

Filed on Behalf of FLSmidth Inc.

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FLSmidth Inc.
Petitioner

v.

Metso Outotec (Finland) Oy
Patent Owner.

Patent 9,518,604

Title: Fluid Bearings

IPR2025-00985

**PETITION FOR *INTER PARTES* REVIEW
PURSUANT TO 37 C.F.R. §42.100 *et seq.***

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EXHIBIT LIST

Exhibit No.	Exhibit Description
1001	U.S. Patent No. 9,518,604
1002	File History of U.S. Patent No. 9,518,604
1003	GB1,508,384
1004	German publication No. DE102007039364
1005	DE102007039364 English Translation
1006	Metso Brochure No. 2060 02-02
1007	US4,025,133
1008	US7,896,551
1009	Trygg, et al. CIM Article
1010	GB1,330,484
1011	US5,333,804
1012	Higgins, R.A. Textbook
1013	US2012/0099993
1014	US3,197,264
1015	US2003/0175074
1016	US2,744,799
1017	US4,408,808
1018	US3,799,628
1019	US4,320,926
1020	Chinese Patent No. CN1904401
1021	CN1904401 English Translation

1022	Declaration (and CV) of David Smith (“Smith”)
1023	Declaration (and CV) of Edward Wipf (“Wipf”)
1024	Declaration of Michele Beacom
1025	Port Definition and Meaning – Merriam-Webster
1026	Declaration of Internet Archive

I. INTRODUCTION

FLSmidth Inc. (“FLS” or “Petitioner”) seeks *inter partes* review of claims 1-26 (the “Challenged Claims”) of US9,518,604 (the “’604 Patent”), which is assigned to Metso Outotec (Finland) Oy (“Patent Owner” or “PO”).

The ’604 Patent is directed to fluid bearings used to support at least a radial load from a rolling body. In its barest form, the ’604 Patent claims an improved fluid bearing that uses a polymer bearing pad instead of a metal pad. While the ’604 Patent claims various means of fastening and/or mounting the polymer pad on the bearing base, neither the use of a polymer as a bearing pad nor use of any of the various means of fastening the polymer pad to the base are nonobvious to the person of ordinary skill in the art (“POSITA”). Had the Patent Office had before it the evidence of record, it would not have allowed any of the Challenged Claims. As a result, the Petition should be granted and the Challenged Claims should be found unpatentable.

II. STANDING, MANDATORY NOTICES, AND FEE AUTHORIZATION

Grounds for Standing: Pursuant to 37 C.F.R § 42.104(a), FLS certifies that the ’604 Patent is available for IPR and that Petitioner is not barred or estopped from requesting an IPR challenging the patentability of the Challenged Claims.

Real Party in Interest: Petitioner identifies FLSmidth Inc. as the real party in interest.

Related Matters: Petitioner is unaware of any related matters.

Lead and Back-Up Counsel: FLS designates Jed H. Hansen (Reg. No. 59106, hansen@tnw.com) of Thorpe North & Western, LLP, 175 South Main Street, Suite 900, Salt Lake City, Utah 84111 (postal and hand delivery), telephone: 801.566.6633, facsimile: 801.566.0750 as lead counsel. FLS designates Kurt Hendricks (Reg. No. 70041, kurt.hendricks@tnw.com) of Thorpe North & Western, LLP, 175 South Main Street, Suite 900, Salt Lake City, Utah 84111 (postal and hand delivery), telephone: 801.566.6633, facsimile: 801.566.0750 as back-up counsel.

Service Information: Please address correspondence to counsel at the address above. Petitioner consents to electronic service to: tnw_litigation@tnw.com and the email addresses listed above. Service information is provided in the designation of counsel.

Fee Authorization: The Office is authorized to charge any request and post institution fees set forth in 37 C.F.R. § 42.15(a) as well as any additional fees that might be due to Deposit Account No. 20-0100.

III. SUMMARY OF CHALLENGE (37 C.F.R. §42.104(b))

Petitioner requests IPR of claims 1-26 of the '604 Patent under 35 U.S.C. §103 on the following grounds:

Ground 1: Claims 1-5, 7, 10-15, 17, 20-22 and 25-26 are obvious in view of GB384 alone or in combination with DE364.

Ground 2: Claims 6, 16 and 23 are obvious in view of GB384, DE364, and the '799 patent.

Ground 3: Claims 8, 18 and 24 are obvious in view of GB384, DE364 and the '551 patent.

Ground 4: Claims 9 and 19 are obvious in view of GB384, DE364 and Trygg.

Ground 5: Claims 1-5, 7, 10-15, 17, and 20 are obvious in view of the '133 Patent and DE364.

Ground 6: Claims 1 and 11 are obvious in view of Metso, the '993 Publication and Trygg.

The '604 Patent is based on a national stage application filed under 35 U.S.C. §371 based on International Application No. PCT/1B2013/055305 filed June 28, 2013. It claims priority under 35 U.S.C. §119 to Australian Patent Application No. 2012902770 filed June 28, 2012. Each of the asserted references is available as prior art under 35 U.S.C. §102.

IV. OVERVIEW OF THE '604 PATENT

The '604 Patent is directed to fluid bearings and in particular, a fluid bearing used in connection with a rolling body. Ex. 1001, Abstract. More specifically, the '604 Patent discloses a fluid bearing having a polymer bearing pad used in connection with a mill (*Id.*, 1:40) but “the invention is not limited to this particular field of use...” *Id.* 1:42-43.

Figures 5 and 6 show cross-sectional views of a radial hydrostatic bearing 11. *Id.*, 8:34-39, 9:40-42. Specifically, Figure 6 illustrates “[a] polymer pad 17 is mountable to the base 14 of each radial hydrostatic bearing 11 via a mounting portion 8.” *Id.*, 9:54-55. “The polymer bearing pad 17 has at least one recess 18 for receiving oil from the oil gallery 16 and distributing it to the outer surface 13A to act as a lubricating fluid between the radial hydrostatic bearing 11 and the journal shafts 4.” *Id.*, 10:3-6 (underlining added). The “recess 18 is fluidly connected to the oil gallery 16 via interconnecting passage 19.” *Id.*, 10:7-8. The “oil gallery 16” is “in fluid communication with the oil supply port 15.” *Id.*, 9:44-45.

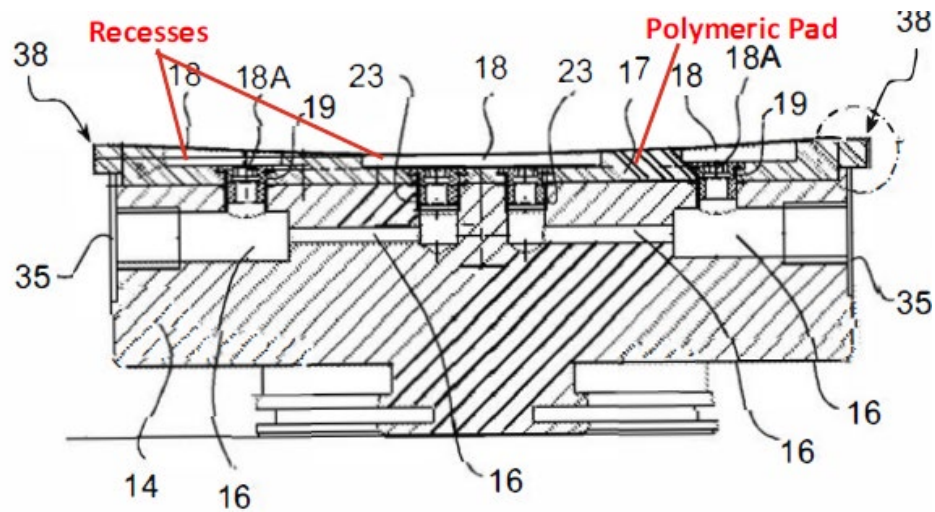


Fig. 5

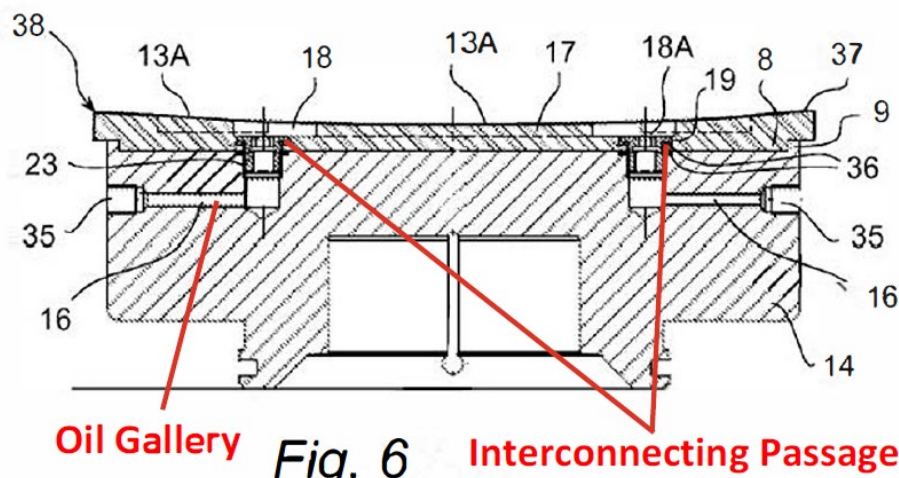


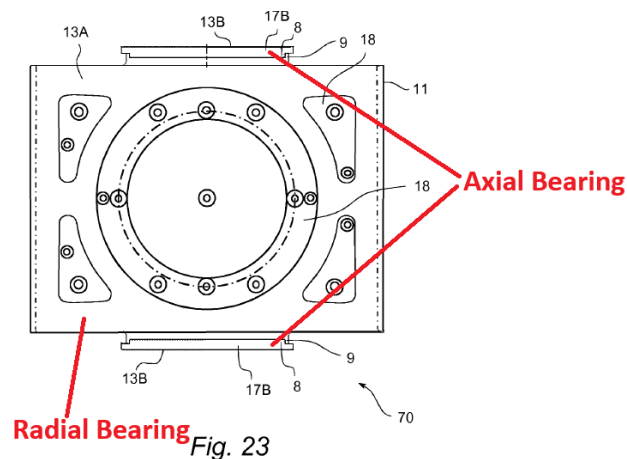
Fig. 6

An oil passage 19 is created by using a hollow bolt 23 as a fastener. *Id.*, 10:52-11:14. Each bolt has a bore 24 for transmitting lubricant from oil galleries 16 to recesses 18. The fasteners (i.e., the bolts 23) can be locked into place via locking elements, which are described as “liquid thread locker, a Scotch key, a

non-loosening thread, a non-loosening washer, or similar locking device.” *Id.*, 17:45-50. A “mounting portion 8 is a protrusion extending from a mounting surface opposite the outer surface 13A to engage flanges 9 located at respective outer edges or sides of the base 14.” *Id.*, 9:56-59.

The '604 Patent further explains that the base 14 may either “self adjust” to any changes in the angular position of the journals 4 during operation of the mill 1 using “spherical seat.” *Id.*, 9:45-51. None of the figures of the '604 Patent depict any structure that provides a self-adjusting feature, including the alleged “spherical seat.” *Id.*, 9:45-51. The '604 Patent states that the base 14 may also be “fixedly mounted.” *Id.*, 16:15-19.

The fluid bearing can include a multidirectional fluid bearing 70 that provides both a radial bearing with a polymer pad 17A and at least one axial bearing with a polymer pad 17B.



Admitted Prior Art: The Background of the '604 Patent discusses technology that was known to the POSITA prior to its filing. In that Background, the grinding mills use bearing pads to support mill journals as they rotate. *See Id.*, 1:58-64. Figure 1 illustrates what the '604 Patent characterizes as a “typical” grinding mill. *See also Smith*, ¶22; *Wipf*, ¶21.

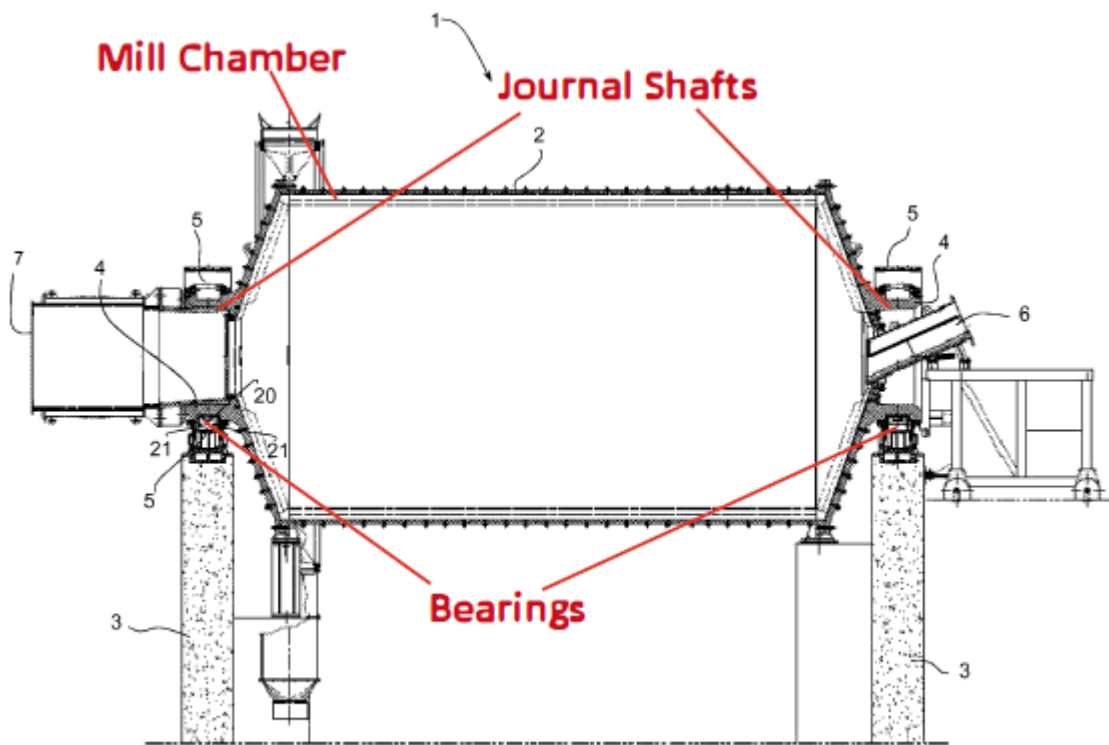
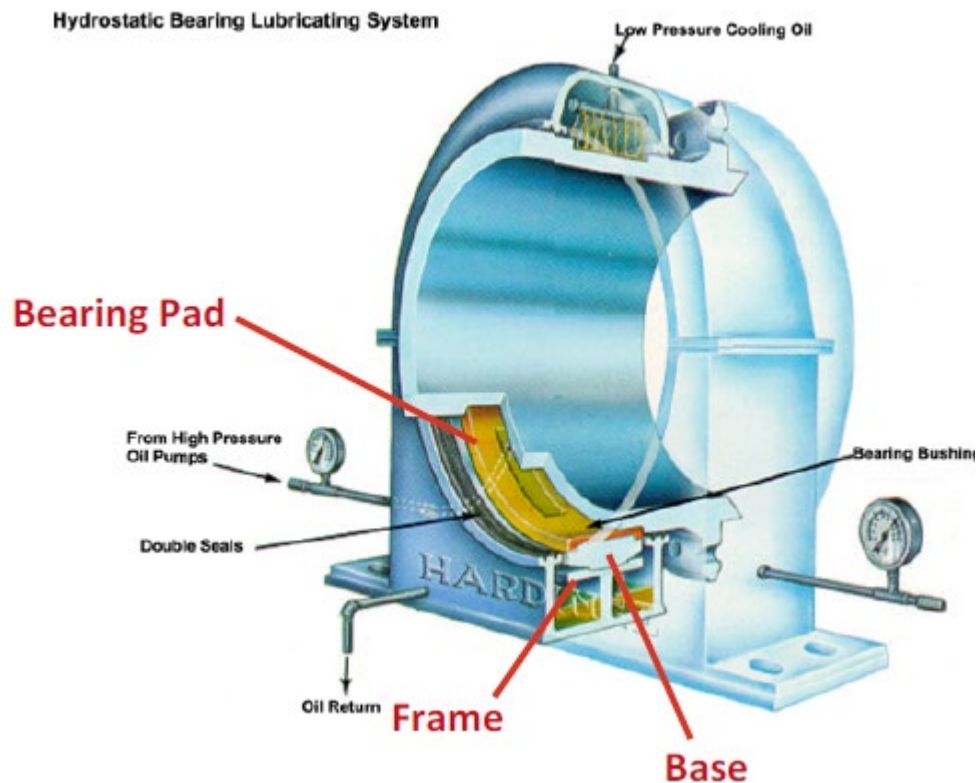


Fig. 1

The Background also describes aspects of hydrostatic bearing pads that were “currently in use.” *See Ex. 1001*, 1:66. Specifically, PO used a “hydrostatic pad bearing system, an external oil supply system pumps high-pressure oil to recesses

machined into the bearing so that the oil forms a thin film on the bearing pad surface.” *Id.*, 1:65 – 2:1-13; *see also* Smith, ¶23; Wipf, ¶22.

An example of this type of system is detailed in a Metso Brochure¹ which is shown below:



The Background of the '604 Patent also notes some of the disadvantages of the Metso fluid bearing system. Specifically, the bronze or spray welded bearing

¹ While the Metso Brochure is prior art, it is not admitted prior art. However, it is provided in this section as a visual reference to assist the Board in understanding the admitted prior art. *See also* Wipf, ¶¶23-24.

pads form a seal with the base that are difficult to repair on-site. *See* Ex. 1001, 2:35-52. One of the purposes of the invention is “to provide improved fluid bearings for mills that are more tolerant to the loss of oil film....” *Id.*, 2:56-62. One of the alleged “improved fluid bearings” uses a polymer instead of brass as the bearing pad.

Challenged Claims: The '604 Patent has 26 claims, all of which are part of the Challenged Claims. Three of the Challenged Claims (1, 11, and 21) are independent claims. Claims 2-10 depend from Claim 1, Claims 12-20 depend from Claim 11 and Claims 22-26 depend from Claim 21.

Numerous of the dependent claims recite identical subject matter, the only difference being the independent claim from which they depend. For efficiency, Petitioner references evidence for one claim where it is equally applicable to another virtually identical claim.

