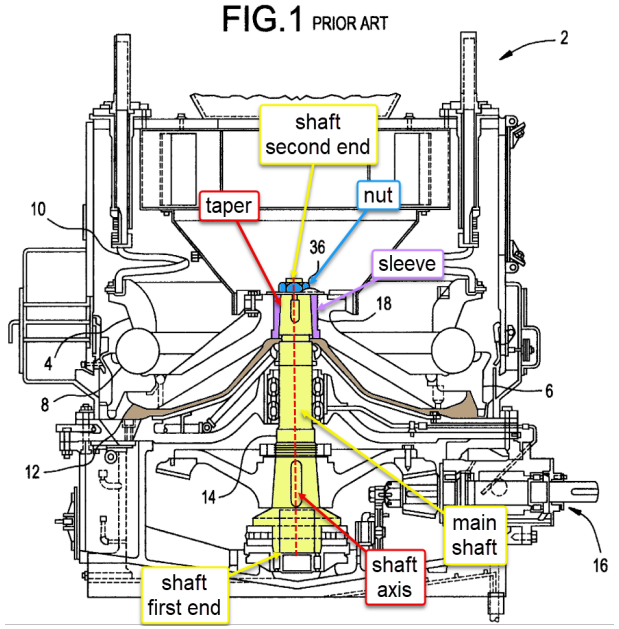


Element 11a2 of Claim 11 is Obvious

Challenged Claim Element Obvious by Prior Art?	
11a2. 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, <u>wherein the tapered region extends from an uppermost extremity of the shaft;</u> and	**YES:** Torrence in view of Piepho discloses 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 decrease in cross-sectional area. Combining the tapered region of Piepho with the shaft of Torrence, the tapered region would extend from an uppermost extremity of the shaft.

