

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CMS CEPCOR LTD., and
CMS CEPCOR AMERICAS LLC,
Petitioner,

v.

SANDVIK INTELLECTUAL PROPERTY AB,
Patent Owner.

IPR2024-01381
Patent 11,014,090 B2

Record of Oral Hearing
Held: January 13, 2026

Before CYNTHIA L. MURPHY, RICHARD H. MARSCHALL, and
ARTHUR M. PESLAK, *Administrative Patent Judges*.

APPEARANCES:

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The above-entitled matter came on for hearing on Tuesday, January 13, 2026, commencing at 12:35 p.m., at the U.S. Patent and Trademark Office, 600 Dulany Street, Alexandria, Virginia.

P R O C E E D I N G S

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12:38 p.m.

JUDGE MARSCHALL:

Good afternoon everyone. This is a hearing on IPR2024-01381 between Petitioner CMS Cepcor, Ltd., and CMS Cepcor Americas LLC, and Patent Owner Sandvik Intellectual Property AB, addressing U.S. Patent No. 11,014,090.

I'm Judge Marschall. With me are Judges Peslak and Murphy. Let's start with the parties' appearances please. Who do we have for Petitioner?

MR. SANKS: Terry Sanks on behalf of the Petitioner.

JUDGE MARSCHALL: And for Patent Owner?

MR. ARJOMAND: Good afternoon, Your Honors. Mehran Arjomand of Morrison & Foerster. With me is Jeff Young also of Morrison & Foerster. In the audience is Corrine Gorski of Sandvik, and we may have colleagues from Sandvik and Morrison & Foerster also on the line.

JUDGE MARSCHALL: Thank you and welcome. The argument will proceed as set forth in the hearing order. During your presentation please refer to exhibit and slide numbers to aid us in following along and to make the transcript clear. Please be aware that there is a public access line for the public to watch this hearing.

Now, in the order we provided 75 minutes for each side, but since that time Patent Owner has a LEAP practitioner that is going to participate in a portion of the argument, so they are allotted 90 minutes of time. And, of course, each side can reserve rebuttal time.

1 So with that, Petitioner would you like to reserve some time for
2 rebuttal?

3 MR. SANKS: Yes. Again, the max -- the maximum.

4 JUDGE MARSCHALL: I'll allow as much as you want. What do
5 you want?

6 MR. SANKS: Twenty-five minutes.

7 JUDGE MARSCHALL: Twenty-five. Okay. So you've got 50
8 minutes, and you'll have 25 for rebuttal and any remaining time, and you can
9 begin when ready.

10 MR. SANKS: All right. Good afternoon, Your Honors.

11 Just again to kind of lay out the agenda that I want to touch on and
12 touch through today, we'll start with a slide overview of the '090 Patent,
13 discussing the level of skill and the field of endeavor. A couple of slides
14 identifying the prior art that I plan to reference. The first slide focused on
15 the prior art towards the primary claims, and the second one towards the
16 amended claims. And then discussion about the motivation to combine, and
17 then I was going to address or touch on each of the primary claims, and then
18 the amended claims following up with discussion on analogous art.

19 The '090 Patent discloses a gyratory main crusher shaft and a main
20 shaft assembly for positioning within a gyratory crusher and in particular,
21 and main shaft having an actual upper end region that tapers regularly
22 inward and comprises at least one groove to receive a pressurized fluid to
23 facilitate mounting and de-mounting of the sleeve at the shaft. So as you
24 see, Figure 2, it identifies essentially where the fluid conduit is.

25 The level of one skilled in the art, both sides essentially agree,
26 someone with a bachelor's degree in mechanical engineering and/or a related

1 field, and at least two years' experience with industrial equipment design and
2 development, or they may have a combination of more fundamental --
3 excuse me -- formal education and less work experience, or a combination of
4 less different formal education and more work experience. As far the field
5 of endeavor, we maintain it's essentially focused -- directed towards a main
6 shaft assembly for rock crushers.