Prosecution History: In the only substantive Office Action, the Examiner rejected the claims then numbered as 63, 64 and 69 as obvious over U.K. Patent No. GB384 in view of U.S. Patent Publication No. 2012/0099993. The elements of claim 63, in its rejected form, are recited below:

a base having a first surface orthogonal to a second surface, one or more lubricating fluid supply ports and a plurality of passages in fluid communication with said lubricating fluid supply ports, said first surface and said second surface,

a first polymer bearing pad mountable to said first surface, said polymer bearing pad having a first outer surface and at least one recess for receiving lubricating fluid from at least one of said plurality of passages and distributing said lubricating fluid to said first outer surface, and

a second polymer bearing pad mountable to said second surface, said second polymer bearing pad having a second outer surface and at least one recess for receiving lubricating fluid at least one of said plurality of passages and distributing said lubricating fluid to said second outer surface

The Examiner found that GB384 disclosed **all of the elements** of claim 63 (which eventually became Claim 21) except that it did “not disclose the antifriction material as [a] polymer.” Ex. 1002 at 46. The ’993 publication, however, disclosed “a fluid bearing for a journal, in which the bearing pad lining comprises a polymer lining” supplied this missing limitation. *Id.* The Examiner found the claim was obvious because “[i]t would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize known antifriction material in [GB384], including polymer, as taught by [the ’993 publication] as exhibiting favorable stability and stiffness, as well as other beneficial properties to fluid bearings.” *Id.*

In support of the rejection of what was claim 64 (renumbered to claim 25), the Examiner found GB384 “discloses said first antifriction material bearing pad substantially covers said first surface and said second antifriction material bearing pad substantially covers said second surface to respectively create fluid seals

between said first and second antifriction material bearing pads and said base.” *Id.*

And in support of a rejection of claim 69 (renumbered to claim 26), the Examiner found GB384 “discloses the first outer surface being partially curved such that the first bearing pad acts as a radial hydrostatic bearing and the second outer surface is substantially planar such that the second bearing pad acts as an axial bearing (Figure 5).” *Id.*

In response, the PO amended what was then claim 63 (renumbered to claim 21) by adding matter that the Examiner had deemed allowable, including, *inter alia*, “at least one fastener,” a “locking tab,” and a “bore for conveying fluid.”

There is no written analysis of claims 53 and 54 (renumbered to independent claims 1 and 11, respectively) by the Examiner and hence no evidence of any substantive analysis of those claims in view of GB384 or any other prior art.

In addition, there is no written analysis of application of DE364 to any of the Challenged Claims.

V. LEVEL OF ORDINARY SKILL IN THE ART

The POSITA of the '604 Patent at the time of the alleged invention would have had a bachelor's degree in mechanical engineering, mining engineering, or an engineering discipline related to either of those two with at least 2 years of experience related to the design and/or operation of equipment that uses fluid

bearings or a commensurate amount of additional education or comparable work experience related to heaving machinery. Smith, ¶14.

VI. CONSTRUCTION OF THE CHALLENGED CLAIMS

For the purposes of this Petition, no explicit construction is required. Rather, all terms are given their plain and ordinary meaning to the POSITA. That said, several claim terms are subject to 35 U.S.C. §112(f) including the terms “mounting element,” “locking element.” Those terms are nonce terms interpreted to cover the corresponding structure described in the specification that achieves the claimed function, and equivalents thereof. *See Media Rights Techs., Inc. v. Capital One Fin. Corp.*, 800 F.3d 1366, 1372 (Fed. Cir. 2015).

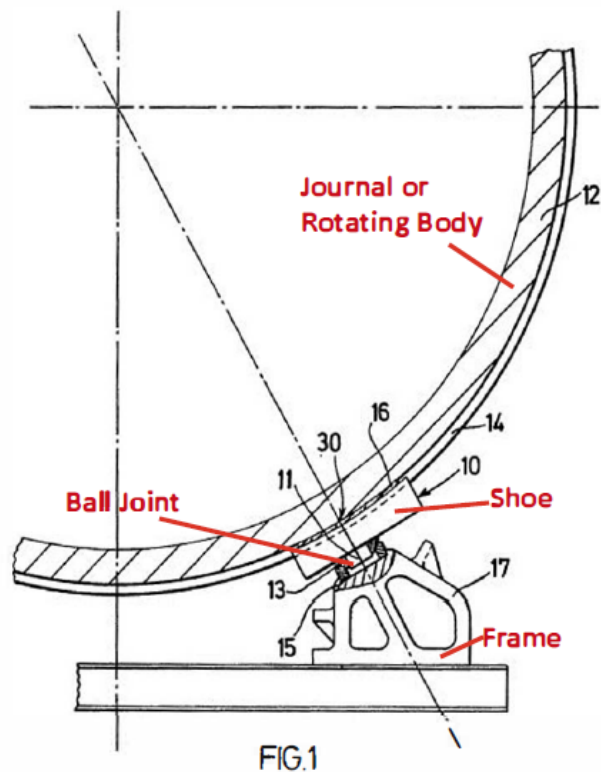
The term “mounting element” does not appear in the specification. The term “mounting portion” is shown at callouts 8 and 9 in FIG. 13 and discussed in 11:15-22. *See* Ex. 1001 (where “mounting portion 8 of the polymer pad 17 engages the flanges 9 of the base 14 to help lock the polymer in place.”). The structure of the mounting portion 8 effectively comprises a corner abutting an edge.

The “locking element” is described as “a liquid thread locker, a Scotch key, a non-loosening thread, a non-loosening washer or similar locking device.” *Id.*, 17:47-50.

VII. OVERVIEW OF GENERAL KNOWLEDGE OF THE ART AND PRIOR ART.

Ex. 1003 – U.K. Patent No. GB1508384 (“GB384”)

GB384 discloses a device for supporting a rotating body that is for use with “bearings of tubular grinding mills.” Ex. 1003, 3:25-26. Figure 1 from GB384 shows a bearing assembly for supporting a journal (rotating body 12) that comprises a frame (frame 17) and fluid bearings (shoe 10). Smith, ¶¶45-46.



A ball joint is located between the bearing (shoe 10) and the frame (frame 17). Ex. 1003, 2:45-54. The ball joint includes member 13 that has “a part spherical lower surface . . . [that] bears on an upper, part-spherical surface of a seat

15 ...” *Id.* The ball joint allows the bearing (shoe 10) to self adjust to changes in the angular position of the journal (rotating body 12). *Id.*, 1:19-44.

Figures 2 and 5 show that the bearing pad (lining 16) includes a recess (channel 18) for receiving lubricating fluid from at least one passage (duct 20) in fluid communication with a lubricating fluid supply port. An upper face and sides of the shoe 10 are covered with a “lining 16 of anti-friction material.” *Id.*, 2:69-72. The lining 16 has side recesses 19 for forming containers for oil, which can be introduced via duct 20 and channel 18. *Id.*, 2:114-118; 2:79-81. These oil containers 19 are “recesses forming container for oil.” *Id.*, 2:1-2. Because it covers both the upper surface and sides of the shoe 10, the lining 16 operates as both a radial and axial bearing. *Id.*, 2:42-45; 2:64-68.

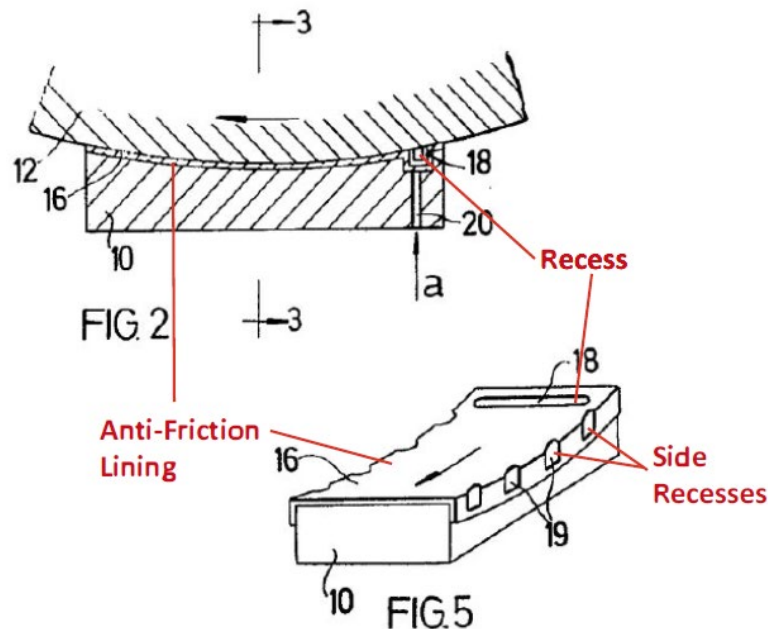
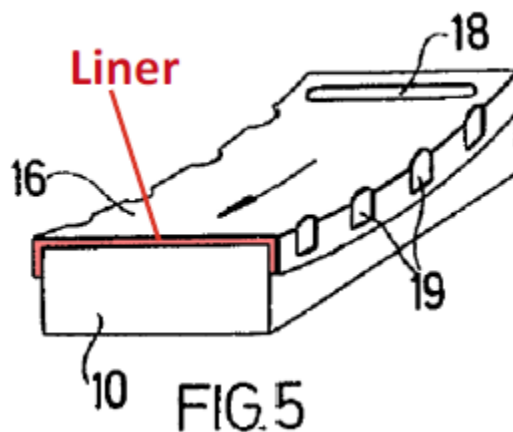
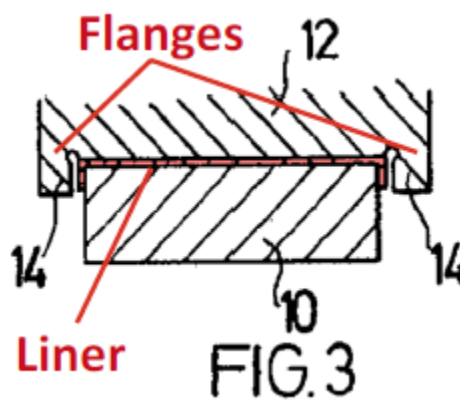


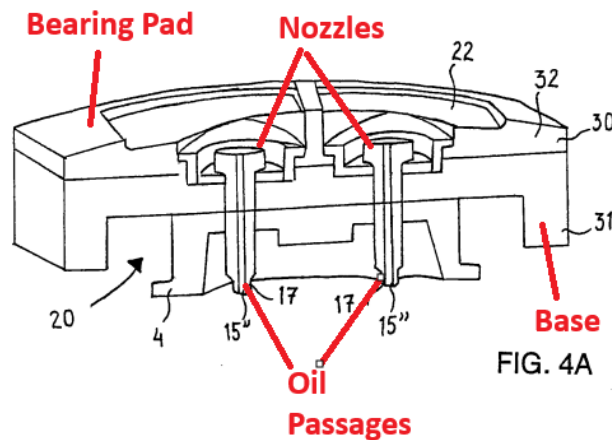
Figure 3 shows a cross section of the arrangement illustrating how the flanges 14 of the journal or rotating body 12 bound the sides of the shoe 10. Figures 3 and 5 shows the liner 16 extending over the side surfaces of the shoe to provide a bearing surface to interact with the flange 14 addressing axial forces. Alternatively, “axial forces can be taken up by flanges of the shoes enclosing or bounding the slidable track of the rotating body.” *Id.*, 3:3-6.



Exs. 1004 & 1005 –DE102007039364 (“DE364”)

DE364 discloses a bearing assembly 20 having a polymer bearing pad 30 mounted on a base 31. The bearing pad 30 and the base 31 “are attached to each other, for example by screws, adhesive, or rivets.” Ex. 1005, ¶ [0011]. Nozzles 17 are used to fasten the polymer bearing pad 30 to the base. The nozzles 17 also have passages 15” that allow lubricating oil to flow to the surface of the bearing pad 30.

Id.



DE364 also states that the bearing pad (30) “can extend in one piece over the entire length of the shoe length (i.e. in the CD direction) or be made of sections, in which case only the damaged one Section needs to be replaced in the event of damage.” *Id.* ¶ [0012].

Ex. 1006 – Metso Brochure No. 2060 02-02

The Metso Brochure (hereinafter “Metso”) was published at least as early as August 27, 2019 on www.metso.com/miningandconstruction/mm_grin.nsf. Ex. 1026. Metso depicts a hydrostatic mill journal that includes a fixed fluid bearing with a bearing pad (shown in orange in the image and called a “bearing bushing”). The bearing pad has a recess connected to a fluid passageway (shown by dotted white lines) for oil (yellow) from a pressurized source to flow to the wear surface of the bearing pad. The bearing pad has a recess which is in fluid communication with a lubrication fluid passageway. Smith, ¶58; Wipf, ¶¶23-25. This allows the journal mill to “float” on the top of the bearing pad which is supported on a fixed base.

Ex. 1007 – U.S. 4,025,133

U.S. 4,025,133 to Cornford discloses “a bearing assembly for supporting a rotating journal having a cylindrical surface.” Ex. 1007 2:22-23. The bearing assembly comprises a plurality of bearing liners (e.g., 16, 17, and 18) disposed on “shoe members” 10, 11, and 12. *See id.*, 2:32-40. The “shoe members 11, 12 provide[] an oil groove 19, 20, to which oil is fed in the conventional manner so as to apply an oil film to the bearing face of the shoe to establish a hydrodynamic wedge of oil.” *Id.*, 2:39-45. *See*, e.g., Figure 1 shown below.

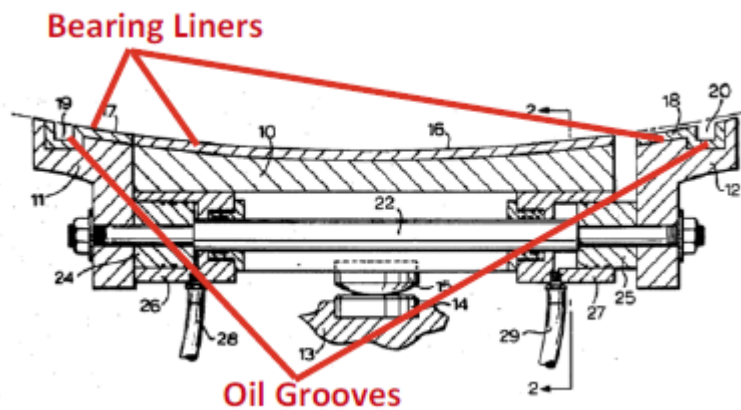
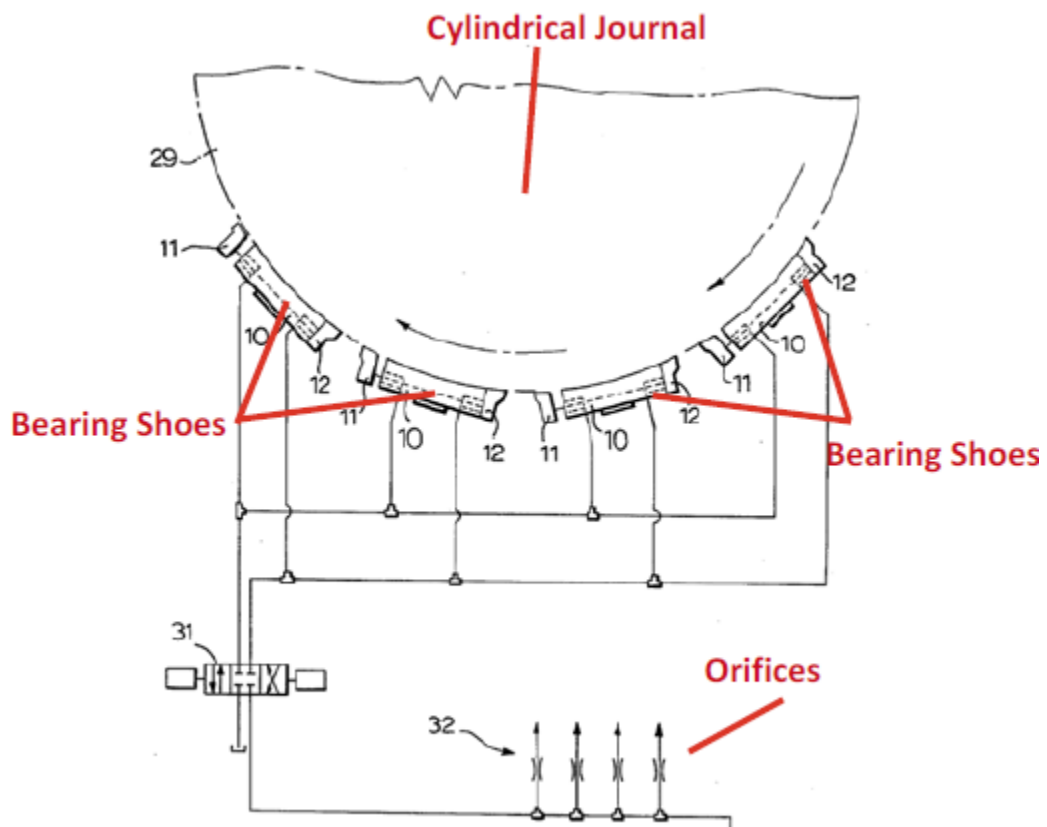
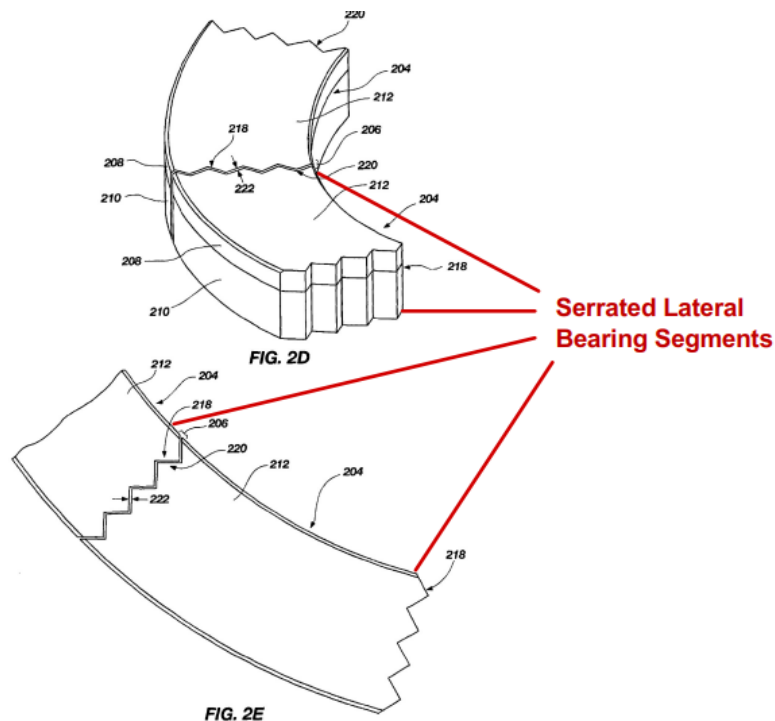


Figure 3 (shown below) depicts a journal supported by four bearings with lubricating oil for the bearing faces provided via a pressure fluid circuit and orifices 32. *Id.*, 3:3-15.



Ex. 1008 – U.S. 7,896,551

U.S. 7,896,551 discloses a hydrodynamic thrust bearing. “FIGS. 2D and 2E are isometric and plan views, respectively, that show the structure of the bearing segments 204 and the manner in which the bearing segments 204 may be assembled together.” Ex. 1008, 4:46-63. Those bearing segments have a “serrated geometry” that helps “provide a tortuous path to limit fluid leakage radially through the seams 206.” *Id.*



Ex. 1009 -- Trygg et al.