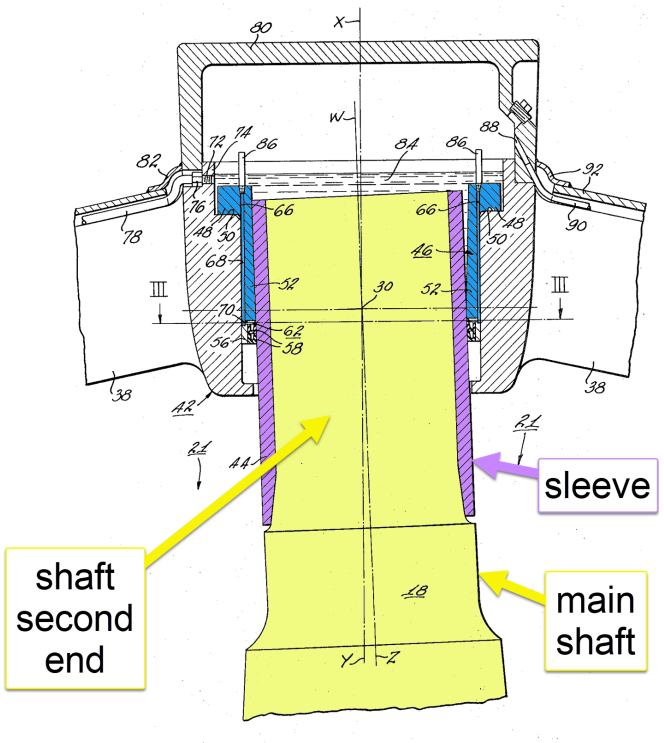


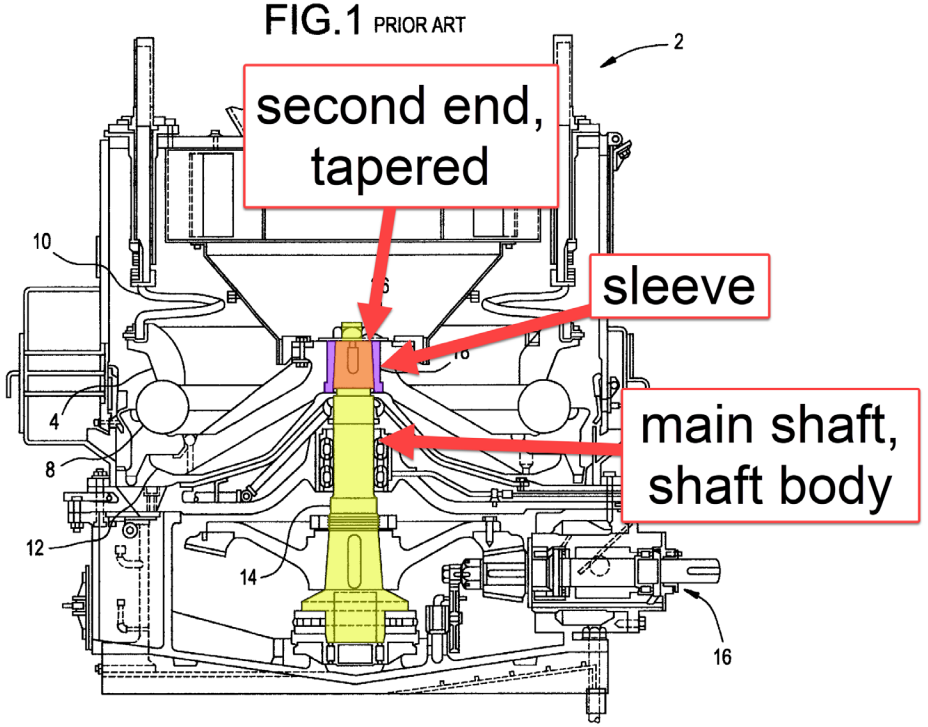




Element 11b1 of Claim 11 is Obvious

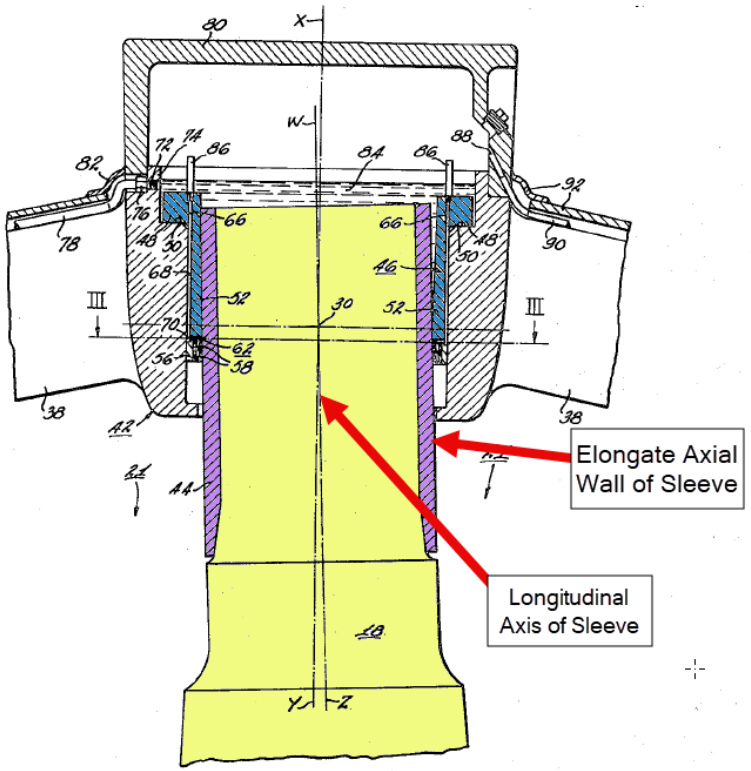
Challenged Claim Element Obvious by Prior Art?	
11b1. a sleeve fitted over the tapered region at the second end of the main shaft,	YES: Torrence in view of Piepho discloses a sleeve fitted over the tapered region at the second end of the main shaft.