7 With respects to the primary claims, there's three patents that we
8 identify as prior art: Polinski, which discloses a gyrating rock crusher;
9 Piepho, which is also -- we still maintain is an analogous art as it is a rock
10 crushing apparatus, mainly a coal pulverizer; and then we also identify
11 Harless. Harless discloses a math that affixed, attaching components to
12 tapered shaft vents is facilitated by the use of fluid power elements.

13 With respects to the amended claims, we're also considering Coxhill
14 which discloses features to prevent a shaft from spinning in the same
15 rotational direction as the driven eccentric rotation; Yagi, which discloses
16 coupling and decoupling tapered coupling structures by pumping oil into
17 interstitial area between the tapered shaft and sleeve utilizing a plurality of
18 grooves and oil passages; and then Torrence, which discloses a protective
19 barrier sleeve on the upper end of the shaft; and the last one we also
20 identified is Shepard.

21 As for motivation, we maintain a POSITA would have been motivated
22 to combine the tapered joint of Piepho with the teaching of Polinski based on
23 the explicit teachings of the prior art. We believe a POSITA would
24 understand the advantages afforded by the use of a tapered joint as compared
25 with a cylindrical joint. Taper interference fits have significantly and
26 important factors over straight fits that a POSITA would likely incorporate

1 them into the design of equipment, including the design of rock crushing
2 equipment or apparatus.

3 Motivation to combine may be again found explicitly or implicitly in
4 the market forces. Design incentives, interrelated teachings of multiple
5 patents, any need or problem known in the field of endeavor at the time of
6 the invention and addressed by the patent, and the background knowledge,
7 creativity, and common sense of the Person of Ordinary Skill.

8 Looking specifically at Piepho, both the '090 Patent and Piepho
9 address essentially the same problem which is preserving the main shaft.
10 The joint is a tapered joint with a tapered end of the shaft. With respect to
11 Yagi, a port in the end of the shaft through which pressured hydraulic oil is
12 introduced, which is running through an axial direction in the shaft. I mean,
13 cross holes connect the actual conduct with circumventable -- oops, sorry
14 about that. That not part of -- so essentially Yagi's directed towards using
15 hydraulics to seat and unseat bearings on tapered shafts.

16 Over -- excuse me -- Slide 8 is an overview of the original
17 independent claims. And the claim elements. So, Claim 1, each of the
18 claims essentially teach a shaft body having a first end and a second end.
19 Each of the original independent claims teach the shaft body being tapered.
20 They teach a shaft sleeve at the tapered region. They teach at least one
21 groove indented at the tapered actual region of the shaft. And that at least
22 one groove arranged to receive pressurized fluids to facilitate mounting and
23 dismounting.

24 Turning to the preamble, Claim 1 is claiming a derogatory pressure,
25 main shaft. Polinski discloses a gyratory pressure main shaft as shown. You

1 have your crushing shell, there's a sleeve. There is the main shaft identified
2 in yellow, and there is a mantle.

3 Element A provides for a body shaft having a regularly outward
4 facing external -- oh, excuse me. I am on Slide 10. And it discloses a shaft
5 body having a regularly outward facing external surface and a first end and a
6 second end. Polinski, combined with Piepho, they each disclose a shaft
7 body having a regularly outward facing external surface and a first end and a
8 second end.

9 Claim 11 provides for an axial region of the shaft body extending
10 from the second end and being tapered relative to a longitudinal access of
11 the shaft body such that a cross sectional area of the shaft body at the tapered
12 axial region decreases in a direction from the first end to the second end.

13 Again, Polinski in view of Piepho discloses an axial region of the
14 shaft body which extends from the second end being tapered relative to the
15 longitudinal access of the shaft body such that a cross- sectional area of the
16 shaft body at the tapered axial region decreases in the direction from the first
17 end to the second end.