Trygg discusses fixed-mounted and self-aligning fluid bearings for journals of grinding mills. Ex. 1009, p.105. Among other features, the base of the fluid bearing in Figure 2 is “fixedly mounted” to the frame. *See Smith*, ¶68.

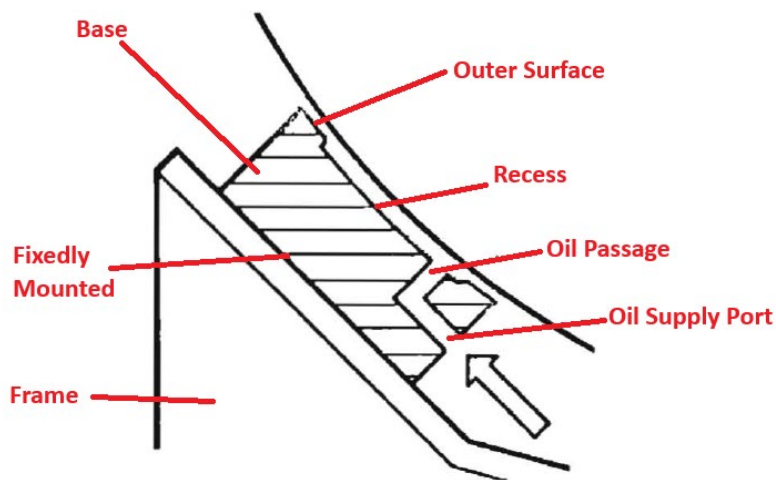


FIGURE 2. Separation of surfaces by oil film.

In contrast, Figure 4 of Trygg, shows a self-adjusting bearing.

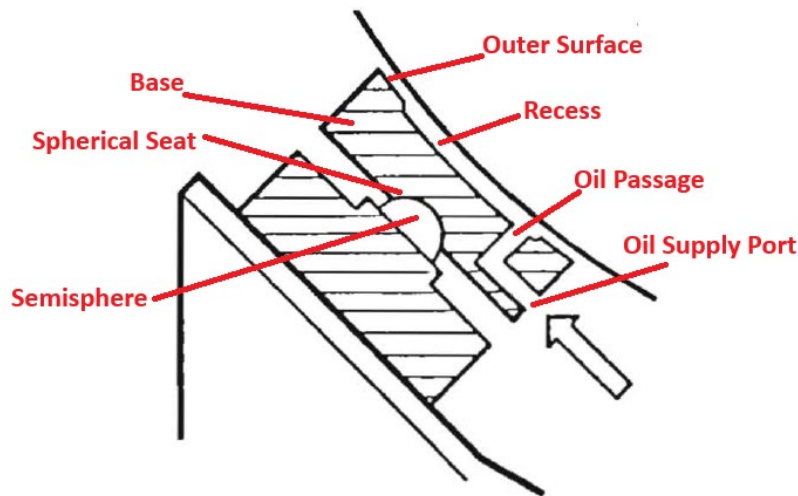


FIGURE 4. Articulated shoes.

The base of the fluid bearing includes a spherical seat formed in its bottom surface that is mounted on a semisphere. Ex. 1009, p. 106. Trygg explains that the spherical seat and the semisphere allow the base (sliding shoe) to self-adjust, i.e., to “be able to tilt and turn in all directions” to compensate for “errors in form and angular misalignments in the girth ring.” Ex. 1009, p. 106.

Trygg also notes that “[h]ydrostatic shoe bearings can be used to advantage to take axial loads as well. If axial location in both directions is required, it is possible to choose between the two methods as shown in Figure 9.” Ex. 1009, p. 107; *see also* Smith, ¶72.

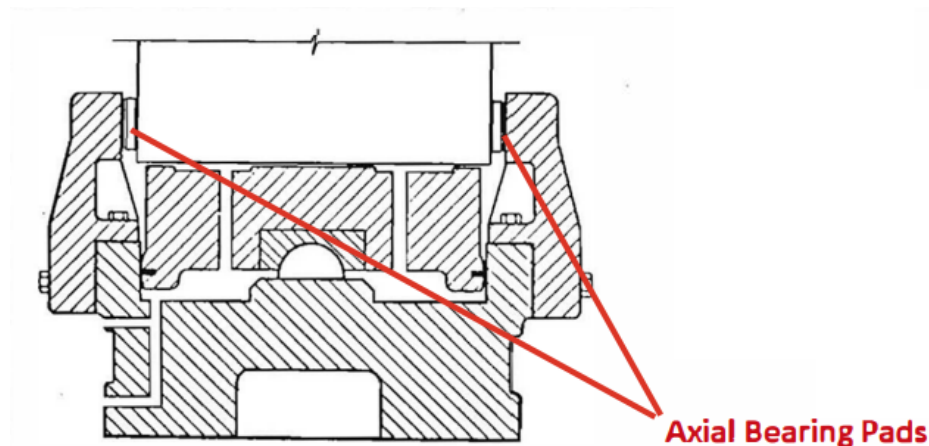
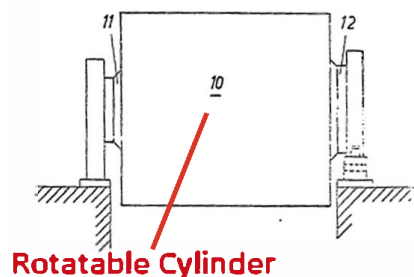


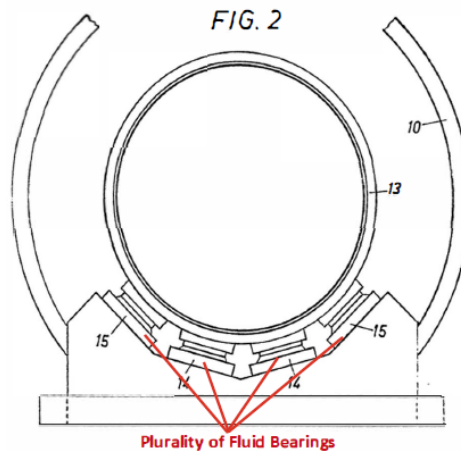
FIGURE 9. Hydrostatic thrust bearing arrangements.

Ex. 1010 – U.K. Patent Pub. No. GB1330484 (“GB484”)

GB484 discloses “a bearing for supporting heavy rotatable machine elements, such as the cylinders of stone crushers.” Ex. 1010, 1:13-16. The stone crusher includes “a rotatable cylinder” and “shaft ends 11 and 12 of which are carried by bearings, which are bearing units 14 and 15.” *Id.*, 2:36-50. Figures 1 and 2, below, show a bearing assembly for supporting a journal (bearing ring 13) of grinding mill body (rotatable cylinder 10), the bearing assembly comprising a frame (Figure 2) and a plurality of fluid bearings (bearing units 14/15).

FIG. 1





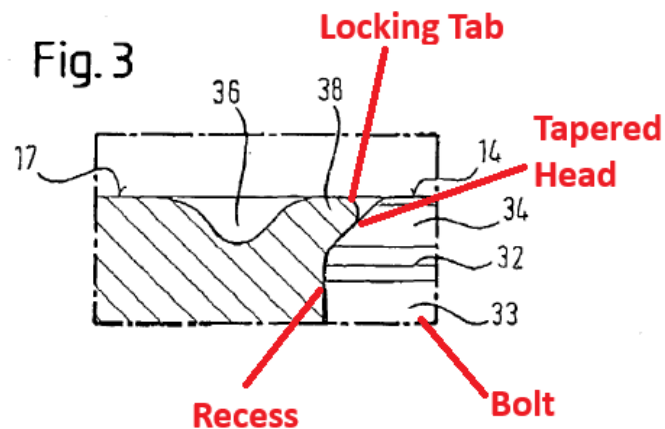
The fluid bearings (bearing units 14) are mounted to the frame so that they self-adjust to changes in the angular position of the journal (bearing ring 13). *Id.*, 3:13-10.

Ex. 1011 -- U.S. Patent No. 5,333,804

U.S. Patent No. 5,333,804 shows an agitator mill with a polymeric bearing 18a “formed from a low friction polymeric material.” Ex. 1011, 3:45-49.

Ex. 1012 -- Higgins, R.A. *Materials for Engineers and Technicians*. 4th ed., Elsevier, 2006.

Higgins is an engineering textbook that discloses the use of PTFE (“Teflon”), a polymer, as a bearing surface due to its “very low coefficient of friction” (Ex. 1012, p. 255) and that “bearing surfaces coated with PTFE can be used without lubrication....” *Id.* Due to its low coefficient of friction, “PTFE is widely used as a bearing material....” Ex. 1012, p. 282.

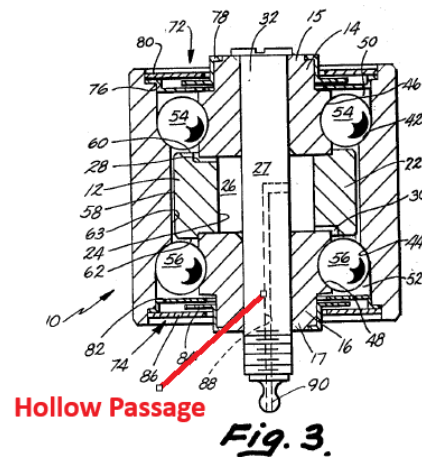


Ex. 1016 – U.S. Patent No. 2,744,799

U.S. Patent No. 2,744,799 discloses a bearing with a leading-edge chamfer 100 and a trailing edge chamfer 101. Ex. 1016, 7:26-34.

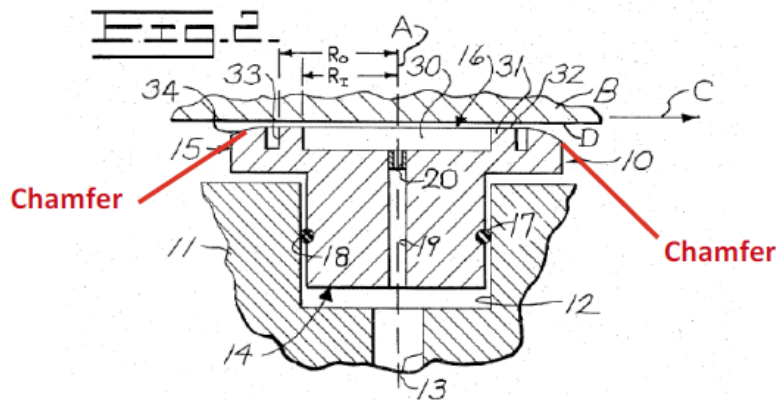
Ex. 1017 – U.S. Patent No. 4,408,808

U.S. Patent No. 4,408,808 teaches a bearing 10 that “is mounted using hollow bolt” such that the “bearing 10 may be relubricated by introducing lubricant into reservoir 26 through hollow bolt 32.” Ex. 1017, 3:55-62. The hollow bolt 32 has a passage 88 and is positioned to both provide a passage for lubricant and to mount the bearing 10. *Id.*, 4:2-9.



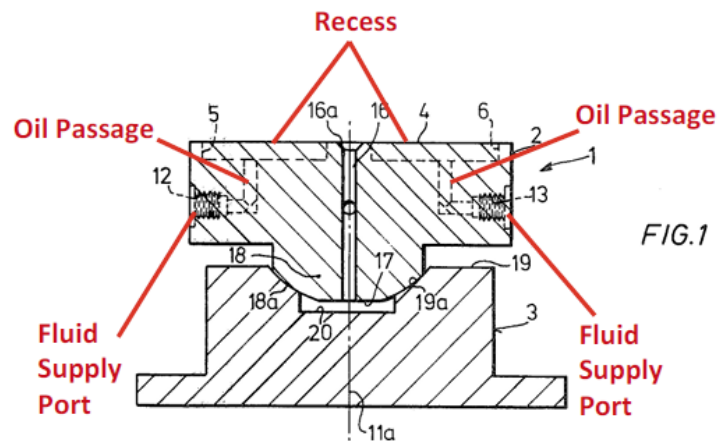
Ex. 1018 – U.S. Patent No. 3,799,628

The '628 Patent discloses a hydrostatic bearing with chamfered edges “to prevent[] any sharp peripheral edges from being prominently exposed to the runner surface D thereby eliminating gouging thereof.” Ex. 1018, 2:65-3:3 and Figure 2.



Ex. 1019 – U.S. Patent No. 4,430,926

The '926 Patent discloses a hydrostatic bearing with a plurality of recesses coupled to plurality of oil passages and a plurality of fluid supply ports. Smith, ¶93.



General Knowledge of Material Properties and Uses of Polymers with Bearings

FLS experts note that the use of a polymer as a low friction alternative to other bearing surfaces was generally known to the POSITA before the filing of the '604 Patent. Smith, ¶¶97; Wipf, ¶¶35-38. And, as noted below, the POSITA would have had a reasonable expectation of success using a polymer as the pad or liner of a hydraulic bearing. *Infra* p. 36. Polymers are appropriate for use on bearing surfaces due to a “very low coefficient of friction.” Smith, ¶79 (citing Ex. 1012, p. 255). *See also* Ex. 1012 at 282, 257, 259, 261, and 267 (discussing numerous

different types of polymers suitable for use as a bearing surface). This low coefficient of friction “improve[s] the sliding properties” of the bearing surface. Ex. 1005, ¶ [0011]. Polymers also “exhibit favourable stability and stiffness, are lightweight, have low coefficients of friction, and can be immersed in oil without damage.” Smith, ¶82 (citing Ex. 1013, ¶ 30). This is “advantageous” when used on a bearing “since a polymer with these properties will deform slightly while under pressure, so that the bearing has more ‘give’. This allows a better fluid film thickness to be built up during hydrodynamic operation.” Ex. 1013, ¶30.

General Knowledge Regarding Common Fasteners and Hollow Bolts.

The use of bolts and screws to mount a pad or liner to the shoe or base of the bearing is also general knowledge and well within the scope of what the POSITA would have. Smith, ¶101; Wipf, ¶¶39-40. “Pre-drilling or manufacturing holes in the pad prior to placing the screw or the bolt is a known method of preparing a device to be mounted onto a base.” Smith, ¶101. Among the many different fasteners that could be used, “hollow bolts, bolt plugs, covers, and tabs are all well-known temporary fastening devices.” *Id.* These are “commonly used on a device that one may wish to remove at some future date due to normal wear or breakage.” *Id.*; *see also, supra* p. 16 (noting use of hollow bolt in prior art reference that provides both a passage for lubrication for the bearing and a means of mounting

the bearing) and *supra* pp. 24-25 (citing use of locking tab for retaining the head portion of a threaded fastener for retaining a bearing pad).

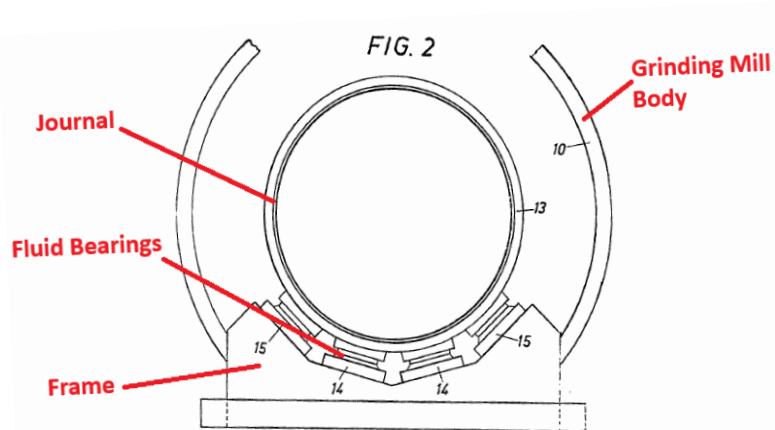
General Knowledge of Chamfers

The use of a chamfer at an outer edge of a bearing pad to retain lubricating fluid at the outer edge and transfer lubricating fluid to the journal was within the general knowledge of the POSITA. Smith, ¶107; Wipf, ¶¶56-58. A chamfer is a transitional surface between two adjacent faces. For bearing pads, the POSITA understands the bearing surface has “a leading edge, or the edge of the pad first encountered by a point on the rotating surface (e.g., of a mill), and a trailing edge, or the opposite edge of the pad that is last touched by the point on the rotating surface of the mill.” Smith, ¶108. A right angle on either the leading or trailing edge of a bearing pad can contribute to lubrication being “scraped” off. The POSITA would understand that a chamfered edge helps minimize the amount of lubrication that is removed from the bearing pad, while providing space for the film of lubricating fluid to develop. *Id.*

General Knowledge of Numerous Bearings

It is also common knowledge to use a plurality of bearings in connection with a rotating body. Smith, ¶112; Wipf ¶¶41-42. Generally speaking, at least two points of contact on a rotating cylindrical mill would be used to support a journal as it rotates. One could theoretically use a large single bearing across an entire

bottom surface but that would be unnecessarily costly because of the increased surface area of the bearing to extend from one side to the other and can be more difficult to service. That said, examples of multiple bearing journal mills are common knowledge as shown in Figure 2 of GB484 (shown below). Ex. 1010. *See* also Smith, ¶112.



General Knowledge of Self Aligning vs. Fixed Bearings

The use of either “self-aligning” or “fixed” fluid bearings was well within the general knowledge of the POSITA. Fixed fluid bearings are exactly what the name suggests. The bearing itself is fixed to a frame and does not move substantially with respect to the load it is encountering. Self-aligning fluid bearings are engineered to pivot or tilt to account for an uneven load. Smith, ¶113; Wipf, ¶43. The ultimate decision to use one over the other is a matter of design choice. For example, if a rotating system encountered relatively low-weight or evenly distributed loads, the use of a fixed fluid bearing might be desirable over a self-

aligning. The self-aligning can comprise more components that cost more money, could fail, and/or require maintenance. Smith, ¶113; Wipf ¶43. In contrast, a POSITA that encounters a system with relatively heavy or uneven loads would likely want a self-aligning or tilting bearing. Smith, ¶113. Heavier rolling loads can have asymmetric weight distribution during operation causing variable radial and circumferential loads on the bearing. The POSITA “would look to understand engineering needs and then apply the proper known engineering solution to that need.” *Id.*

General Knowledge of Multiple Fluid Passages, Fluid Supply Ports, and Interconnecting Passages on Bearings

The use of multiple passages to distribute a fluid to the surface of a fluid bearing was within the general knowledge of one of ordinary skill at the time the '604 Patent was filed. Smith, ¶115; Wipf, ¶¶52-55. Fluid bearings were a mature technology when the '604 Patent was filed. The '604 Patent itself notes the “currently in use” hydrostatic bearing system has a recess machined into a bearing to receive high pressure oil. *Supra* pp. 7-8. That high pressure oil is delivered to the recess in many ways, including closed vessels or passageways in the bearing pad itself. Smith, ¶115.