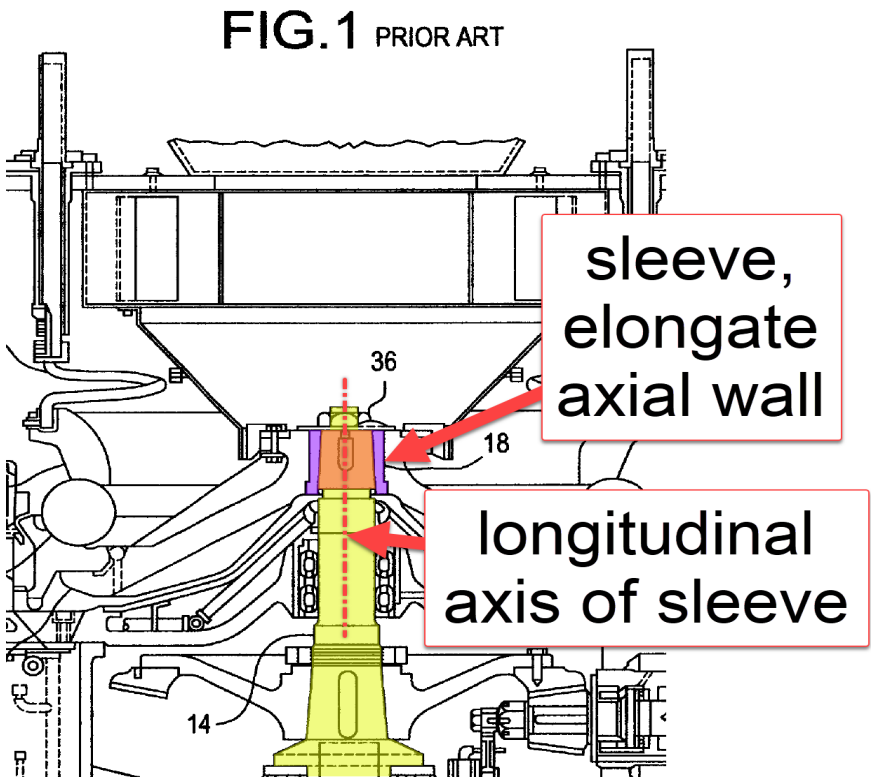




Element 11b2 of Claim 11 is Obvious

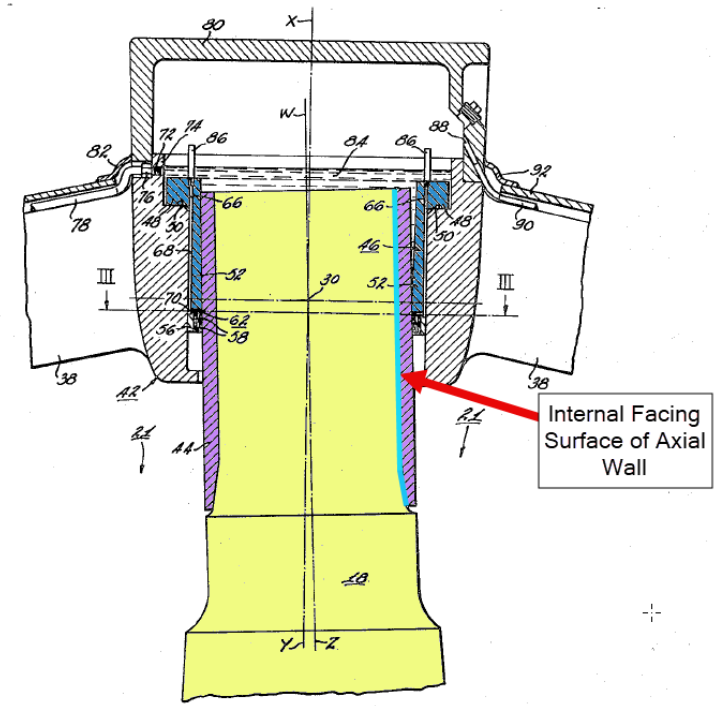
Challenged Claim Element Obvious by Prior Art?	
11b2. the sleeve including an elongate axial wall extending around a longitudinal axis of the sleeve,	**YES**: As shown below, both Torrence and Piepho disclose a sleeve including an elongate axial wall extending around a longitudinal axis of the sleeve.

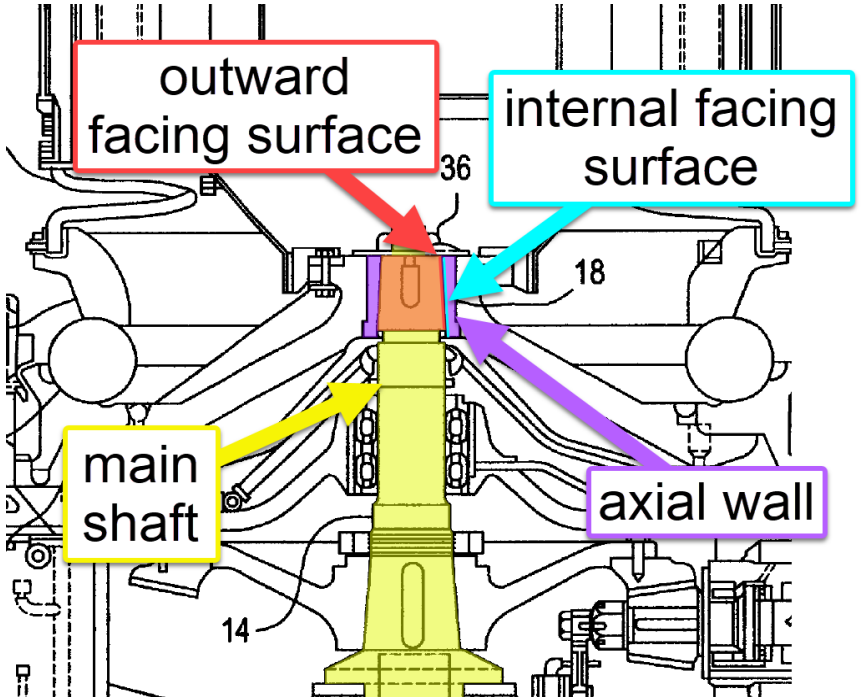




Element 11b3 of Claim 11 is Obvious

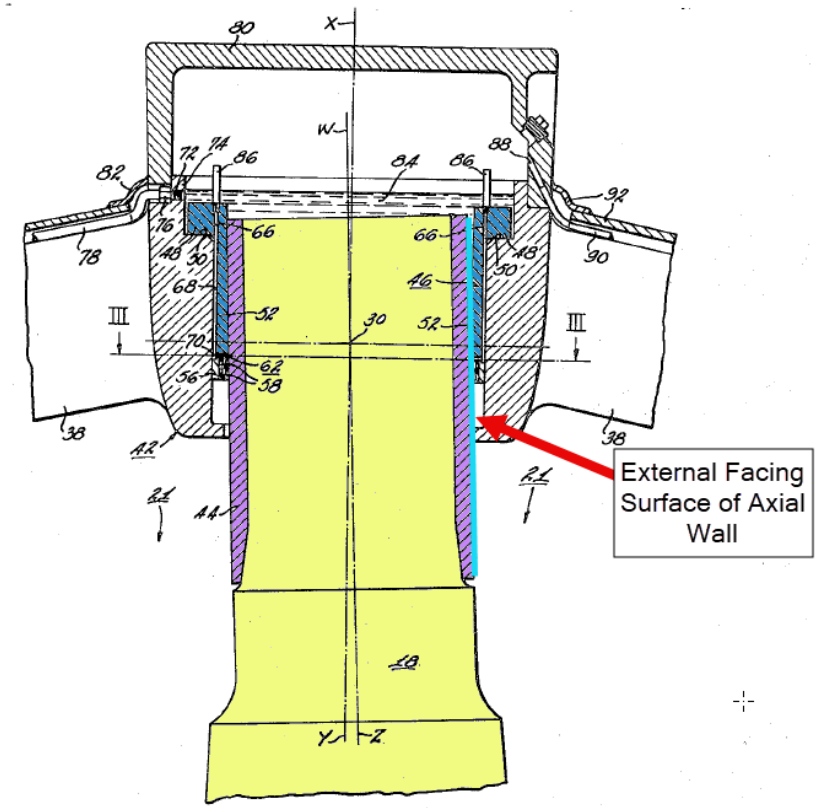
Challenged Claim Element Obvious by Prior Art	
11b3. the axial wall having an internal facing surface for positioning in contact with an outward facing surface of the main shaft, and	**YES**: Both Torrence and Piepho disclose a sleeve with an axial wall having an internal facing surface for positioning in contact with an outward facing surface of the main shaft.