18 We maintain that a POSITA would have been motivated to
19 incorporate the tapered end of the main shaft of Piepho with the main shaft
20 of Polinski. Again, Polinski describes a tapered shaft aids in accurate
21 alignment which is notoriously more difficult with purely cylindrical
22 shafting. Incorporating the tapered portion of the Piepho shaft with Polinski
23 would be a combination of known elements.

24 Slide 12 we've addressed element -- what we identified as 1c, a shaft
25 sleeve mounted on the tapered axial region. Shown here, Piepho teaches a

1 sleeve mounted on the tapered axial region of the second end of the main
2 shaft. This sleeve is the bushing 12, which is highlighted in purple.

3 So the present invention provides an intervening material between the
4 shaft end 25 and the meeting bore and yoke bushing 18 fitted within the bore
5 of the yoke 12, to prevent fretting damage. For accurate alignment and for
6 reliable support of the yoke, this joint, 21, must be capable of accepting
7 radial, axial, and bending or overturning loads.

8 Preferably the joint 21 is a tapered joint with the tapered end 25 of the
9 shaft. And that is all, again, what's taught in Piepho.

10 Turning to page 13, we're looking at the element, at least one groove
11 indented at the external surface and positioned at the tapered axial region.
12 Polinski, in view of Piepho, and further in view of Harless disclose at least
13 one groove indented at the external end and positioned at the tapered axial
14 region. Specifically, Harless discloses a groove, 12, positioned at the
15 external surface of the tapered region of the shaft.

16 And as recited in Harless, oil under pressure is introduced into a
17 circumferential groove 12, through a bore 13, expanding the barium
18 sufficiently to permit it to be pushed up against the spacer 6 by conventional
19 means. Harless further teaches grooves 42 in the sleeve where the above
20 bore 44, has branches for supplying oil to both the grooves 42, as indicated.
21 The construction and operation is otherwise the same as in the embodiment
22 previously discussed.

23 Each of these grooves disclosed in Harless are indented at the external
24 surface and positioned at the tapered axial region. We maintain a POSITA
25 would recognize that whether the groove is cut in the sleeve, or if the shaft is
26 a design choice, either one which would be functional, and both of which

1 were well-known in the art. Hence, we believe a POSITA would be
2 motivated to make the groove in the shaft. Especially since sleeves are
3 known to wear -- to wear out and be replaced.

4 Moving on to Slide 14. Element d1 -- excuse me, d2, identifies at
5 least one groove being arranged to receive a pressurized fluid to facilitate
6 mounting and dismounting of the shaft sleeve at the shaft body.

7 Again, Harless discloses that each of their three grooves disclosed are
8 arranged to receive pressurized fluid which is used to facilitate both
9 mounting and dismounting of components such as shaft sleeve at the shaft
10 body. In column 2, lines 19 through 26 of Harless actually talk about that
11 where it talks about the oil under pressure is introduced into a
12 circumferential groove 12, through a bore 13, expanding the bearing
13 sufficiently to permit it to be pushed up against the spacer 6 by conventional
14 means.

15 Thereafter, the oil pressure is released permitting the bearing interface
16 to contract and affixing it to the shaft with a shank fit. The extent of shank
17 or interference being as indicated about .003 inches. Harless goes on further
18 to discuss that the oil bore 44 has branches for supplying oil to both the
19 grooves 44, as indicated.

20 As for Claim 9, as you can see here on Slide 15 each of these
21 elements, 9p, 9a, 9a3, 9a4, 9a5, 9a6, we believe have already been addressed
22 with respect to corresponding elements in Claim 1.

23 As for Claim B, a sleeve fitted over the tapered axial region, the
24 sleeve having a tapered wall thickness such that the wall thickness at a
25 second end of the sleeve is greater than the wall thickness at the first end of
26 the sleeve. We believe that both -- well Polinski in view of Piepho and

1 Harless disclose the sleeve fitted over the tapered axial region. The sleeve
2 having a tapered wall thickness such as the wall thickness at the second end
3 of the sleeve is greater than the wall thickness at the first end.