It was generally known that one could use one passageway or multiple passageways. The POSITA would evaluate a number of factors in making this

determination, including number of recesses on a bearing pad and the amount of pressure that would be encountered on the bearing pad surface. Smith, ¶116; Wipf ¶53. GB384, for example, shows one fluid passageway 20 for one recess 18. *Supra* p. 17. By way of comparison, the '926 Patent and Trygg show multiple passageways to multiple recesses. *Supra* pp. 18, 27; see also Smith, ¶74.

It was also general knowledge that in order for lubricating fluid to enter a passageway in the base of the bearing, an opening (i.e., a port) must be present. Otherwise, there would be no way of providing fluid to the passageway. Smith, ¶117. It logically follows that if one were to have multiple passageways there would be multiple ports on the bearing. *Id.*

Finally, it was also general knowledge to have some opening or interconnecting passage between the recess of the bearing pad or liner to communicate with the fluid passageway in the shoe. If not, there would be no way for fluid to move from the passageway in the shoe to the recess within the bearing pad. Smith, ¶118.

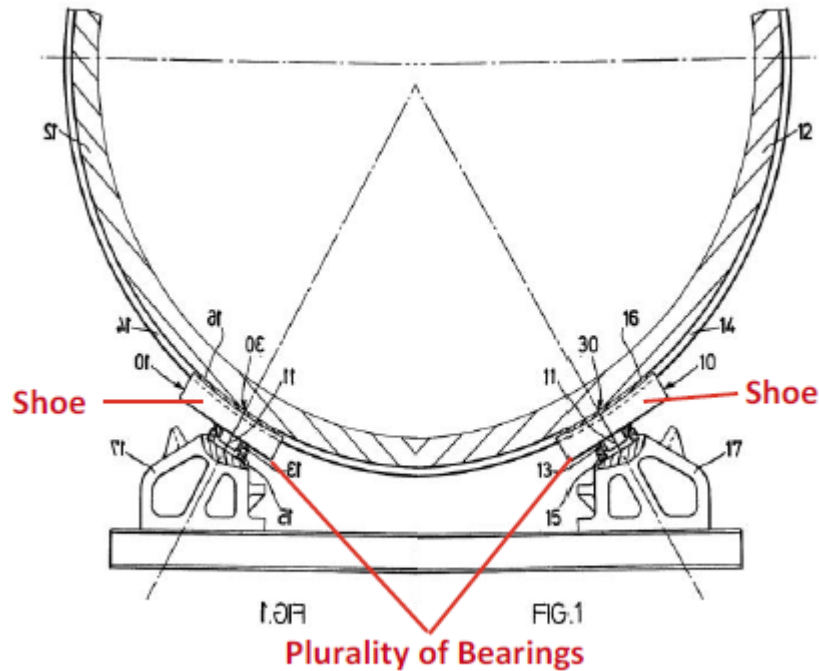
VIII. GROUNDS OF UNPATENTABILITY

A. GROUND 1: Claims 1-5, 7, 10-15, 17, 20-22 and 25-26 are Obvious under 35 U.S.C. § 103 in view of GB384 and DE364.

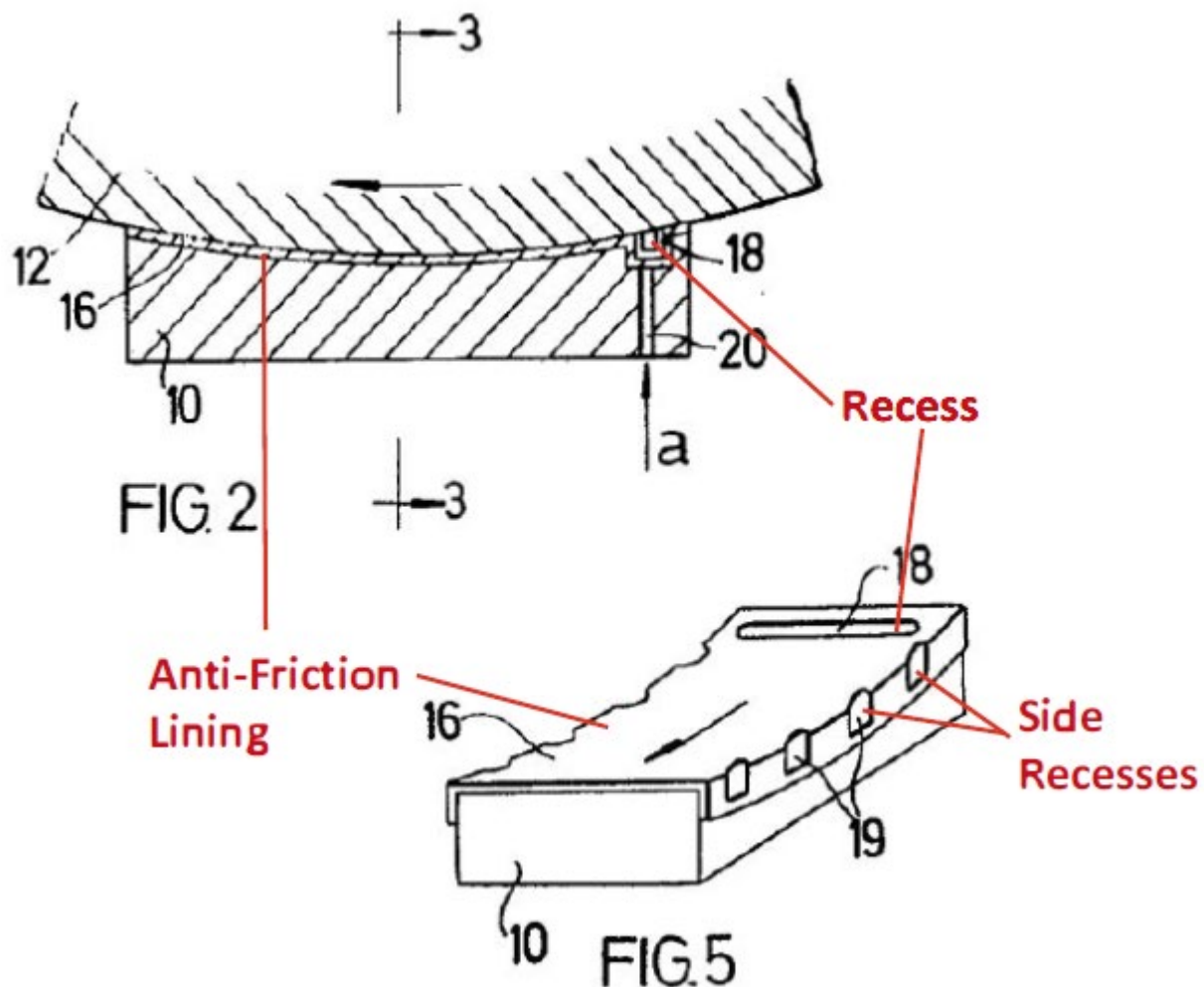
1. Independent Claim 1

[1a and 1b] *A bearing assembly for supporting a journal of a grinding mill body, comprising a frame and a plurality of fluid bearings comprising a frame and a plurality of fluid bearings, said fluid bearings each comprising a polymer bearing pad mounted to a base, said polymer bearing pad comprising an outer surface*

GB384 discloses a plurality of bearings 10 coupled to a frame 17 for use with a “tubular grinding mill.” Ex. 1003, 3:25-27. A plurality of bearings are tacitly disclosed as the specification describes that “a supporting device shown in Figure 1 is intended to support a rotating body 12 of large diameter; an identical device is arranged symmetrically relatively to a vertical plane containing the axis of the rotating body 12.” Ex. 1003, 2:33-38. *See also* Smith, ¶123. It is common knowledge to use a plurality of bearings to support a rotating body, including mills. *See, e.g., supra* pp. 29-30 (discussing well-known principles common to fundamental engineering, including a plurality of supports having their own bearings). Smith describes how a mirror image of FIG. 1 of GB384 placed next to the original illustrates that tacit disclosure. Smith, ¶124.



GB384 also comprises “[a]n upper face of the shoe 10 and an upper portion of the sides thereof are covered with a lining 16 of anti-friction material. Recesses 19 (Figure 5) forming containers for oil are formed in the sides of the shoe 10.” Exhibit 1003, 4:69-74. “[R]ecesses 22 allow the oil to flow from the channel 18 into the groove 24 and then into the lateral containers 19 for oil, to provide lubrication for the sides of shoe 10.” Exhibit 1003, 2:114-117.



GB384 does not identify the composition of its bearing pad. Rather, it simply states it is an “anti-frictional lining 16.” The use of a polymer as the anti-frictional lining 16 in GB384 was within the general knowledge of POSITA. Smith, ¶¶97-99. GB384 itself states that its bearing pad can help avoid an undesired “shearing stress on a film of oil formed between the shoe and rotating body,” which is “harmful to the stability of said film and may consequently have been detrimental to lubrication of the sliding surfaces.” Ex. 1003, 1:26-32.

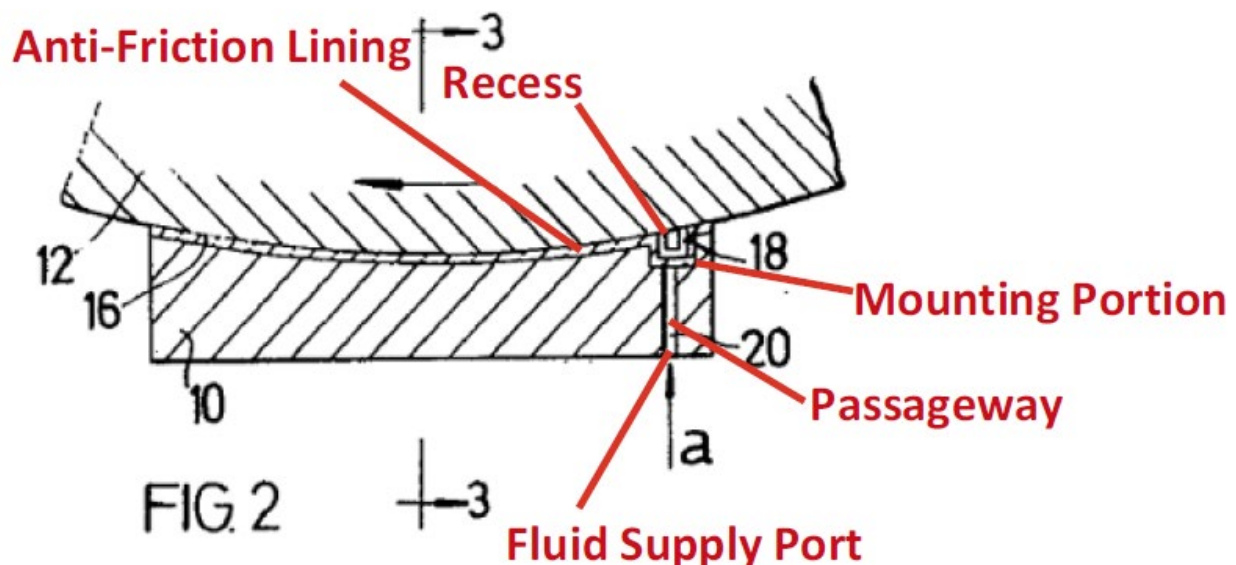
POSITA would have understood that the anti-frictional properties of polymers are a known substitute for the “anti-friction” liner of GB384 and would have had a reasonable expectation of success in making that substitution. Those properties include “favourable stability and stiffness, are lightweight, have low coefficients of friction, and can be immersed in oil without damage” and the advantage of deformation under pressure resulting in more “give.” Smith, ¶¶97-99. “This allows a better fluid film thickness to be built up during hydrodynamic operation.” *Supra* p. 28.

That said, DE364 expressly teaches that “preferred material” for the bearing is “thermoplastic, for example polyether ketone (PEEK) polyamide-imide (PAI) or polyimide (PI), which is preferably supplemented with a small amount of polytetrafluoroethene (PTFE) and / or graphite to improve the sliding properties.” Ex. 1005, ¶ [0011].

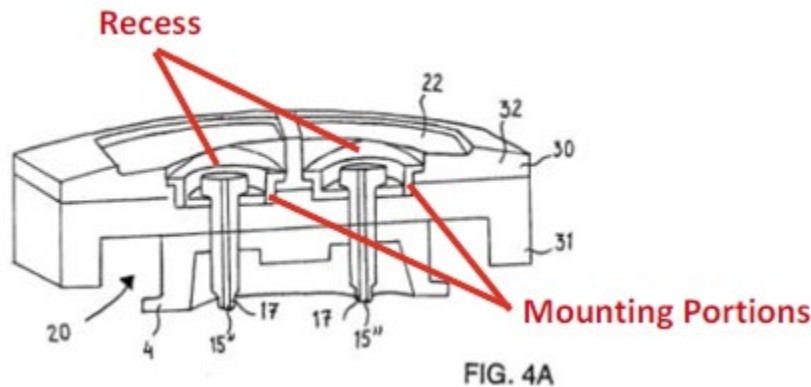
[1c and 1d] at least one recess for receiving lubricating fluid from at least one passage of said base and distributing said lubricating fluid to said outer surface and mounting element for securely mounting said polymer bearing pad to said base, said base also comprising at least one lubricating fluid supply port in fluid communication with said at least one passage

GB384 discloses a base (i.e., the shoe 10) with at least one passage (i.e., the duct 20). The bearing pad (the anti-friction lining 16) has at least one recess (the channel 18/oil containers 19) that receive lubricating fluid from at least one passage (duct 20) and is disposed on the outer surface of the lining 16. *See* Ex.

1003, 1:20-32; *See also* Smith, ¶133. A fluid supply port in communication with the duct 20 is necessarily present in Figure 2 at the bottom of the shoe 10. *Id.* The upper surface of the shoe 10 has a surface (i.e., a mounting element) whereon the anti-friction lining 16 is mounted. Specifically, the anti-friction liner 16 of GB384 comprises a corner abutted against an edge of the shoe 10 as shown below. *Id.*



DE364 also discloses mounting portions that mount the polymer bearing pad 30 to the base 31. “The mounting portion is a downward protrusion extending from the bottom of the pad 31 for placement within the recesses on the top of the base 31 as shown below in Figure 4A.” Smith, ¶134.



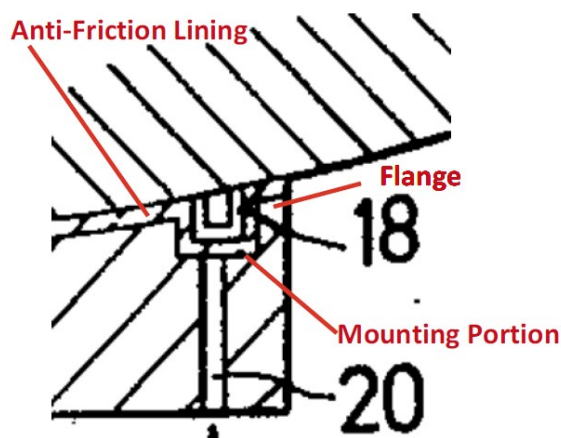
[1e] wherein said base is mounted to said frame so that said fluid bearings self adjust to changes in the angular position of the journal during operation of said grinding mill body.

GB384 notes “[t]he shoe comprises an extending portion 11 fitted into a central bore of an annular member 13 forming a ball joint. The member 13 has a part-spherical lower surface and a centre 30 situated on the sliding surface of the shoe 10.” Ex. 1003, 3:45-51. By mounting the shoe 10 atop a member 13 having a part-spherical lower surface, shoe 10 “self adjusts” to angular movements of the rotating body 12. Smith, ¶135. The shoe 10 “self-adjusts” by virtue of the layer of lubricating oil deposited on the outer surface of the anti-friction lining 16 (i.e., the pad) in connection with the part-spherical annular member formed in the ball joint.

Id.

2. **Dependent Claim 2.** *The bearing assembly of claim 1, wherein said mounting element comprises a mounting portion extending from said polymer bearing pad, said mounting portion comprising a protrusion from a mounting surface opposite to said outer surface for engaging a flange of said base, said flange being located at an outer edge of said base.*

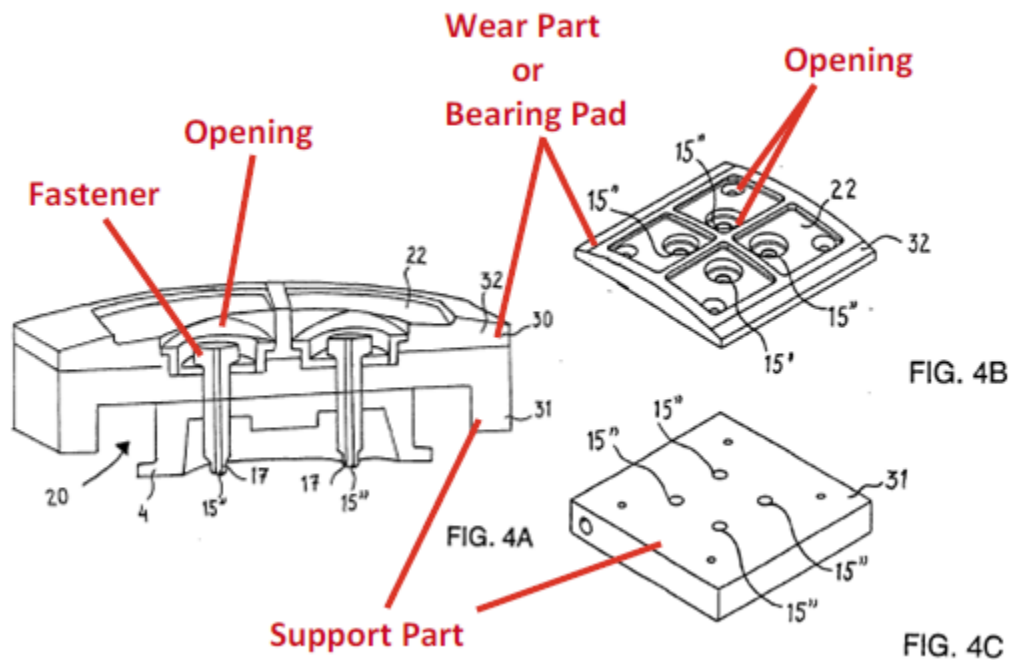
Figure 2 and 4 of GB384 disclose the mounting portion. The mounting portion has a protrusion extending up from the anti-friction liner 16 (i.e. the mounting surface). It is opposite the outer surface of the liner and engages a flange of the shoe 10. The flange is on the outer edge of the shoe 10. Smith, ¶137.