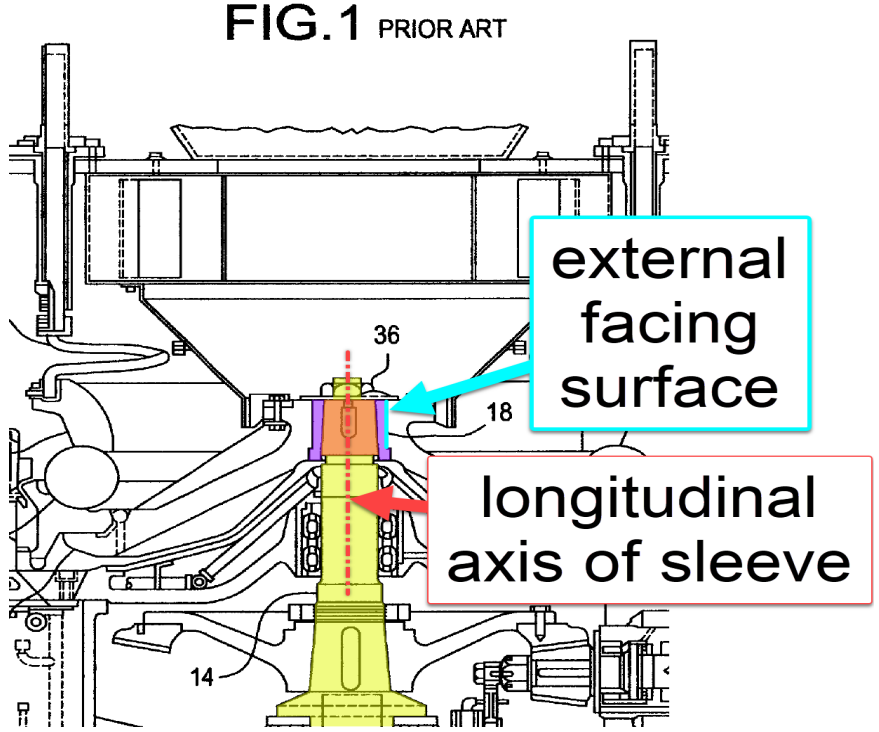




Element 11b4 of Claim 11 is Obvious

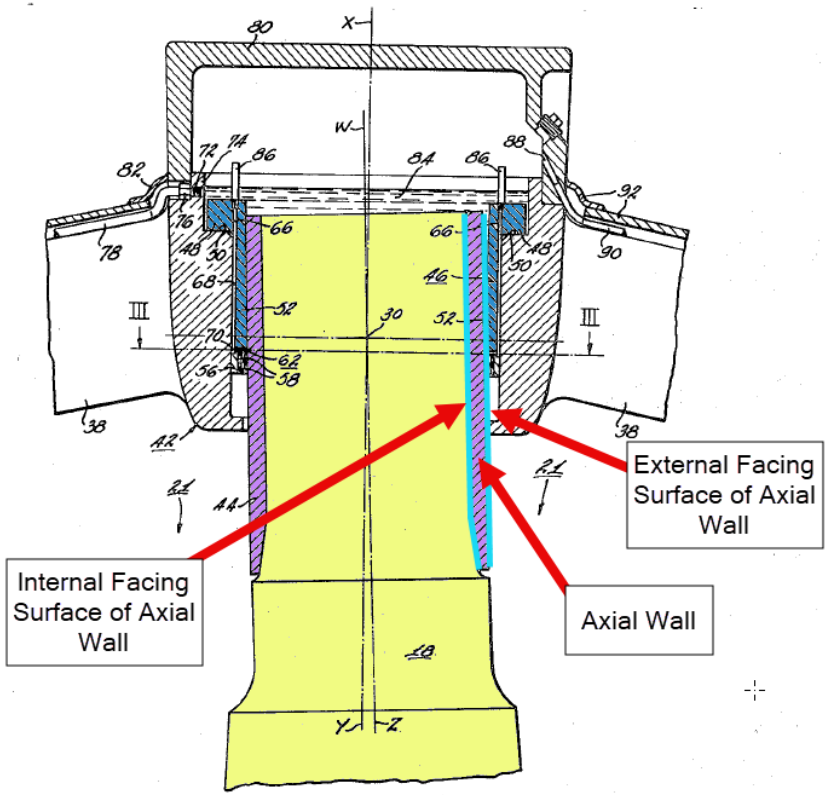
Challenged Claim Element Obvious by Prior Art	
11b4. an external facing surface relative to the longitudinal axis,	**YES**: Both Torrence and Piepho disclose a sleeve with an external facing surface relative to the longitudinal axis.