4 In Piepho, I mean this portion is tapered inwards, and thus the sleeve
5 that is fitted to it is also tapered. Further, the external surface of the sleeve is
6 cylindrical which makes it so that the wall thickness of the sleeve is greater
7 at the second end of the sleeve than at the first end of the sleeve.

8 Turning to Slide 17 --

9 JUDGE PESLAK: Counsel?

10 MR. SANKS: Yes. Yes.

11 JUDGE PESLAK: Before you go to Claim 14, Claim 11 depends
12 from Claim 9. And it looks like you dropped your challenge to original
13 Claim 11. Is that correct?

14 MR. SANKS: Do you want me to address that during my rebuttal
15 Your Honor?

16 JUDGE PESLAK: At the end of your petitioner reply.

17 MR. SANKS: I believe your correct. I need to confer with that, but I
18 believe you are correct.

19 JUDGE PESLAK: Okay. Thank you.

20 MR. SANKS: With respect to Claim 14, again certain elements we
21 believe have already been addressed with respect to Claim 1. So I will turn
22 to Slide 18, which addresses the claim we would like to draw your attention
23 to which has Element 14b, a fitted -- sleeve fitted over the tapered axial
24 region, and the sleeve having a tapered wall thickness such that a wall
25 thickness at the second upper end of the sleeve is greater than the wall
26 thickness at the first lower and of the sleeve.

1 Again, Polinski in view of Piepho discloses a sleeve fitted over the
2 tapered axial region. The sleeve having a tapered wall thickness such as the
3 wall thickness at the second upper end of the sleeve is greater than the wall
4 thickness at the lower end of the sleeve.

5 As for the other combinations that we've talked on so far, even with
6 this one with respect to Polinski and Piepho, we maintain that a combination
7 of these two is a result of combining known elements using known methods
8 to produce predictable results.

9 Now I want to look at the revised amended claims. Claim 15, they
10 added an element or component to 15a wherein the second body is the upper
11 most extremity of the body shaft. 15d, they added a plurality of grooves
12 indented at the external surface and positioned at the tapered axial region.
13 The plurality of grooves being arranged to receive a pressurized fluid to
14 facilitate mounting and dismounting of the shaft sleeves at the shaft body.

15 Turning to Claim 20. Claim 21 has been amended to say a body --
16 shaft body being a outward facing external surface at a first end and a
17 second end wherein the second end is an upper most extremity of the body.
18 And 21d is wherein the shaft sleeve is fitted over the tapered axial region,
19 and the shaft sleeve having a tapered wall thickness such that the wall
20 thickness at a second end of the shaft sleeve is greater than the wall
21 thickness at the first end of the shaft sleeve wherein the first end of the shaft
22 sleeve is at a lower most extremity of the shaft sleeve.

23 Claim 26 with respect to Claim 14, again, they've essentially just
24 added wherein the second end -- wait -- with respect to the first element,
25 wherein the second end is in the upper most extremity of the shaft body.
26 They have Element 26c which is a carry over from 14c where they just

1 added again, wherein the first end of the sleeve is at the lower most end of
2 the extremity body.

3 And a new element they added is 26c wherein the sleeve is configured
4 such that when positioned on the shaft body the sleeve is separated from and
5 not fastened to a crushing head and a crushing shell.

6 Turning to Claim -- going back to now Claim 15a, we maintain with
7 the changes that were made, Coxhill further teaches the upper portion of the
8 pressure shaft 33 is fitted with a bearing sleeve, 36, and is received into the
9 pivot bearing member 26. Coxhill also teaches the lower end of the crusher
10 head shaft 33, is provided with the bearing sleeve assembly 46, which is
11 tunneled in the inner brace of a radial bearing.