3. **Dependent Claim 3.** *The bearing assembly of claim 1, wherein said mounting element comprises at least one opening for receiving at least one fastener for mounting said polymer pad to said base; said at least one recess comprises a locking tab for retaining a head portion of said fastener within said at least one recess and said at least one fastener comprises a bore for conveying lubricating fluid from said at least one passage to said at least one recess.*

DE364 discloses an opening in a “mounting element” for receiving at least one fastener for mounting a pad to a base. Smith, ¶139. The fastener in DE364

comprises a bore for conveying lubricating fluid from a fluid passage to a recess on the pad for lubrication of the bearing. *Id.* The “support element 20 comprises a surface part 32, i.e., a bearing part, and a support part 31. The support element 20 is attached to the loading piston 4 via the nozzles 17, in which the medium channels, i.e., the capillaries 15”, run. The surface part 30 of the support element 20 acts as a bearing.” Exhibit 1005, ¶[0025]. “The replaceable wear part 30 thus consists of the part 32 acting as a bearing material which, together with its support part 31, is removably attached to the remainder of the shoe structure, for example by means of the nozzles 17.” *Id.*



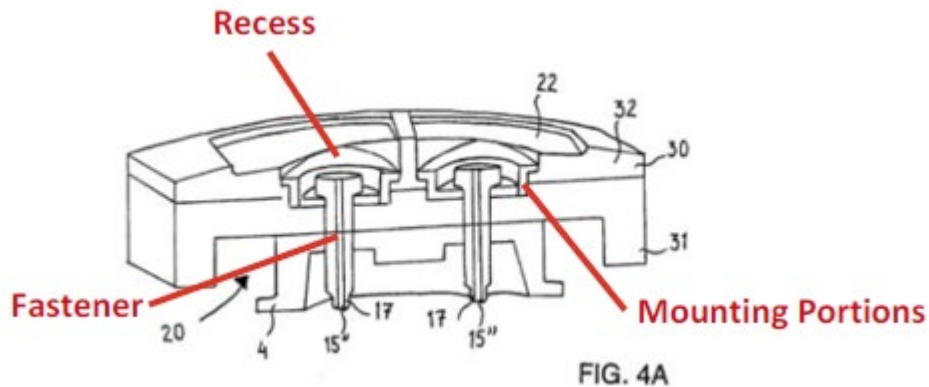
As noted by Smith, “fasteners (i.e., the nozzles 17) are placed in an opening within recess 22 of the polymeric bearing pad 20. The fasteners have a bore

(described as a capillary 15”) that provide oil to the polymeric bearing pad for lubrication.” Smith, ¶142. See also *id.* at ¶138 (where it is general knowledge to have an “opening for receiving a fastener and a recess for having a locking tab to secure the head of the fasteners in place” as well as “use of hollow bolts” for conveying lubrication.)

There is no locking tab shown in DE364. However, Smith notes that “it would be a simple and predictable modification with a predictable outcome for one of ordinary skill [] to provide a locking tab if any extra locking mechanism was desired” at least because the POSITA would use “a locking tab for the fastener so that it did not back out due to vibration as the mill rotated, and made contact with the mill journal causing damage and requiring expensive maintenance.” Smith, ¶143.

- 4. Dependent Claim 4. *The bearing assembly of claim 1, wherein said mounting element comprises at least one opening for receiving at least one fastener for mounting said polymer pad to said base, said bearing assembly further comprising a locking element for retaining said at least one fastener within said at least one recess.***

DE364 discloses a bearing with a plurality of openings that are countersunk to receive “screws” to fasten the pad onto the mounting surface 31 as well as the nozzles 17. Smith, ¶144. The countersunk portion in the recess comprises a mounting element.



Moreover, it was within the general knowledge of POSITA to have an opening for receiving a fastener and locking elements for securing fasteners in place. *See supra* p. ¶41. And adding a locking element such as a “liquid thread locker” to secure the fastener is well within the general knowledge of the skilled artisan. Smith, ¶144.

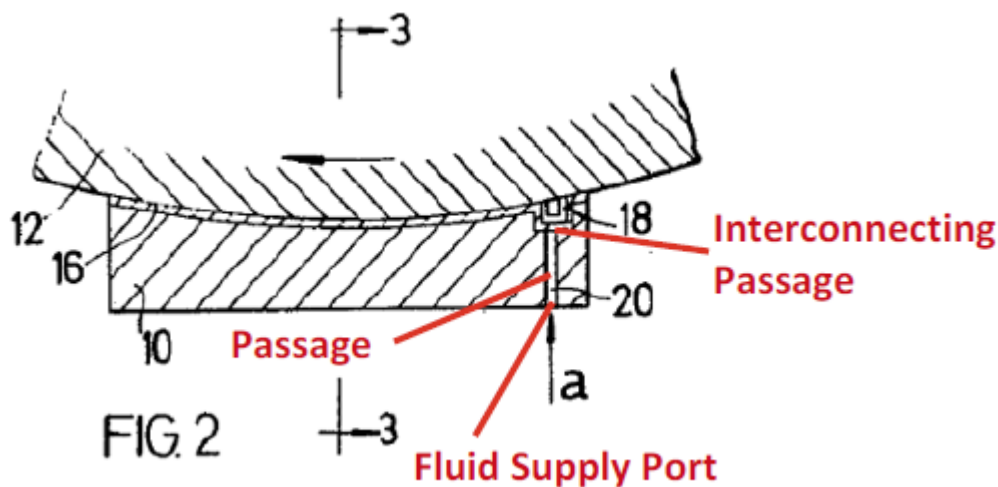
- 5. Dependent Claim 5.** *The bearing assembly of claim 1, wherein said polymer bearing pad substantially covers an outer surface of said base to create a fluid seal between said polymer bearing pad and said base.*

GB384 notes that “[a]n upper face of the shoe 10 and an upper portion of sides thereof are covered with a lining 16 of anti-friction material.” Ex. 1003, 2:69-71. Figure 2 and 5 of GB384 shows the lining fully covering the upper surface of shoe 10 including the recess 18. Smith, ¶145. Thus, the anti-friction lining 16 covers the entire upper surface of the shoe 10 and creates a fluid seal between the pad and the base. *Id.*

The '604 Patent itself notes that “typical” hydrostatic bearings have a “bearing pad” that can “form a seal with the base.” Ex. 1001, 2:35-41. Smith notes that “[t]he formation of the fluid seal is important to help keep the oil or fluid where it is designed to be, and to keep it out of places where it is not supposed to be. This affects the cleanliness, minimizes fluid loss, and decreases the required maintenance. Smith, ¶145.

6. **Dependent Claim 7.** *The bearing assembly of claim 1, said at least one recess of said polymer bearing pad comprises at least one interconnecting passage for fluidly connecting said at least one recess to said at least one passage of said base.*

“GB384 discloses an interconnecting passage from recess 18 in the anti-frictional liner 16 (i.e., the bearing pad) to at least one passage 20 in the base 10.... The interconnecting passage is what allows fluid to move from the passage 20 into the recess 18.” Smith, ¶146.



7. Dependent Claim 10. *The bearing assembly of claim 1, wherein said polymer bearing pad is removably mounted to said base.*

DE364 discloses a polymer bearing pad that is removable in that it is secured to a base by a “dovetail connection, screws or other fit” to enable replacement. Ex. 1005, ¶[0025]. The polymer bearing pad of DE364 is in fact referred to as a “wear part 30.” *Id.* “The replaceable wear part 30 thus consists of the part 32 acting as bearing material, which, together with its support part 31, is removably attached of the remainder of the shoe structure, for example by means of the nozzles 17.” *Id.* Removable bearing pads are well within the general knowledge of the POSITA. *See supra* pp. 24, 29. “It is not uncommon to make a part of a device that is ‘disposable’ meaning intended to wear out over time, or ‘sacrificial’ meaning a less expensive part designed to fail first, preventing failure of other more expensive parts. Both disposable and sacrificial parts are designed to be removable. This reduces the need for costly repairs.” Smith, ¶147.

8. Independent Claim 11.

The claim elements recited in Claim 11 are identical to those of Claim 1 except that the fluid bearing of Claim 1 recites a “self-adjusting” bearing whereas Claim 11 recites “wherein said base is fixedly mounted to said frame.” All of the elements shared by Claim 11 are present in the prior art and obvious for the same reasons noted above for Claim 1. *See supra* pp. 13-14.

With respect to the “fixed bearing” limitation, it is well within the general knowledge of POSITA to fix the bearing depending on the particular desire of the user. *See supra* pp. 30-31. (discussing at length the different advantages and benefits of fixed bearings vs. self-adjusting bearings and why the POSITA would choose one or the other).

9. Dependent Claims 12-15, 17 and 20.

Other than their base claim, Claims 12-15, 17 and 20 are the same as Claims 2-5, 7 and 10, respectively. As such, they are obvious under Ground 1 for the same rationale provided in those claims.

10. Independent Claim 21.

[21a and b] *A multidirectional fluid bearing for a journal, comprising: a base having a first surface orthogonal to a second surface, one or more lubricating fluid supply ports and a plurality of passages in fluid communication with said lubricating fluid supply ports, said first surface and said second surface,*

GB384 discloses a multidirectional fluid bearing for a journal having a base with a first surface of liner 16 is clearly orthogonal to a second surface of liner 16 disposed about the side of the shoe 10. Smith, ¶172.

“The upper portion of each of the plurality of recesses 19 are fluid supply ports” and “act as an entrance to the ‘container’ formed by the recess 19.” Smith, ¶173. Passageway 20 connects directly with recess 18 and then to recesses 19.

Smith, ¶175, And the sloping recesses 22 act as a plurality of passages in fluid communication with the supply ports.” Smith, ¶173.

In addition to the foregoing, a plurality of passageways and a plurality of fluid supply ports or openings in a bearing shoe was general knowledge to the POSITA. Smith, ¶218. The POSITA would have had a reasonable expectation of success adding multiple passageways and multiple ports to accommodate delivery of lubricating fluid to a plurality of bearing surfaces, particularly where there is a plurality of recesses on the bearing surface. *See also, supra* p. 18.

[21c] a first polymer bearing pad mountable to said first surface, said polymer bearing pad having a first outer surface and at least one recess for receiving lubricating fluid from at least one of said plurality of passages and distributing said lubricating fluid to said first outer surface, and

GB384 discloses an anti-friction 16 lining mounted on the first surface with a recess 18 for receiving lubricating fluid from passageway 20 and distributing oil to the surface.

DE364 discloses the use of a polymer bearing liner with at least one recess for receiving fluid from a plurality of passages to a first outer surface. *See supra* p. 16. In addition, the POSITA would have had general knowledge that a polymer was one of the many options available for use as a bearing pad and would have had a reasonable expectation of success using a polymer as the “anti-friction liner 16” of GB384. *See supra* p. 27.

[21d] a second polymer bearing pad mountable to said second surface, said second polymer bearing pad having a second outer surface and at least one recess for receiving lubricating fluid at least one of said plurality of passages and distributing said lubricating fluid to said second outer surface,

GB384 discloses an anti-friction lining 16 mounted on a second surface with a plurality of recesses 19 for receiving lubricating fluid from passageway 20. *See supra* p. 45. DE364 discloses the use of a polymer bearing liner with at least one recess for receiving fluid from a plurality of passages to a first outer surface. *See supra* p. 16. And the POSITA would have had general knowledge that a polymer was one of the many options available for use as a bearing pad and would have had a reasonable expectation of success using a polymer as the “anti-friction liner 16” of GB384. *See supra* pp. 27-28.

[21e] wherein at least one of said first and second polymer bearing pads comprises at least one opening for receiving at least one fastener for mounting said at least one polymer bearing pad to said base,

DE364 discloses a polymer bearing pad with at least one opening for receiving at least one fastener 17 for mounting the bearing pad 30 to the base 31. *See supra* p. 16.

[21f] wherein said at least one recess comprises a locking tab for retaining a head portion of said fastener within said at least one recess, said head portion being tapered to facilitate retention of said at least one fastener within said at least one recess by said locking tab,

Locking tabs and tapered fastener heads are within the general knowledge of POSITA. The POSITA could easily choose to implement this general knowledge

to assist in minimizing bolts from coming loose based on the vibration and operation of the bearing. *See supra* p. 28 (citing Smith, ¶101).

[21g] and wherein said at least one fastener comprises a bore for conveying lubricating fluid from said at least one passage to said at least one recess, said at least one fastener being partially received in said at least one passage.

DE364 discloses a fastener (i.e., the nozzle) with a bore 15” for conveying lubricating fluid from a passage to the recess on a polymer bearing pad. In DE364, the fastener is partially received in the passage for conveying lubrication. Smith, ¶183. That said, Smith notes that placing “a hollow fastener into the passageway is a generally known method of forming a seal between the cavity for receiving the hollow fastener and the passageway. This minimizes the likelihood that lubricating fluid from the passageway will seep past the hollow fastener in the cavity rather than moving through the bore of the fastener. A POSITA would be motivated to utilize a fastener comprising a bore to minimize the number of holes needed to be manufactured in the base and the polymer bearing pad, reducing manufacturing and maintenance costs.” *Id.*

11. Dependent Claim 22.

Aside from its dependency on Claim 21 and the claim elements recited therein, the elements recited in Claim 22 are substantially the same as those recited

in Claim 5. *See supra* pp. 42-43. The claim elements recited in 22 are present in the prior art as noted in Claim 5 and obvious for the reasons presented therein.

12. Dependent Claim 25.

Aside from its dependency on Claim 21 and the claim elements recited therein, the elements recited in Claim 25 are substantially the same as those recited in Claim 2. *See supra* p. 39. The claim elements recited in 25 are present in the prior art as noted in Claim 2 and obvious for the reasons presented therein.

13. Dependent Claim 26. *wherein said first outer surface is partially curved such that said first polymer bearing pad acts as a radial hydrostatic bearing and said second outer surface is substantially planar such that said second polymer bearing pad acts as an axial bearing.*

GB384 shows the first outer surface of lining 16 is partially curved and acts as a radial hydrostatic bearing. Smith, ¶186. GB384 also shows that the second outer surface is substantially planar and acts as an axial bearing “[t]o take up axial forces.” Ex. 1003, 1:67-70. *See also* Smith, ¶187.

B. Motivation to Combine GB384 and DE364.

The POSITA would be motivated to combine GB384, DE364 and the general knowledge in the art. GB384 “is applicable to all supporting and thrust-bearing devices for rotating parts sliding on shoes by means of a hydrostatic or hydrodynamic film of oil.” Ex. 1003, 3:20-24. It is particularly applicable to “bearings of tubular grinding mills and bearings supporting rotary oven wheels.”

Ex. 1003, 3:20-27. DE364 discloses a rotary thrust bearing for a press machine.

Ex. 1005, ¶¶ [0002] and [0003].

The bearing pad of GB384 helps avoid any undesired “shearing stress on a film of oil formed between the shoe and rotating body,” which is “harmful to the stability of said film and may consequently have been detrimental to lubrication of the sliding surfaces.” Ex. 1003, 1:20-32. The use of a polymer as that anti-friction lining is expressly discussed in DE364 which states its bearing pad is a polymer that helps improve “sliding properties.” Smith, ¶189 (citing Ex. 1005, ¶[0011]). In other words, the use of a polymer as a bearing pad was a known solution to a known technical problem (i.e., that of helping decrease friction and improve the sliding properties of the bearing.) Thus, the POSITA would have been motivated to use the improved sliding properties in DE364 as the “anti-friction liner” in GB384 and “would have been able to predict with a reasonable degree of success” in doing so. Smith, ¶189. *See also, supra pp. 27-28* (discussing general knowledge of the favorable properties of polymers for use as bearing pads).

In addition, DE364 recognizes the problem associated with wear and the need to replace bearing pads that have worn out. Using a replaceable bearing pad is a known solution to that problem. Smith, ¶190. This permits the POSITA to use one or more sections of the bearing pad and to temporarily fasten them to the bearing shoe. Using one or more “wear parts” is nothing more than a design choice

for POSITA. Smith, ¶193 (noting that DE364 teaches that pads can be made in a single piece or in multiple connecting pieces). A POSITA would be motivated to use multiple bearing segments from DE364 so that if only one part of the pad is damaged or worn, only one part needs to be replaced.

Hollow bolts, locking tabs, and other “locking elements” are within the general knowledge of POSITA. Smith, ¶191. The POSITA would be motivated to combine that general knowledge and the knowledge from the DE364 at least because the use of hollow bolts reduces the number of openings needed in the bearing pad and the shoe and reduces manufacturing and maintenance costs. Smith, ¶192. And the use of locking elements minimizes the risk that temporary fasteners prematurely loosen during operation. *Id.*

C. GROUND 2: Claims 6, 16 and 23 are Obvious under 35 U.S.C. § 103 Over GB384 in view of DE364 and further in view of the '799 Patent.

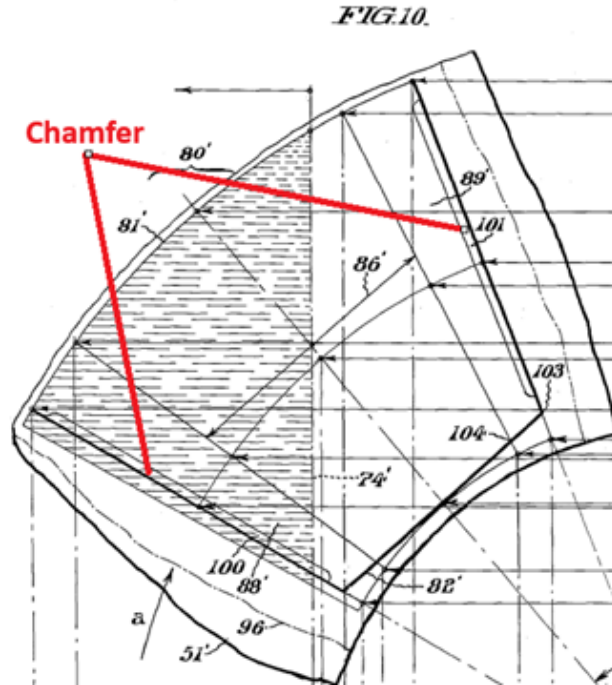
Claims 6, 16 and 23 recite similar limitations, the primary difference being that claim 6 depends from claim 1, where claim 16 depends from claim 11 and claim 23 depends from claim 21. Claims 1, 11 and 21 are obvious for the reasons stated above. *See supra* pp. 33-48. Claims 6, 16 and 23 are obvious as explained below.

- 1. Dependent Claim 6, 16 or 23. *further comprising a chamfer at an outer edge for retaining lubricating fluid at said outer edge and transferring said lubricating fluid to a journal, wherein said***

chamfer has an outer edge that is displaced from a journal when said journal engages said polymer pad.

The use of a chamfer on an outer edge of a bearing pad to help retain lubricating fluid on a bearing surface was within the general knowledge of POSITA at the time the '604 Patent was filed. Specifically, “a chamfer is well-understood to be a transitional surface or edge between two faces of an object...including, “a side surface and a top surface may typically adjoin at an edge that forms a right angle.” Smith, ¶107. For bearing pads, the POSITA understands that chamfers are used on “a leading edge, or the edge of the pad first encountered by a point on the rotating surface (e.g., of a mill), and a trailing edge, or the opposite edge of the pad that is last touched by the point on the rotating surface of the mill.” Smith, ¶108. The chamfers on these edges help minimize the amount of lubricating fluid that is removed from the journal thus helping build up the lubrication film distributed across the bearing surface. *Id.*

As shown in FIG. 10 below, the '799 Patent discloses a bearing with a leading-edge chamfer 100 and a trailing edge chamfer 101. Ex. 1016, 7:26-34.