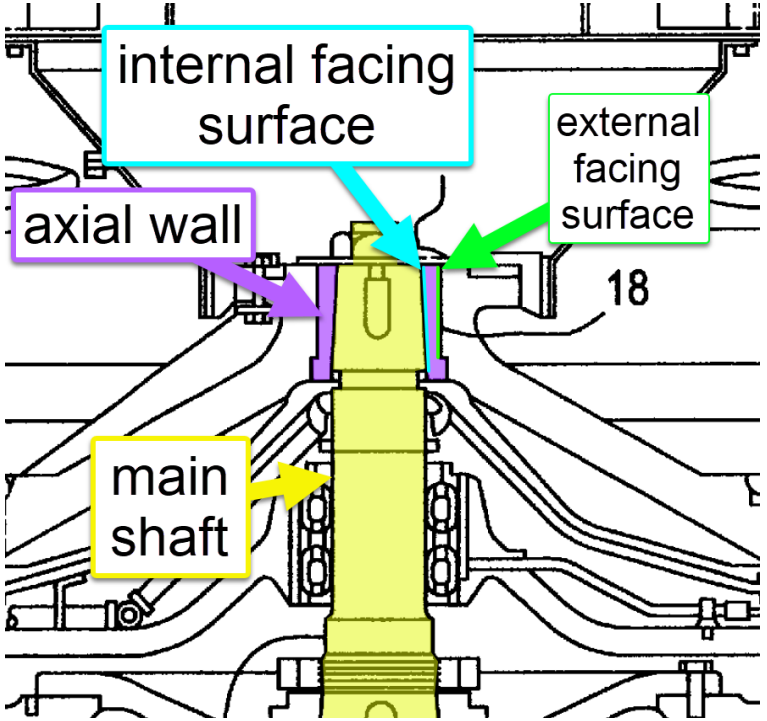




Element 11b5 of Claim 11 is Obvious

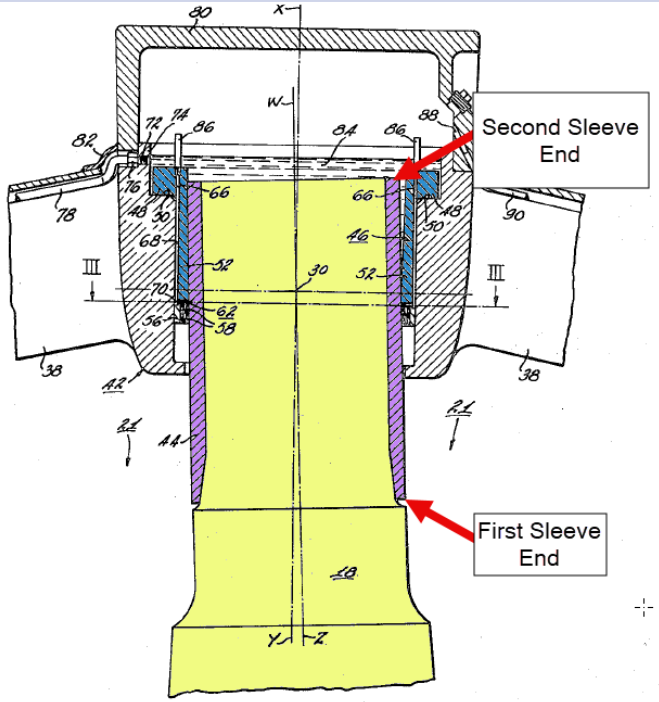
Challenged Claim Element Obvious by Prior Art	
11b5. the axial wall extending between the internal and external facing surfaces,	**YES**: Both Torrence and Piepho disclose a sleeve with an axial wall extends between the internal and external facing surfaces.