12 Looking at Slide 23 as to the plurality of grooves, Coxhill in view of
13 Piepho, and further in view of Yagi disclosed a plurality of grooves indented
14 at the external surface and positioned at the tapered axial region. The
15 grooves in Yagi are arranged to receive pressurized fluid, to facilitate
16 mounting and dismounting of the shaft sleeve on the shaft. So essentially,
17 Yagi teaches having grooves on a shaft.

18 Reverting back, now going back again to now Element 21, or Claim
19 21. Looking at 21d if you incorporate Piepho and Coxhill you would have
20 the thickness -- you have a sleeve having a tapered wall thickness such as
21 the wall thickness at the second end of the shaft sleeve is greater than the
22 wall thickness at the first end, wherein the first end of the sleeve is the lower
23 most extremity of the shaft sleeve, as the sleeve of Coxhill does not have a
24 flange.

25 Looking at claim -- or excuse me, page 25. Claim 16 and 20 were
26 amended to say, further comprises an oil path consisting of. So instead of

1 comprising, they're seeking to limit it to consisting of. Where now they've
2 got the fluid inlet position at second end, the first groove, the second groove,
3 an actually extending channel indented at the external surface of the shaft
4 body to couple the first groove and the second groove in fluid
5 communications, and at internal oil path extending within the shaft body
6 only to the first groove.

7 The internal oil path consisting of a first conduit extending axially
8 towards the first end from the fluid inlet, and a second conduit extending
9 from the first conduit towards the regularly outward facing external faced
10 surface of the shaft body to the first groove. We maintain that all of this
11 amendment again, it's all -- the prior art assumes this.

12 MPEP 2111.03 provides for consisting of being a closed, strictly
13 limiting invention to only the recited elements, excluding anything else. So
14 while the use of "consisting of" may defeat anticipation, such claims
15 typically do not still overcome obviousness. For in this case, Yagi teaches
16 grooves in the shaft. Modifying the number of grooves is an obvious
17 change.

18 To be more specific with respect to Yagi, Yagi teaches an oil path
19 starting at the end of the shaft and extending to a single groove. That's
20 identified in Figure 3. An oil path starting at the end of the shaft extending
21 to a near groove, and a far groove. That's identified in Figure 4.

22 An oil path starting at the end of the shaft extending to a far groove
23 and then continuing back to the near groove via an external groove, and the
24 tapered shaft is identified in Figure 5. And Figure 6, there it shows an oil
25 path starting at the end of the shaft and extending to the far groove. Thus we

1 maintain as far as -- well, Claim 26 again, we maintain that it is also obvious
2 for the same reasons just stated.

3 As for analogous art, the test for analogous -- there's two tests for
4 analogous art. One is if the reference is not within the field of the inventor's
5 endeavor, whether the reference still is reasonably pertinent to the particular
6 problem with which the inventor is involved, and whether the art is from the
7 same field of endeavor regardless of the problem addressed.

8 Again, in this case this art is all related to crushing rocks. The
9 distinction that's been trying -- that Patent Owner is trying to make is there's
10 a difference between pulverizing versus crushing. The only difference there
11 is the end result. Crushing is still diminishing or reducing in size. So is
12 pulverizing. It's reducing in size.

13 The thing to take into consideration is, all this technology we've been
14 talking about today is really a simple mechanical invention. And there is
15 established case law. And it says simple mechanical invention, broad
16 spectrum, and there's a broad spectrum of prior art. It must be explored, and
17 it's reasonable to permit inquiring into other areas when one of ordinary skill
18 in the art would be aware that similar problems exist.

19 Now this situation, you could possibly have a pulverizer and a
20 gyrating crusher at the same work location, at the same quarry, at the same
21 coal mine, where one could be used to -- the gyrating crusher could be used
22 to reduce the coal or the rock to one level or out goes the coal and then the
23 pulverizer could be used to create the granulars or fines.

24 The point is, someone skilled in the art could very well be at -- we
25 could be at the site and see both of them and be able to say hey, why can't I
26 use the grooves, the taper, shaft from one and apply it to the other. I mean,

1 that to me is just kind of common sense. You can't look at it in a vacuum. If
2 you look at it and how this technology is used, it should be considered prior
3 art.