That chamfer is described as forming “a face angled about 45 degrees” and configured “to receive the impact pressure of lubricant in a high speed bearing.” Smith, ¶110. The ’799 Patent shows a flat horizontal hydrostatic bearing wherein the “outside edge of the polymer bearing pad is displaced from the sliding surface.” Smith, ¶199.



D. Motivation to Combine GB384, DE364, and the '799 Patent.

GB384 teaches that the fluid bearing “is applicable to all supporting and thrust-bearing devices for rotating parts sliding on shoes by means of a hydrostatic or hydrodynamic film of oil.” Ex. 1003, 3:20-24. The ’799 patent discloses that “[w]hile the invention is widely applicable to thrust bearings having flat faced pivoted shoes, it is also applicable to journal bearings.” Ex. 1016, 1:30-32. The bearing pad from GB384 helps avoid an undesired “shearing stress on a film of oil formed between the shoe and rotating body,” which is “harmful to the stability of said film and may consequently have been detrimental to lubrication of the sliding surfaces.” Ex. 1003, 1:27-32. One of the objects of ’799 Patent is “to provide bearing means wherein the shape and thickness of the lubricant film may be predetermined to provide optimum conditions over a wide speed range.” Exhibit 1016, 1:55-58.

Smith testifies that “maintaining a consistent thickness and consistency of the lubricating fluid between the journal and bearing surface is important to reduce vibrations and protect the surface of the bearing pad.” Smith, ¶201. And that the chamfers “on the leading and trailing edges of the bearing pads prevent pressure build up and removes part of the concavity of the film as it traverses across the bearing surface.” *Id.* “This allows a stable, equilibrium condition at greater velocity.” *Id.* Exhibit 1016, 5:57-75. A POSITA would be motivated to combine the chamfer shown in the ’799 with GB384 and DE364 to “further lubricate the portion of the bearing pad between the leading edge and the recess in the pad where additional oil is supplied.” Smith, ¶201. Moreover, a POSITA “would have been motivated to include the chamfer on a journal bearing pad to reduce the impact pressure on the lubricant as it came back into contact with the bearing pad as taught in the ’799 patent.” Smith, ¶199.

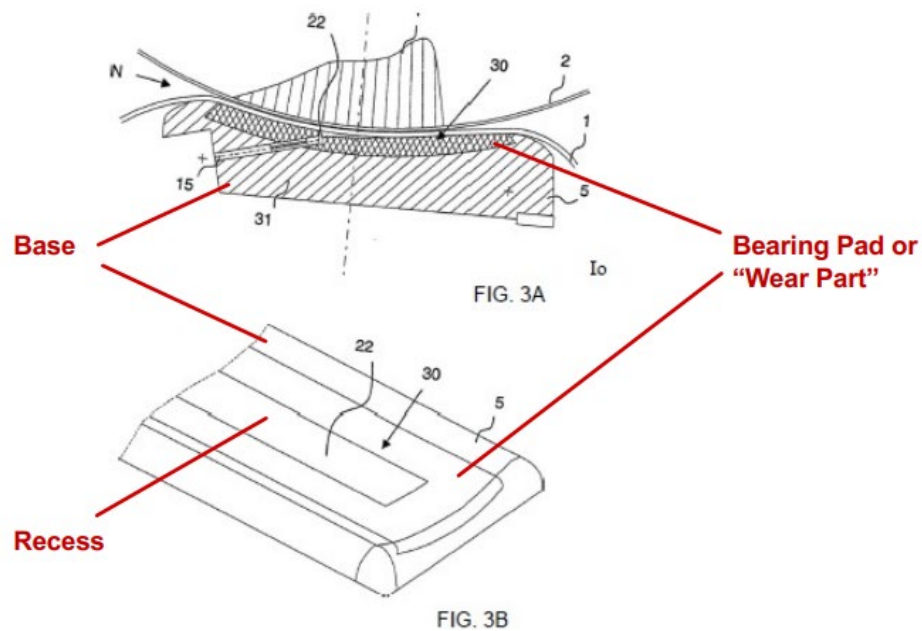
E. GROUND 3: Claims 8, 18 and 24 are Obvious under 35 U.S.C. § 103 in View of GB384, DE364, and the ’551 Patent.

Claims 8 and 18 depend from Claims 1 and 11, respectively. Claims 1 and 11 are obvious as noted above. *See supra* pp. 33-38, 44-45. Claims 8 and 18 are obvious as explained below.

- 1. Dependent Claim 8. *The bearing assembly of claim 1, further comprising a plurality of said polymer bearing pads, wherein said respective outer surfaces of said polymer pads form a substantially uniform bearing surface for said journal, wherein each of said***

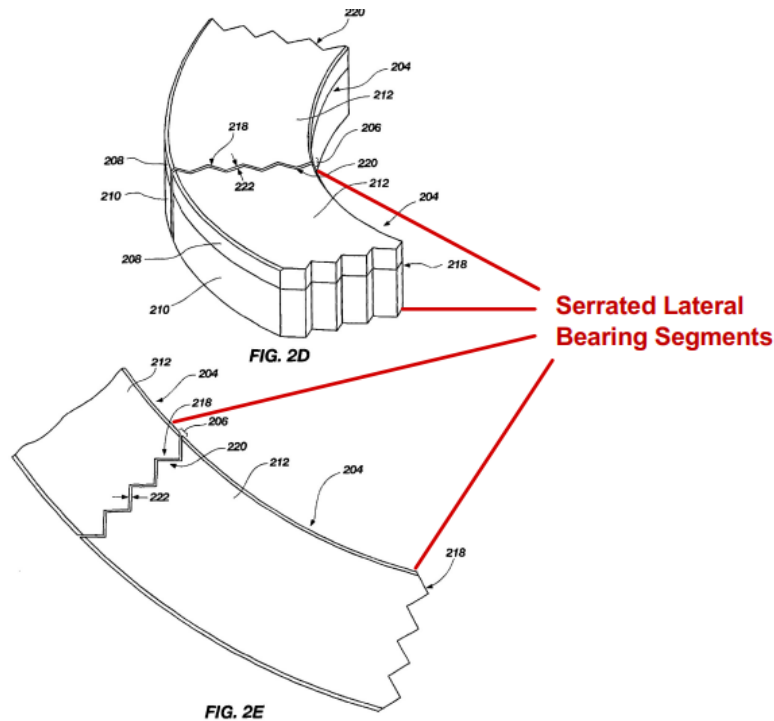
polymer bearing pads comprises at least one lateral connecting portion for mutual engagement with a corresponding lateral connecting portion of an adjacent polymer bearing pad.

DE364 discloses a polymeric bearing pad with a “wear part 30” that has a substantially uniform upper surface as shown in Figures 3A and 3B. Smith, ¶202.



“The [wear part 30] can extend in one piece over the entire length of the shoe [5] (in the CD direction) *or be made of sections*, in which case only the damaged section needs to be replaced in the event of damage.” Ex. 1005, ¶ [0012] (emphasis added).

The '551 Patent discloses a bearing pad made of laterally connecting segments for mutually engaging adjacent bearing pads.



Smith states it was general knowledge to use lateral connecting members to couple a plurality of adjacent bearing segments together to, at least, minimize leakage of oil from the outer surface of the bearing between adjacent pads. Smith, ¶204. Thus, the POSITA would have had a reasonable expectation of success forming lateral members (using rectangular or serrated geometries, for example) to couple adjacent bearing segments together.” *Id.*

2. Dependent Claim 18

But for its dependency, Dependent Claim 18 is virtually identical to Claim 8 and is obvious for the same reasons. *See supra* pp. 55-57.

F. Motivation to Combine GB384, DE364 and the '551 Patent.

The motivation to combine GB384 and DE364 is detailed above. *See supra* pp. 49-51. The POSITA would be motivated combine the '551 Patent with GB384 and DE364 to provide a “tortuous pathway” between the adjacent plurality of “wear pads” disclosed in DE364 to “limit fluid leakage radially through the seams” of the connecting lateral members. Ex. 1008 at 4:46-63; *see also* Smith, ¶63.

G. GROUND 4: Claims 9 and 19 are Obvious under 35 U.S.C. § 103 in View of GB384, DE364, and Trygg.

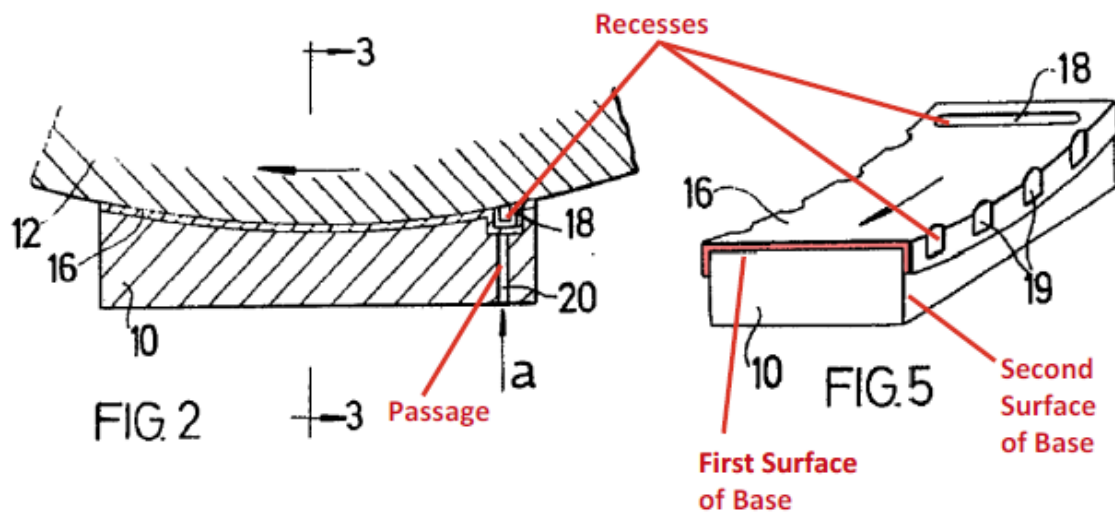
Claims 9 and 19 depend from Claims 1 and 11, respectively. Claims 1 and 11 are obvious as noted above. *See supra* pp. 33-38, 44-45. Claims 9 and 19 are obvious as explained below.

1. Dependent Claim 9.

[9a] *The bearing assembly of claim 1, wherein said base further comprises a first surface, a second surface, a plurality of said at least one passages and a plurality of said at least one lubricating fluid supply ports, wherein said at least one passages are in fluid communication with said at least one lubricating fluid supply ports, said first surface and said second surface, and*

GB384 discloses first and second bearing pad surfaces. More specifically, it discloses an anti-friction lining 16 on a top surface of the shoe 10 and on the side surfaces of the shoe 10. Smith, ¶215. “The upper portion of each of the plurality of recesses 19 are fluid supply ports” and “act as an entrance to the “container”

formed by the recess 19.” *Id.* Passageway 20 connects directly with recess 18 and then to recesses 19. Smith, ¶217.



Figures 9 and 10 of Trygg disclose a fluid bearing for use with a grinding mill comprising a plurality of passageways and a plurality of fluid supply ports for providing lubricating fluid to the bearing surface. Smith, ¶234.

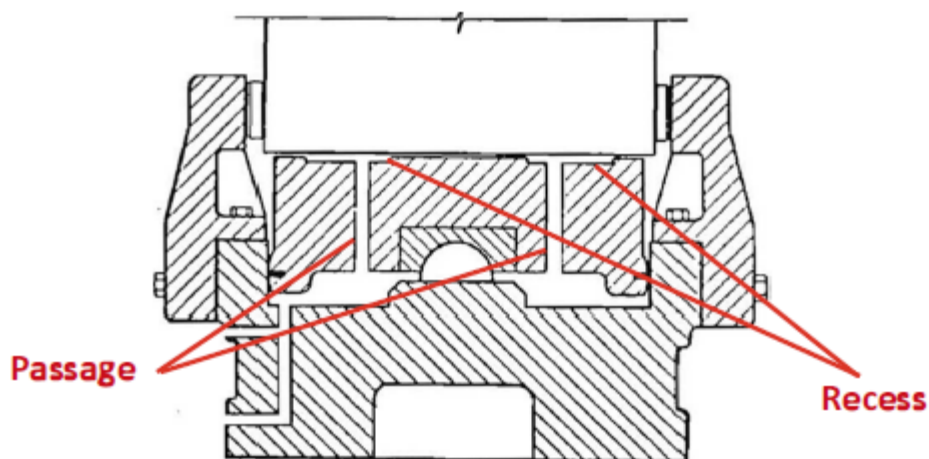
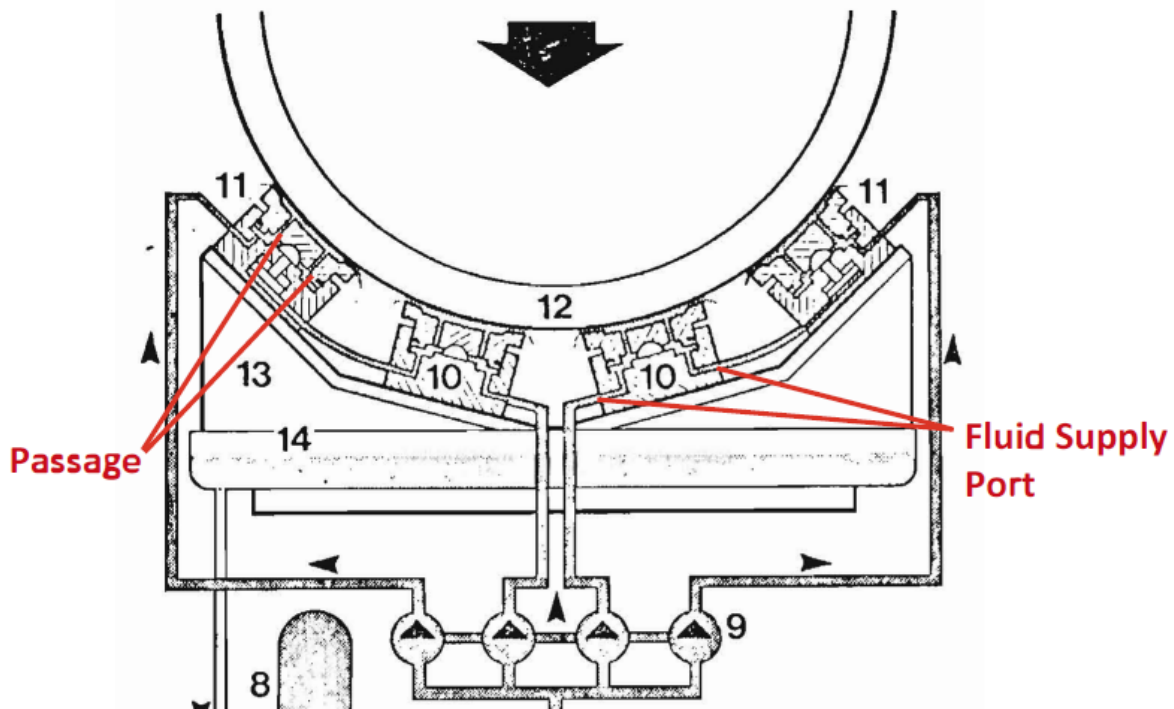


FIGURE 9. Hydrostatic thrust bearing arrangements.



Moreover, a plurality of passageways and a plurality of fluid supply ports or openings in a bearing shoe was general knowledge to the POSITA. Smith, ¶234. The POSITA would have had a reasonable expectation of success adding multiple passageways and multiple ports to the bearing shoe of GB384 to accommodate delivery of lubricating fluid to a plurality of bearing surfaces. *See supra pp. 46.*

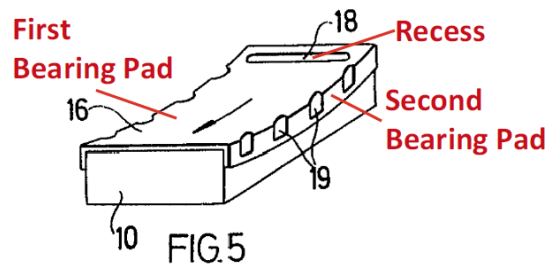
[9b] wherein there is a plurality of said polymer bearing pads, a first of said polymer bearing pads being mountable to said first surface and a second of said polymer bearing pads being mountable to said second surface

GB384 discloses a bearing pad (i.e., the anti-friction liner 16) extending across the first surface and a second surface of the shoe. See e.g., Figure 5 below.

See also supra pp. 20-21 (discussing general knowledge and Trygg article referencing first and second bearing pads).

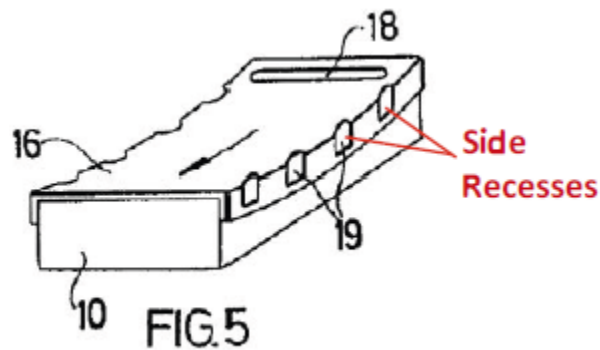
[9c] wherein said first polymer bearing pad comprises a first outer surface and at least one recess for receiving lubricating fluid from at least one of said plurality of passages and distributing said lubricating fluid to said first outer surface, and

GB384 discloses a first bearing pad with a first outer surface 16 and at least one recess 18 for receiving lubricating fluid from at least one passage 20 and distributing the lubricating fluid to the first outer surface 16. Smith, ¶220.



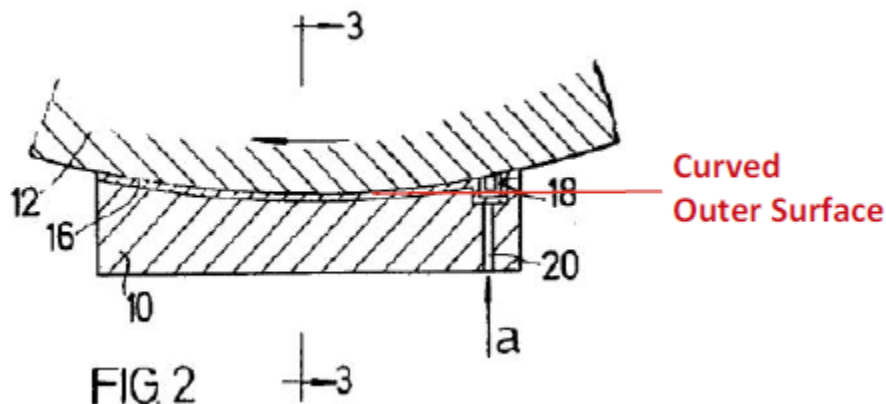
[9d] said second polymer bearing pad comprises a second outer surface and at least one recess for receiving lubricating fluid at least one of said plurality of passages and distributing said lubricating fluid to said second outer surface,

GB384 discloses a second bearing pad with a second outer surface and at least one recess 19 for receiving lubricating fluid from passage 20 and distributing the lubricating fluid to the second outer surface. Smith, ¶221.