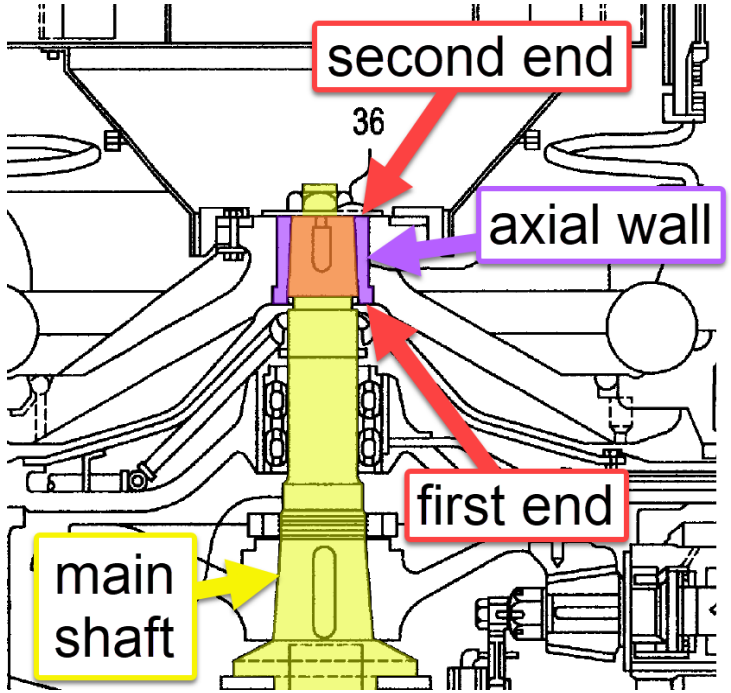




Element 11b6 of Claim 11 is Obvious

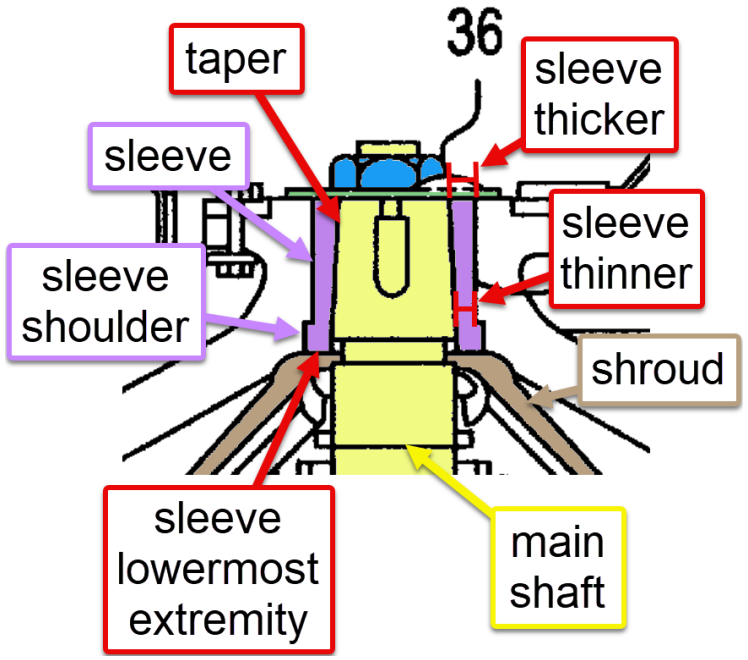
Challenged Claim Element Obvious by Prior Art	
11b6. the axial wall having a first sleeve end for positioning at a lower region of the main shaft and a second sleeve end for positioning at an upper region of the main shaft relative to the lower region,	**YES**: Both Torrence and Piepho discloses an axial 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.

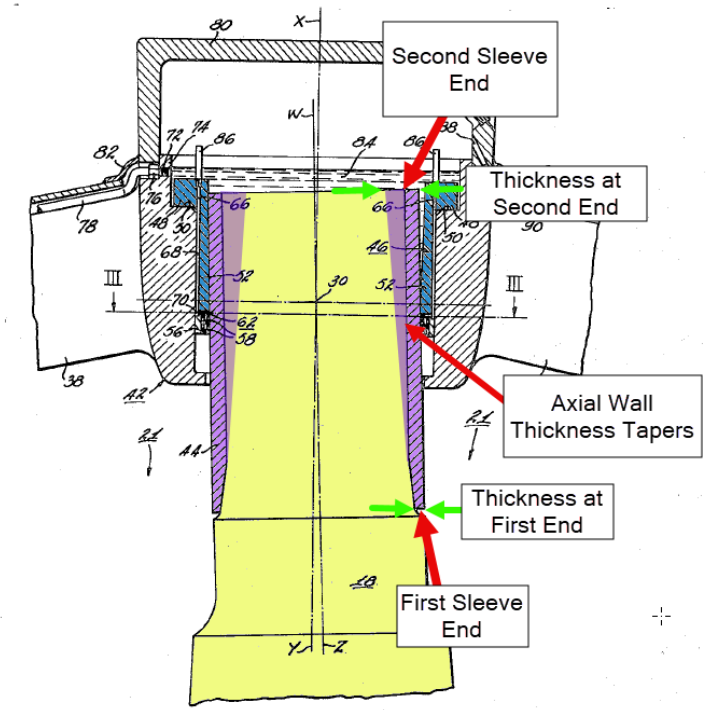




Element 11c of Claim 11 is Obvious

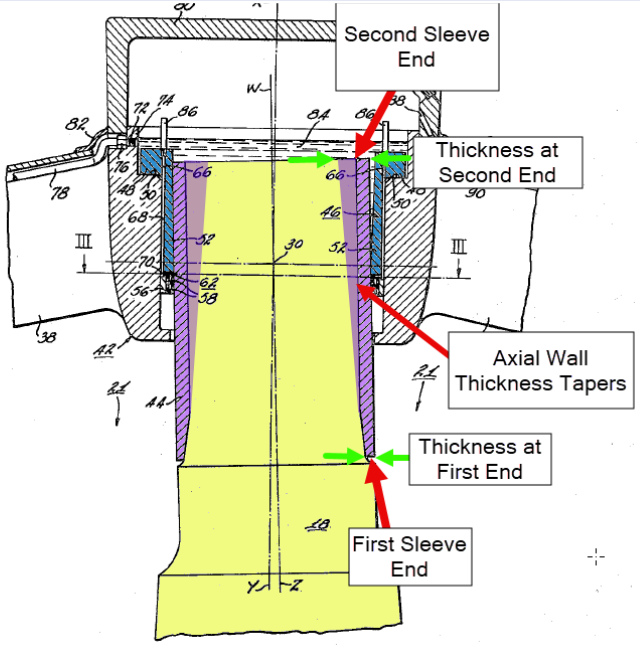
Challenged Claim Element Obvious by Prior Art	
11c. wherein a thickness of the axial wall at a region between the first and second sleeve ends tapers and decreases in a direction from the second sleeve end to the first sleeve end, wherein the first sleeve end is a lowermost extremity of the sleeve,	**YES:** Torrence in view of Piepho discloses that the thickness of the axial wall at a region between the first and second ends decreases in a direction from the second end to the first end.