4 Citing again, MPEP 904.01, not only must the art be searched within
5 which the invention claim is classifiable, but also analogous art must be
6 searched. Regardless of where the claimed invention is classified.

7 Now in this case, the '090 and Piepho are both classified as
8 cooperative patenting classification. For -- under B02c, for crushing,
9 pulverizing, or disintegrating in general. I mentioned Piepho, but the other
10 references I've talked about are also in this same classification.

11 Piepho has been cited by Petitioners since the filing of this initial
12 petition which was back in August of 2024. It's been continuously cited by
13 Petitioners in the response to oppositions, Patent Owner's contingent motion,
14 the opposition to Patent Owner's contingent motion to amend, a request for -
15 - and Petitioner's response to Patent Owner's revised contingent motion. The
16 first time the allegation that it's not analogous art came up was in their reply
17 brief which was filed December 16, 2025.

18 Why are we maintaining Piepho's analogous art? Again, this is a
19 simple mechanical invention, broad spectrum prior art must be explored.

20 As for trying -- their both crushing rocks. Patent Owner's own expert
21 admits that coal is a specific kind of rock. Rock crushing, I've already
22 touched on this, and pulverizing is a multi-stage process where depending on
23 the operation, you start with a large size, range of sizes, and there may be
24 where it then moves from one system to another to get to smaller sizes. And
25 that was actually a statement from Patent Owner's own expert. And that was
26 Slide 31.

1 And I will save the rest of my time now for my rebuttal.

2 JUDGE MARSCHALL: Thank you. You'll have about 38 minutes
3 left for rebuttal should you need it.

4 How much time would you like for rebuttal out of your 90 minutes?

5 MR. ARJOMAND: Twenty minutes, Your Honor.

6 JUDGE MARSCHALL: You may begin when ready.

7 MR. ARJOMAND: Thank you, Your Honors, and may it please the
8 Board. Let me first address the analogous art and waiver arguments. Again,
9 since Mr. Sanks raised them at the end of his presentation.

10 First I want to address a question that Judge Peslak has asked about
11 *KSR*, and whether that changed the test. And I would direct Your Honors to
12 MPEP 2141.01a. Now I know that MPEP is not binding on Your Honors,
13 but it does say there that the Supreme Court case of *KSR* did not change the
14 test for analogous art as stated in *In re Bigio*.

15 And so in our opinion, *In re Bigio* on the field of endeavor test looks
16 toward structured embodiment subject matter. And based on that test we
17 think that Piepho is not analogous art.

18 I think that's actually, to be honest, Your Honors, or candidly, I think
19 that's admitted by the Petitioner in their sur-reply. So, for example, in this
20 proceeding, Paper 52, they say while primary crushers may have different
21 designs and operate differently than other crushers in the stream of
22 production. So they recognize that gyratory crusher and coal pulverizes
23 have different designs and operate differently. And as such, under the *In re*
24 *Bigio* test, that knocks out Piepho as being in the same field of endeavor.

25 Now, the *KSR* case, as it goes on to say in MPEP 2141.01a, talks
26 about looking at other fields of endeavor. So I think, if anything, the *KSR*

1 case would be more relevant to the reasonably pertinent test Your Honors.
2 And for that test, as we know from the record, Petitioner has never
3 established, never even tried to establish that Piepho is analogous art under
4 that test.

5 Now they also raise, in their papers and today in their presentation,
6 they raise the *Stevenson* case which they point to as you know, for a simple
7 mechanical invention you can take a look, a broad spectrum of prior art.
8 First of all, I think their focus on it being a simple mechanical invention, it
9 really brings in the potential trap of hindsight. The simplicity of the
10 invention isn't a basis for determining whether an invention is obvious or
11 not. And there's case law as to that.