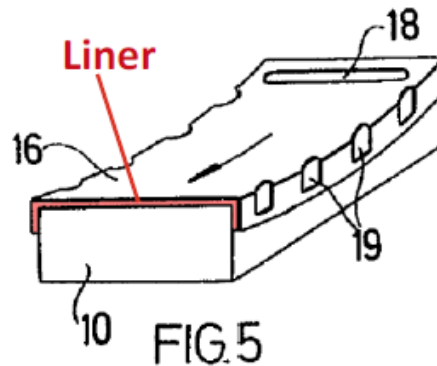
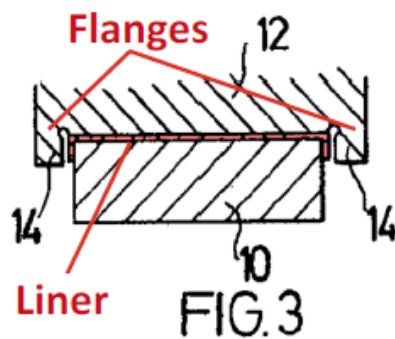


[9e] wherein said first outer surface is partially curved such that said first polymer bearing pad acts as a radial hydrostatic bearing and said second outer surface is substantially planar such that said second polymer bearing pad acts as an axial bearing.

GB384 shows the first outer surface of lining 16 is partially curved and acts as a radial hydrostatic bearing. Smith, ¶222.



GB384 also shows that the second outer surface is substantially planar and acts as an axial bearing. GB384 notes, that “[a]xial movements of the part 12 are limited by two flanges 14 arranged to be integral with said body 12 and flanges 14 are arranged with a small clearance at each respective side of the shoe 10.” Ex. 1003, 2:64-68. See also Smith, ¶232.



2. Dependent Claim 19

But for its dependency, Dependent Claim 19 is virtually identical to Claim 9 and is obvious for the same reasons. *See supra pp. 58-62.*

H. Motivation to Combine GB384, DE364 and Trygg.

The POSITA would be motivated to combine GB384 and DE364 as noted above. *See supra pp. 49-51.* Trygg discloses a hydraulic bearing for use with a grinding mill comprising a plurality of internal passageways directed to a plurality of recesses. The POSITA would be motivated to combine the plurality of passageways in Trygg in order to reach the plurality of recesses on different bearing surfaces disclosed in GB384. For similar reasons, the POSITA would be motivated to combine the plurality of fluid supply ports in Trygg to provide lubrication to the plurality of passageways. Smith, ¶234; *see also supra pp. 31-32.*

I. GROUND 5: Claims 1-5, 7, 10-15, 17 and 20 are Obvious under 35 U.S.C. § 103 in View of the '133 Patent and DE364.

1. Independent Claim 1

[1a and 1b]

The '133 Patent discloses a plurality of fluid bearings 10 coupled to a frame or “support structure” 13 for supporting a journal 29 of a grinding mill body. A plurality of pivoted bearing shoes are positioned to engage the journal “wherein oil is applied to the bearing faces of the shoes to establish a hydrodynamic wedge of oil created by the motion of the slide member.” Ex. 1007, 1:5-15. Annotated Figure 4 from the '133 Patent illustrates recesses or “oil grooves” and a liner or “bearing face.”

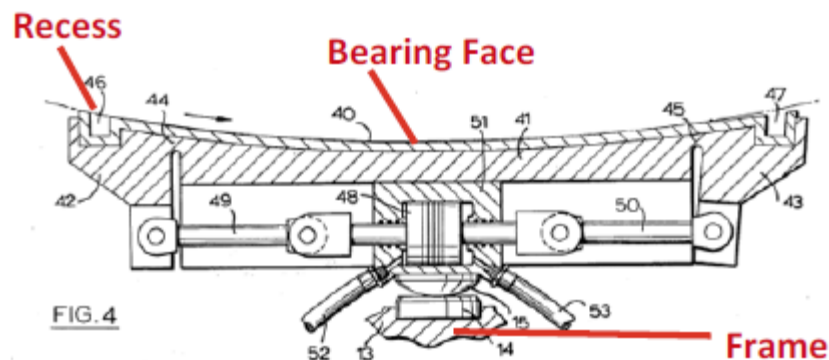
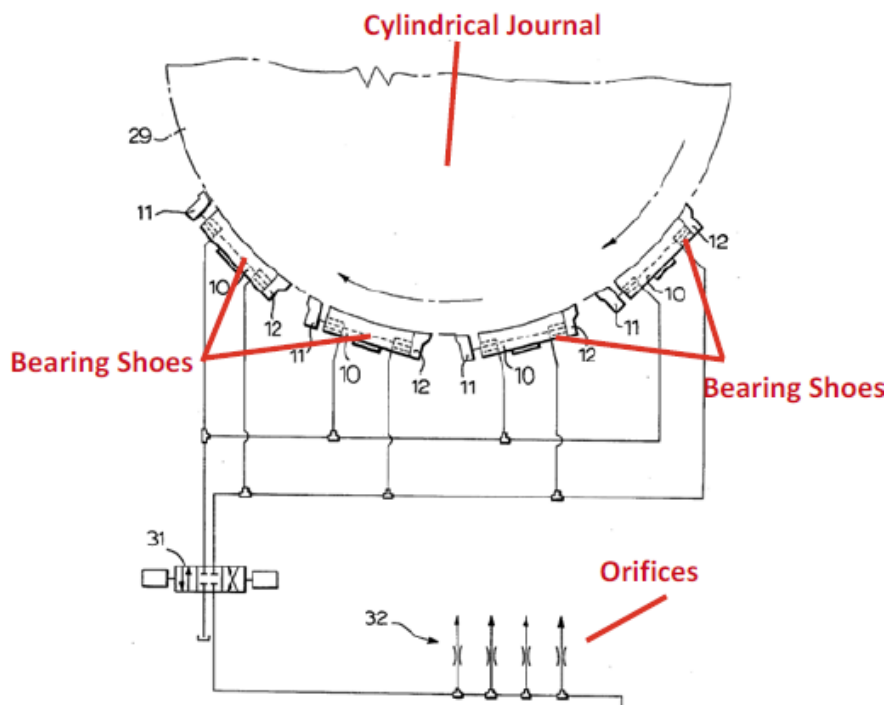


Figure 3 of the '133 Patent shows the plurality of fluid bearings 10 positioned about and supporting the cylindrical journal. *See also*, Ex. 1007 3:3-4.

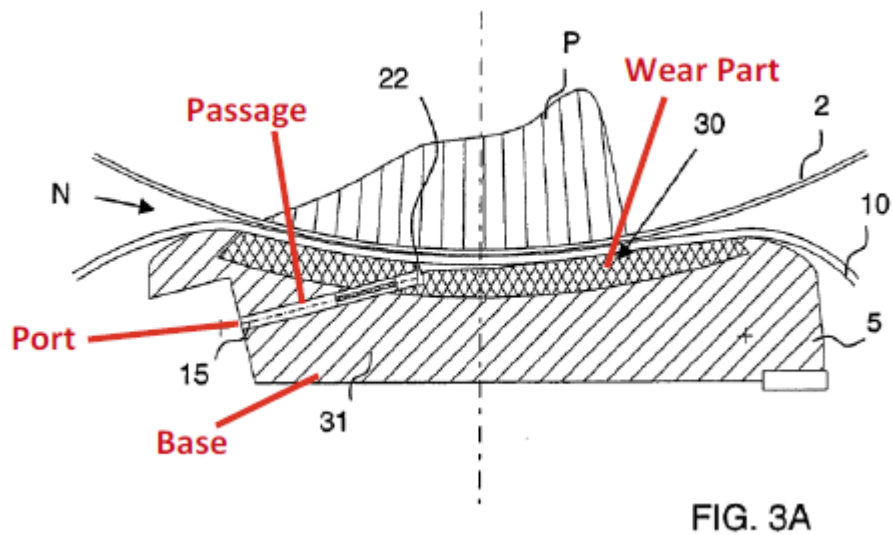


The bearing in the '133 Patent comprises a lining 40 on the top of the shoe defining a “bearing face of the shoe.” Ex. 1007, 2:34-39. While '133 does not identify the composition of the liner 40, the use of a polymer as the lining 40 (or alternatively 16, 17, 18) was within the general knowledge of the POSITA. *See supra* pp. 27-28. (where POSITA would have known that using a polymer as the lining of a fluid bearing was one of the many options available and would have had a reasonable expectation of success using a polymer.) In addition, however, DE364 expressly discloses the use of a polymer as bearing pad liner. *See supra* p. 16. The POSITA would have had a reasonable expectation of success combining the teachings of DE364 with the '133 Patent to use a polymer as its bearing liner.

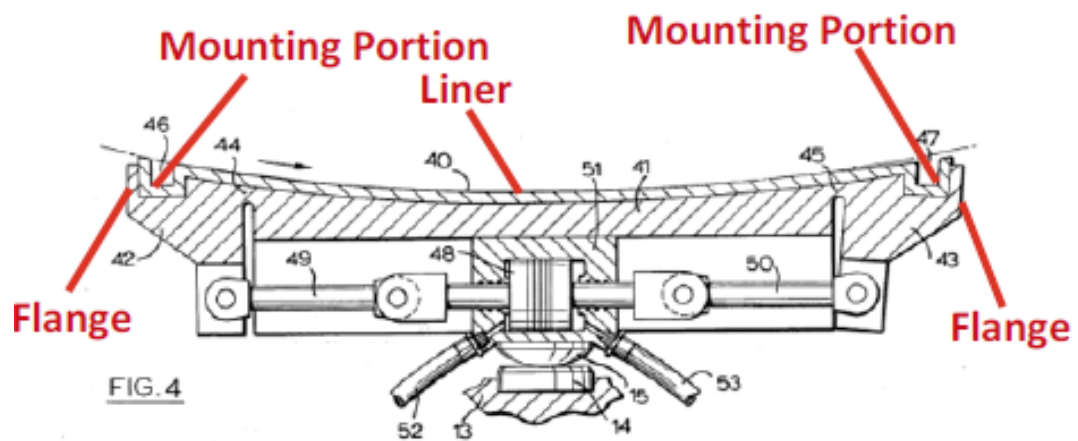
[1c and 1d]

The '133 Patent discloses a plurality of recesses 19, 20 (or 46 and 47 in other embodiments) “to which oil is fed in the conventional manner so as to apply an oil film to the bearing face of the shoe to establish a hydrodynamic wedge of oil.” Ex. 1007, 2:41-45. “Lubricating oil for the bearing faces of the shoes may be derived from the pressure fluid circuit via orifices 32, or alternatively may be derived in any other manner.” Ex. 1007, 3:12-15. “A fluid supply port in an outer surface of the shoe 10 is necessarily present. That is the location (i.e., the port or opening) on the shoe where lubricating fluid from the orifices 32 is introduced into the passageways within the shoe.” Smith, ¶241.

DE364 also discloses a fluid supply port in communication with an internal passage that provides lubricating fluid to a bearing surface. See *Supra* p. 16 and FIG. 3A below.

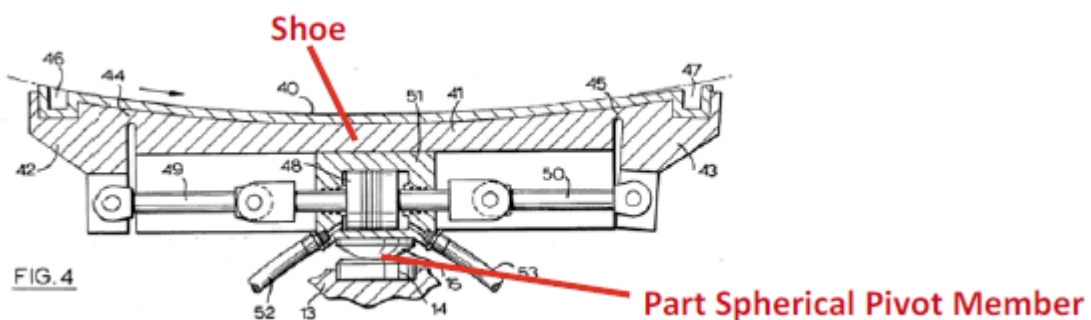


The '133 Patent also discloses a mounting portion. Figure 4 is one example that shows liner 40 disposed within a corner of groove 46 which limits movement of the liner 40. Smith, ¶243.



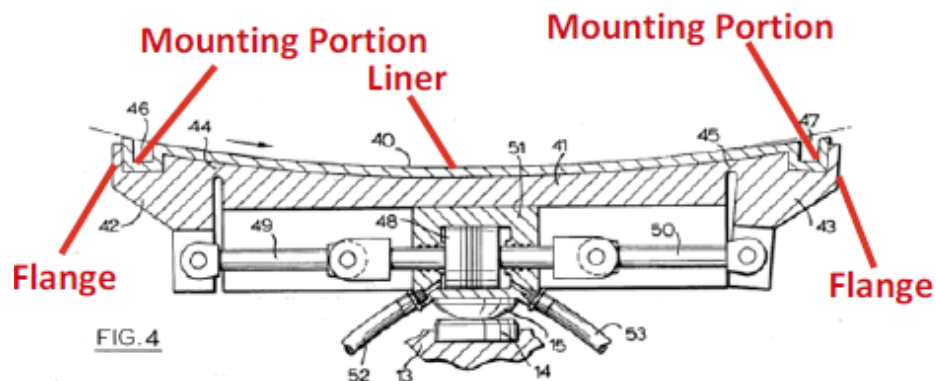
[1e]

The '133 Patent discloses a “shoe [] mounted on a support structure 13 which provides a universal pivotal mounting formed by a pivot pad 14 and a part-spherical pivot member 15 which is connected to the shoe structure. The bearing shoe is mounted symmetrically with respect to its pivot.” *See*, Ex. 1007 at 2:20-33. *See also* Smith, ¶244.



2. Dependent Claim 2.

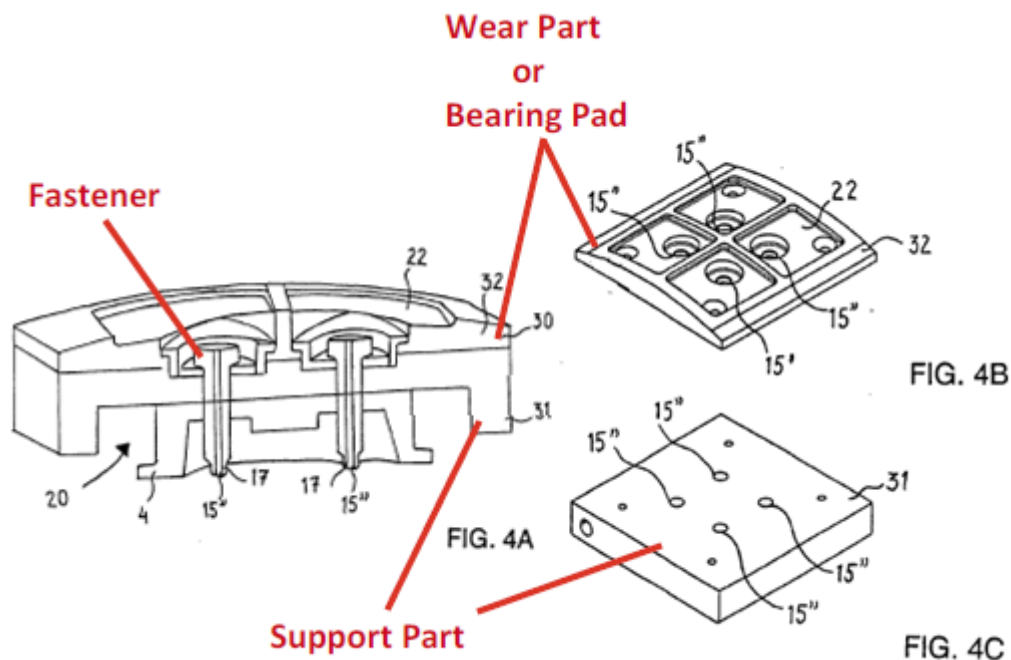
The '133 Patent discloses a mounting portion with a protrusion extending from the liner 40. It is opposite the outer surface of the liner and engages a flange of the shoe 10. The flange is on the outer edge of the shoe 10.



3. Dependent Claim 3.

It was within the general knowledge of POSITA to have an opening for receiving a fastener and a recess for having a locking tab to secure the head of the fasteners in place. *See supra* pp. 28-29. Using hollow bolts were within the general knowledge of POSITA. *Id.* And POSITA would have had a reasonable expectation of successfully creating a recess for placing a hollow bolt (i.e., a fastener with a bore) in the liner of the '133 Patent, “particularly if you wanted to have a removable pad or liner.” Smith, ¶247. Likewise, the POSITA “would have had a reasonable expectation of success placing a locking tab in the recess to help keep the fastener from loosening or backing out of its cavity due to the vibration or movement of the journal during operation.” *Id.*

DE364, for example, specifically discloses a plurality of openings for receiving fasteners for mounting a bearing pad to a base. The fasteners have a bore for conveying lubricating fluid from a fluid passage to a recess on the bearing pad for lubrication. Smith, ¶248. A replaceable wear part 30 acts as the “bearing material” which “is removably attached” to the shoe by nozzles 17 as shown in FIGS. 4A, 4B, and 4C.



It would be a simple and predictable modification with a predictable outcome for one of ordinary skill to add a locking tab “to minimize the likelihood that a fastener will come loose during operation of a device.” Smith, ¶252.

4. Dependent Claim 4.

It was within the general knowledge of a POSITA to have an opening for receiving a fastener and locking elements for securing fasteners in place. *See supra* pp. 28-29. That said, DE364 specifically discloses a bearing with plurality of openings (there are four on the pad shown in FIG. 4B) that are countersunk to receive at least “screws” to fasten the pad onto the mounting surface 31. *Supra* p. 16. Adding a locking element such as a “liquid thread locker” or some other

“element” to secure the fastener is well within the knowledge of a POSITA. Smith, ¶253.

5. Dependent Claim 5.

The '604 Patent itself notes that “typical” hydrostatic bearings have a “bearing pad” that can “form a seal with the base.” Ex. 1001, 2:38-41. Moreover, the lining 40 of the bearing of '133 covers the entire upper surface of the shoe 10 and creates a fluid seal between the pad and the base. Smith, ¶254. The POSITA would understand that the liner 40 creates a fluid seal between the liner and the base. *Id.* Smith notes that “[i]f for no other reason, the lack of a fluid seal can create a decrease of fluid that maintains the ‘oil film’ on ‘the bearing face’ of the shoe to establish a hydrodynamic wedge of oil.” *Id.*

6. Dependent Claim 7.

The shoe members 11 and 12 of the '133 Patent “provide[] an oil groove 19, 20, to which oil is fed in the conventional manner so as to apply an oil film...” Ex. 1007, 2:41-43. “Lubricating oil for the bearing faces of the shoes may be derived from the pressure fluid circuit via orifices 32, or alternatively may be derived in any other manner.” Ex. 1007, 3:12-15. Smith notes that “[t]o communicate lubricating fluid from the passageway in the shoe 10 to the recesses, an ‘interconnecting passageway’ is necessarily present in the liner. Otherwise, there

would be no way to communicate the lubricating fluid to the recesses.” Smith, ¶256.