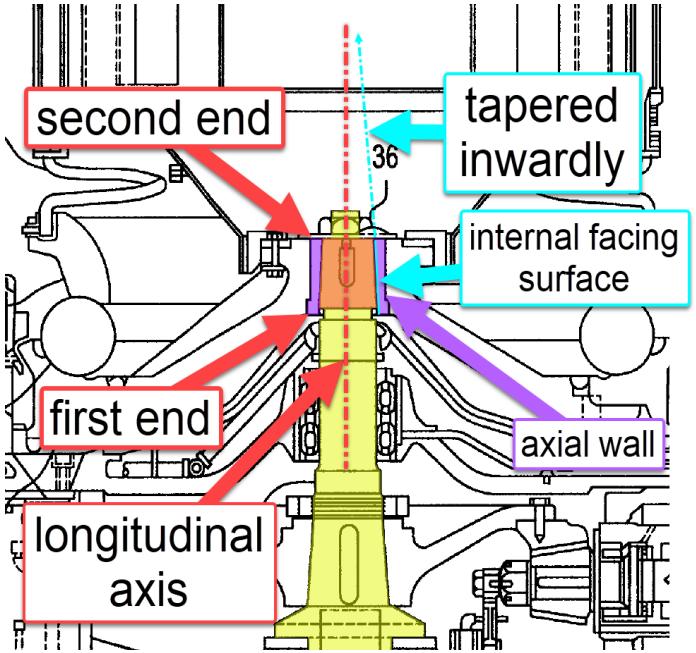




Element 11d of Claim 11 is Obvious

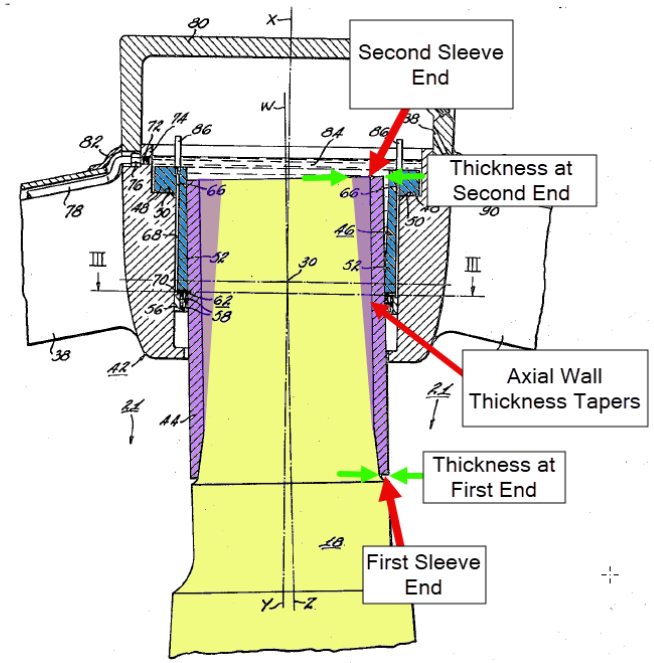
Challenged Claim Element Obvious by Prior Art	
11d. in the axial direction the internal facing surface at said region between the first and second sleeve ends extending transverse to the longitudinal axis so as to taper inwardly towards the longitudinal axis of the sleeve in the direction from the first sleeve end to the second sleeve end, and	**YES**: Piepho discloses that 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.

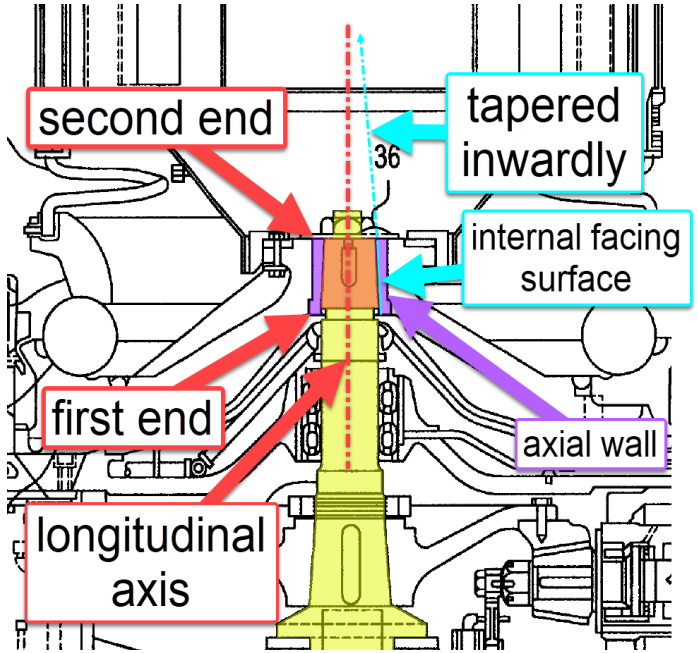




Element 11e of Claim 11 is Obvious

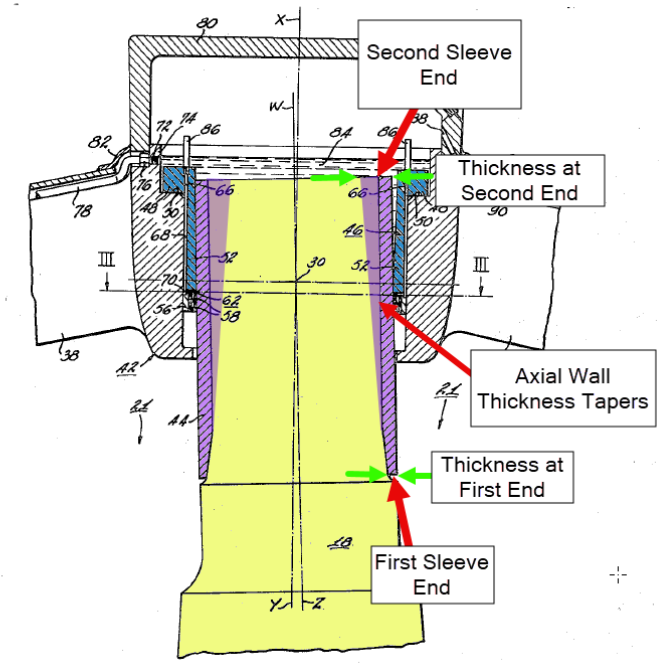
Challenged Claim Element Obvious by Prior Art	
11e. wherein the external facing surface from the first sleeve end to the second sleeve end is parallel to the longitudinal axis of the sleeve such that the external facing surface of the sleeve when viewed externally has a cylindrical geometry.	**YES**: Torrence discloses 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.





Element 11f of Claim 11 is Obvious

Challenged Claim Element Obvious by Prior Art	
11f. wherein the second end of the shaft body is configured to be supported by a top bearing assembly such that the second end is rotatable eccentrically and freely rotatable about a longitudinal axis of the shaft within the bearing assembly.	**Yes.** Torrence discloses a crusher where the second end of the shaft body is configured to be supported by a top bearing assembly such that the second end is rotatable eccentrically and freely rotatable about a longitudinal axis of the shaft within the bearing assembly.



The Cited Prior Art is Analogous Art

- Two separate tests define the scope of analogous prior art; (1) whether the art is from the same field of endeavor, regardless of the problem addressed and (2) if the reference is not within the field of the inventor's endeavor, whether the reference still is reasonably pertinent to the particular problem with which the inventor is involved. *In re Deminski*, 796 F.2d 436, 442 (Fed. Cir. 1986); *see also In re Wood*, 599 F.2d 1032, 1036 (CCPA 1979).
- It is further well established that "[i]n a simple mechanical invention a broad spectrum of prior art must be explored and it is reasonable to permit inquiry into other areas where one of ordinary skill in the art would be aware that similar problems exist." *See Stevenson v. Int'l Trade Comm*., 612 F.2d 546, 550, 204 USPQ 276, 280 (CCPA 1979).

Analogous Art Continued

- MPEP 904.01(c) ("Not only must the art be searched within which the invention claimed is classifiable, but also all analogous arts must be searched regardless of where the claimed invention is classified.").
- The '090 Patent and Piepho have the same section, class, and subclass Cooperative Patent Classification ("CPC") identifier of B02C—**CRUSHING, PULVERIZING** OR DISINTEGRATING IN GENERAL (emphasis added). (Paper 43, p. 3).

Patent Owner Delayed Arguing Piepho Isn't Analogous Art

- Piepho has been cited by Petitioners since their first Petition (Paper 2) initiating this action filed in August 2024.
- Piepho was continuously cited in Petitioners' Response in Opposition to Patent Owner's Contingent Motion to Amend and Request for Preliminary Guidance (Paper 19) and in Petitioners' Response to Patent Owner's Revised Contingent Motion to Amend (Paper 33).
- Patent Owner did not claim not analogous art until its Reply Brief filed December 16, 2025 (Paper 38).

Why Piepho Is Analogous Art

- In a simple mechanical invention, a broad spectrum of prior art must be explored and it is reasonable to permit inquiry into other areas where one of ordinary skill in the art would be aware that similar problems exist." *Stevenson v. Int'l Trade Comm*., 612 F.2d 546, 550, 204 USPQ 276, 280 (CCPA 1979). (Paper 43, p. 2).
- Patent Owner's expert admits that coal is specific kind of rock. Ex. 1057 2nd Deposition of Dr. Kytömaa, 7:4-25.
- Rock crushing and pulverizing is a multi-stage process where "depending on the mining operation, you'll start with a broad range of sizes, and there may be sort of a, let's say, a course size classification that allows smaller components to –let's say, smaller pieces of rock to move on, and larger ones may get crushed by some kind of crusher that accommodates large rocks. Ex. 1057 2nd Deposition of Dr. Kytömaa, 26:9-18.

The Examiner Did Not Consider Torrence in view of Piepho

- Patent Owner and Dr. Kytomaa note that "during prosecution, the Examiner cited Torrence and applied Coxhill '800 (Ex. 1039)… Yet she allowed the (broader) issued claims over them. This indicates to me that the Examiner viewed Torrence as deficient. Petitioner is simply recycling considered art and arguments." Ex. 2022 Third Kytomaa Declaration p. 22.
- However, Piepho nor any of the other tapered shaft and tapered sleeve references provided by Petitioners were considered by the Examiner. Ex. 1001-1 (Patent File Wrapper).

EVIDENCE OF COPYING DOES NOT OVERCOME OBVIOUSNESS

(Paper 43, p. 11)

It is well settled that secondary considerations of non obviousness simply cannot overcome this strong prima facie case of obviousness. Sundance, Inc. v. Demonte Fabricating Ltd., 550 F.3d 1356, 2008 U.S. App. LEXIS 26082, 89 U.S.P.Q.2D (BNA) 1535, 78 Fed. R. Evid. Serv. (Callaghan) 320 (citing to *Agrizap, Inc. v. Woodstream Corp.*, 520 F.3d 1337, 1344 (Fed. Cir. 2008); *see also* *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 61, 90 S. Ct. 305, 24 L. Ed. 2d 258 (1969) (considering argument of secondary considerations but holding that "those matters without invention will not make patentability"); *Leapfrog Enters., Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1162 (Fed. Cir. 2007) (holding that the objective considerations of nonobviousness presented, including substantial evidence of commercial success, praise, and long-felt need, were inadequate to overcome a strong showing of primary considerations that rendered the claims at issue invalid); *Dystar Textilfarben GMBH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1371 (Fed. Cir. 2006) ("The presence of certain secondary considerations of nonobviousness are insufficient as a matter of law to overcome our conclusion that the evidence only supports a legal conclusion that claim 1 would have been obvious.").