7. Dependent Claim 10.

Using removable vs. fixed bearing pads is well within the general knowledge of a POSITA. Smith, ¶¶82, 106. Smith testifies that “[i]t is not uncommon to make a part of a device that is “disposable” (meaning intended to wear out over time) or “sacrificial” (meaning a less expensive part designed to fail first), preventing failure of other more expensive parts. Both disposable and sacrificial parts are designed to be removable. This reduces the need for costly repairs. Smith, ¶257. That said, DE364 discloses a polymer bearing pad that is secured to a base by a “dovetail connection, screws or other fit” to enable replacement. Ex. 1005, ¶¶ [0024-5]. The polymer bearing pad of DE364 is referred to as a “wear part 30.” *Id.* The POSITA would have had a reasonable expectation of success in implementing this known solution to a known problem of wear. *Id.*

8. Independent Claim 11.

The claim elements recited in Claim 11 are identical to those of Claim 1 except that the fluid bearing of Claim 1 recites a self-adjusting bearing whereas Claim 11 recites “wherein said base is fixedly mounted to said frame.” All of the elements in Claim 11 that are in Claim 1 are present in the prior art and obvious for the same reasons noted above for Claim 1. *See supra* pp. 64-68.

With respect to the “fixed bearing” limitation, it is well within the general knowledge of POSITA to fix the bearing depending on the particular desire of the user. *See supra* pp. 30-31 (discussing at length the different advantages and benefits of fixed bearings vs. self-adjusting bearings and why the POSITA would choose one or the other). Because it is a known engineering solution to a known problem, the POSITA would have had a reasonable expectation of success in using a fixed bearing instead of the self-adjusting bearing disclosed in the ’133 Patent.

9. Claims 12-15, 17 and 20.

Other than their base claim, Dependent Claims 12-15, 17, and 20 are the same as Claims 2-5, 7, and 10. As such, they are obvious under Ground 3 for the same rationale provided with respect to those claims. *See supra* pp. 68-72.

J. Motivation to Combine the ’133 Patent and DE364.

The POSITA would be motivated to combine the ’133 Patent, DE364 and general knowledge in the art. The bearing in the ’133 Patent “is applicable to trunnion bearings for cylindrical journals and also to slider bearings in which the slide member has a flat bearing face.” Ex. 1007 1:11-14. And “can in fact be adapted to suit either” a cylindrical journal or a slide member. Ex. 1007 4:13-14. DE364 discloses a rotary thrust bearing. Ex. 1005 ¶¶ [0002], [0003].

The bearing shown in the ’133 Patent includes a bearing lining for engaging a journal. Ex. 1007, 2:30-37. The use of a polymer as a bearing face or bearing

lining is expressly discussed in DE364, which states its bearing pad is a polymer that helps improve “sliding properties.” Ex. 1005, ¶ [0011]. According to Smith, “the use of a polymer as a bearing pad was a known solution to a known technical problem (i.e., that of helping decrease friction and improve the sliding properties of the bearing.)” Smith, ¶281. The POSITA thus would have been motivated to use polymer pad of DE364 as the pad disclosed in the ’133 Patent and “would have been able to predict with a reasonable degree of success that one could use the polymer bearing pad disclosed in DE364” *Id.*

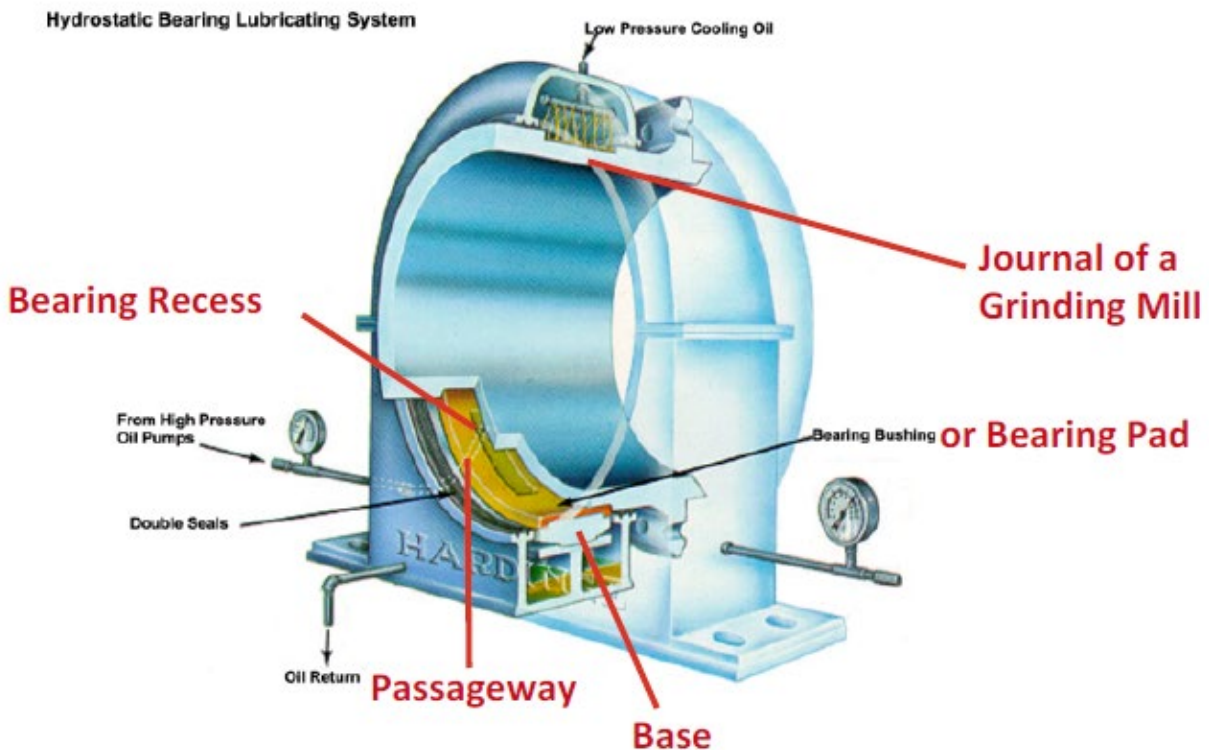
DE364 also “recognizes the problem associated with wear and the need to replace bearing pads that have worn out” and that having a replaceable pad is a known solution to that problem. Smith, ¶282. This naturally results in the need to use fasteners to secure the bearing to the shoe.” *Id.* Concomitantly, this results in the use of hollow bolts disposed within recesses on the face of the bearing pad to deliver fluid from inside the shoe to the bearing surface. Smith, ¶283. Thus, the POSITA would have been motivated to combine DE364 with ’133 to use temporary fasteners to secure the removable polymer bearing pad in DE364 onto the shoe of the ’133 Patent. *Id.*

K. Ground 6: Claims 1 and 11 are Obvious under 35 U.S.C. § 103 in View of Metso, the '993 Publication, and Trygg.

1. Independent Claim 1.

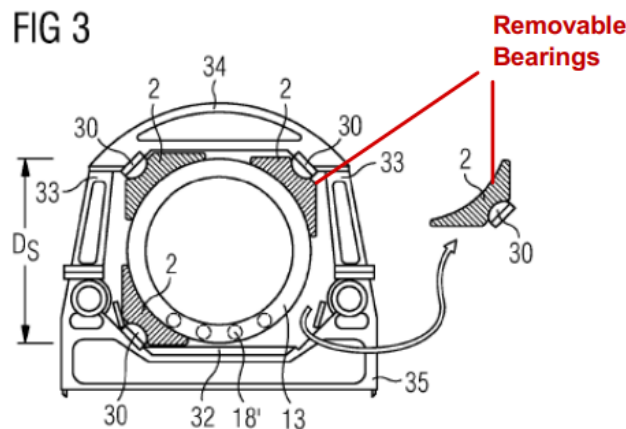
[1a and 1b]

Metso discloses a bearing assembly for supporting a journal of a grinding mill comprising a frame and a fluid bearing comprising a pad (referred to as the “Bearing Bushing”) mounted to a base. Smith, ¶284; *see also supra pp.* 17.



The '993 publication discloses a plurality of fluid bearings used to support a rotating shaft. “The pad arrangement of the fluid bearing for a wind turbine can

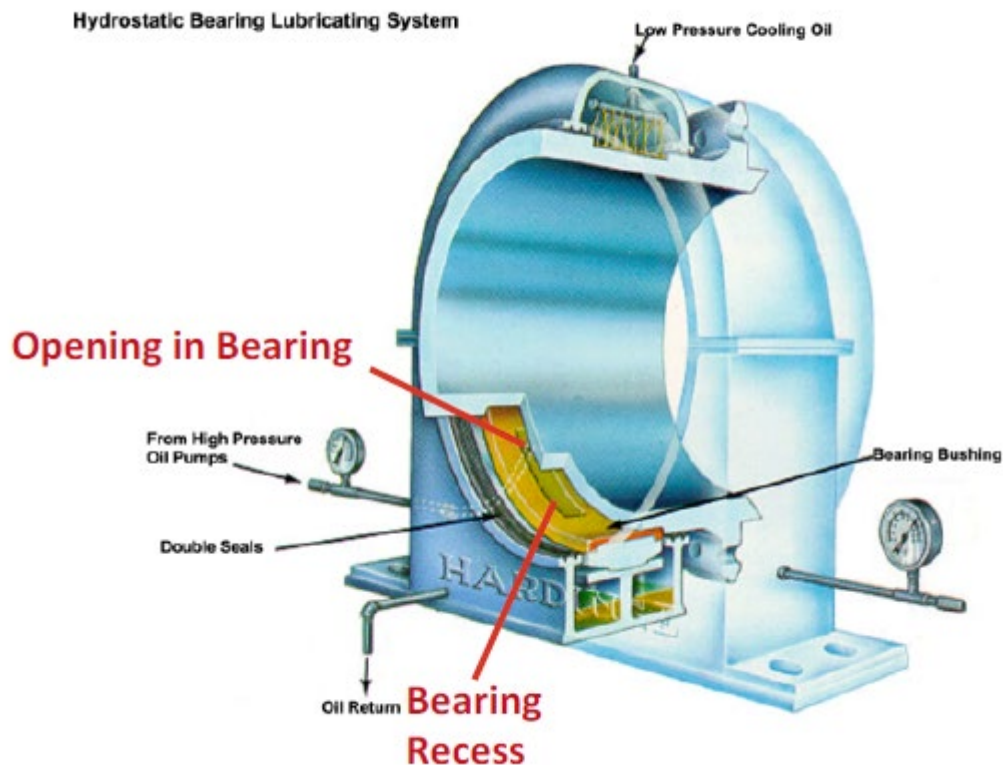
comprise several bearing pads suitably arranged relative to the rotor and held in place by the outer containing structure. Preferably, at least three bearing pads are arranged about the rotor shaft in a ring or annular arrangement.” Ex. 1013 at ¶[0031]; *see also* Smith, ¶285.



The '993 publication specifically notes that polymers “exhibit favourable stability and stiffness, are lightweight, have low coefficients of friction, and can be immersed in oil without damage. Use of such a material as an inner surface of the bearing can be advantageous, since a polymer with these properties will deform slightly while under pressure, so that the bearing has more ‘give’. This allows a better fluid film thickness to be built up during hydrodynamic operation.” *See* Ex. 1013 at ¶[0030]. The POSITA would have known from these teachings that use of a polymer as the bearing pad shown in Metso was advantageous and would have had a reasonable expectation of success in doing so. Smith, ¶286.

[1c and 1d]

Metso discloses a recess for receiving lubricating fluid from a passage in the bearing base. Smith, ¶288. The recess distributes lubricating fluid to the outer surface of the bearing. *Id.* Metso also shows a passage (shown in the dotted white lines) through the bearing coupled to an oil pressure line. *Id.* The fluid enters the back of the bearing at a fluid supply port or opening. *Id.* There is likewise an opening or an interconnecting passage from the passage through the bearing liner and into the recess on the top surface of the bearing. *Id.*



Metso's bearing pad covers the recess, which has a rectangular shape with sidewalls on all sides of the recess. The pads orientation on the bottom of the recess against the sidewalls thus comprise a "mounting element." Smith, ¶289.

[1e]

The base of the Metso bearing is a variation of a fixed mounted bearing. Wipf, ¶51. However, it was generally known that the POSITA could use a fixed bearing mount or a self-adjusting bearing mount depending on the needs of the designer. *See supra* pp. 30-31. The '993 publication specifically notes that "[i]n a preferred embodiment of the invention, a bearing pad of the fluid bearing comprises a pivot bearing to tiltably connect the bearing pad to the bearing housing. The pivot bearing can comprise a ball and socket arrangement for each bearing pad, so that the outer surface of the bearing pad comprises a socket, and the "ball" or hemisphere is part of the outer containing structure." Ex. 1013 at ¶22.

2. Independent Claim 11.

The claim elements recited in Claim 11 are identical to those of Claim 1 except that the fluid bearing of Claim 1 recites a "self-adjusting" bearing whereas the Claim 11 recites "wherein said base is fixedly mounted to said frame." All of the elements shared by Claim 11 are present in the prior art and obvious for the same reasons noted above for Claim 1. *See supra* pp. 75-78. Metso discloses a variation of a fixed bearing mount. *Supra* pp. 78. As noted elsewhere herein, the

POSITA would have known that a fixed fluid bearing was one of many known options in the art that was available for use.

L. Motivation to Combine Metso, the '993 Publication, and Trygg.

The POSITA would have been motivated to combine the teachings of Metso with the '993 Publication and Trygg. Metso discloses a tubular grinding mill with a fluid bearing coupled to a source of lubrication. *Supra pp.* 17. The '993 Publication discloses a hydraulic fluid bearing for use in connection with the rotating shaft of a wind turbine. *Supra pp.* 16. Like Metso, the bearings in the '993 Publication provide a lubricated surface which engages and supports the rotating body of the shaft. *See Ex.* 1013, ¶[0026] (discussing the use and benefits of bearing pads with hydraulic fluid bearings).

The '993 Publication discloses the benefits and advantages of using a polymer bearing pad in connection with hydraulic bearing pads. *See Ex.* 1013 ¶[0030] (discussing material properties of polymers for use as a bearing pad and the advantages)

The POSITA would have understood the benefits and advantages disclosed in the '993 Publication and would have been motivated to use a polymer bearing pad as the bearing pad shown in Metso. Smith, ¶286.

In addition, the POSITA would have known from Trygg (as well as general knowledge in the art) of the benefits and advantages of using self-adjusting

bearings versus a fixed bearing. *See* Ex. 1007 at 107; Smith, ¶292 (discussing benefits and advantages of fixed versus self-adjusting bearings). Based on this knowledge, the POSITA would have been motivated to combine Trygg with the teachings of Metso and the '993 to use a fixed or self-adjusting bearing as suited a particular engineering need.

IX. NONE OF THE GROUNDS INVOKE 35 U.S.C. §325(d)

Four of the six grounds in this Petition rely on GB384. GB384 was cited in connection with examination of what is now claim 21. The record is devoid of any analysis of GB384 in connection with claims 1-20. The Examiner's failure to substantively rely on GB384 with respect to claims 1-20 was a material error. Accordingly, the Board should not deny this Petition under 35 U.S.C. §325(d).

In *Advanced Bionics*, the Board set forth a two-part test for evaluating arguments under 325(d). Namely, “(1) whether the same or substantially the same art previously was presented to the Office or whether the same or substantially the same arguments were previously presented to the Office; and (2) if either condition of the first part of the framework is satisfied, whether the petitioner has demonstrated that the Office erred in a manner material to the patentability of the challenged claims.” *Advanced Bionics, LLC v. MED-EL Electromedizinische Gerate GmbH*, IPR2019-01469, Paper 6 at 8 (PTAB Feb. 13, 2020) (precedential).

Applying part two of this test, the Board considers “the extent to which the asserted art was evaluated during examination, including whether the prior art was the basis for rejection.” See *Advanced Bionics*, 9-10. “For example, if the record of the Office’s previous consideration of the art is not well developed or silent, then a petitioner may show the Office erred by overlooking something persuasive.” *Id.* at 10. Further, “[a]n example of a material error may include misapprehending or overlooking specific teachings of the relevant prior art where those teachings impact patentability of the challenged claims.” *Id.* at 8, n.9.

Here, the Examiner failed to consider GB384 substantively during prosecution and/or GB384 was misapprehended. Specifically, the Examiner issued a single prior art rejection asserting that GB384 disclosed all of the elements recited in what is now claim 21 but for the bearing pads’ polymer composition. PO did not rebut the Examiner’s characterization or the proposed combination. Rather, PO amended the claim to include elements directed to, *inter alia*, fasteners for securing the bearing pad to the base, locking tabs, and the use of hollow bolts as fasteners. Smith, ¶42.

Based on the Examiner’s own analysis of GB384, the Examiner erred in allowing Claim 1 and 11. Specifically, Claims 1 and 11 recite all of the elements the Examiner stated were present in GB384 and the ’993 publication except for a “mounting element” and functional language regarding a self-adjusting or fixed

bearing, respectively. Smith, ¶39. As noted above (*see supra pp.* 80) both of those elements, including many other of the recited claims, are clearly present in GB384. The Examiner thus materially erred in allowing the Challenged Claims.

In addition, Petitioner does not rely on the same or substantially same art or arguments. Specifically, all of the grounds rely on combinations of art that were not analyzed by the Examiner during prosecution. Discretionary denial is not warranted.

X. CONCLUSION

Petitioner respectfully requests institution of trial and that the Challenged Claims be found unpatentable.

Dated: May 14, 2025

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CERTIFICATE OF COMPLIANCE PURSUANT TO 37 C.F.R. §42.24

Pursuant to 37 C.F.R. § 42.24(d), the undersigned certifies that the foregoing
PETITION FOR *INTER PARTES* REVIEW PURSUANT TO 37 C.F.R.
§42.100 *et seq.* complies with the typeface requirements of 37 C.F.R. §42.6(a)(ii)
and the style requirements of 37 C.F.R. §§42.6(a)(iii) and (iv). This document
contains 13,745 words, excluding the parts exempted as provided in 37 C.F.R. §
42.24(b). The undersigned relies on the word count of the computer program used
to prepare this brief.

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that the above-captioned PETITION FOR INTER PARTES REVIEW PURSUANT TO 37 C.F.R. §42.100 *et seq.*, the accompanying Power of Attorney, and all associated exhibits, were served in their entireties on May 14, 2025, upon the following parties via FedEx:

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