12 But specifically with respect to the *Stevenson* case, if you actually
13 read the case, the court there ultimately found the art that was being cited as
14 non-analogous to being non-analogous. And in that case the patent involved
15 a skateboard, and the art related to a surfboard and a water ski. And they did
16 not find in that situation, the art to be analogous. So think the *Stevenson*
17 case is definitely distinguishable and in fact, favors our position.

18 In terms of the classification argument that Mr. Sanks made, in that
19 section of the MPEP that I cited, 2141.01a2, it talks about the classification
20 analysis. And it says that that may be relevant, that might be worth some
21 weight, but we always go back to looking at the substantial differences in
22 structure and function of the inventions disclosed in the references to carry --
23 that carries far greater weight. And they cited case *In re Ellis*, 476 F.2d.
24 1370.

25 So the focus on classifications I think isn't really a very strong
26 position for Petitioner to land on. And, in fact, I think the reason why that's

1 the case is because when you're thinking of analogous art, it's a part of the
2 obviousness analysis. As you're thinking of it from the context of a person
3 of ordinary skill in the art, what he or she would do, you wouldn't be
4 thinking of it in terms of what the patent office classifies art as.

5 And in fact, there's a case that we found, that's called *In re Adolf Mlot-*
6 *Fijalkowski*. A difficult name to pronounce, but the cite is 676 F.2d. 666.
7 That's a CCPA case from 1982. And there they said that such evidence
8 relating to classifications in the context of analogous art is inherently weak
9 because considerations informing a classification system differ from those
10 relating to a person of ordinary skill seeking a solution for a particular
11 problem.

12 So it's really a very slender read that Mr. Sanks is relying upon in
13 terms of the classification argument.

14 JUDGE PESLAK: Counsel?

15 MR. ARJOMAND: Yes. Yes.

16 JUDGE PESLAK: Maybe you can -- the waiver issue here is stickier
17 than in the other case because in the 1380 case, I understand your argument
18 that there were new grounds involving different prior art.

19 In this case, but in the 1380 case it was a non-contingent motion to
20 amend, so we didn't have to deal with the original claims.

21 MR. ARJOMAND: Yes.

22 JUDGE PESLAK: But in this case we have to deal with the original
23 claims, with the grounds that are in the petition. And correct me if I'm
24 wrong, but you did not raise analogous art in your Patent Owner response to
25 the petition. Correct?

1 MR. ARJOMAND: Patent Owner response with respect to the issued
2 claims. That's correct, Your Honor. We did not raise analogous art.

3 JUDGE PESLAK: All right.

4 MR. ARJOMAND: We focused --

5 JUDGE PESLAK: Can you explain how that's not a waiver?

6 MR. ARJOMAND: Yeah. So I appreciate the question Judge Peslak
7 because I feel like maybe in the previous hearing we were speaking a little
8 bit past each other.

9 So what I was trying to get at was that the analogous art requirement,
10 in my view is a jurisdictional requirement. That it never goes away. And
11 that's particularly the case in a motion to amend proceeding. Whether you're
12 in a proceeding where the motion to amend is contingent, or whether it's
13 non-contingent.

14 Now what I mean by that is that because the grounds change, when
15 you're filing your motion to amend, or your revised motion to amend, you
16 don't know what the Petitioner is going to do in opposition. They could state
17 -- they could present the same grounds that was in the petition, or they can
18 change it completely.

19 In this case for example, they went from Polinski to Torrence. And so
20 it's a little bit unfair to say that well, because the ground remained the same
21 at least with respect to Piepho you should have raised it initially in your
22 motion to amend or in your revised motion amend while there is no way for
23 us to have predicted that.

24 And so I think to require us to somehow put forward in a motion to
25 amend which is page limited, every argument that we can think of that could
26 be raised is I think an unfair result. We put in our claims, we argued how

1 they are patentable over the art, they came back, they changed the grounds.
2 We can bring up our analogous art argument.

3 I mean, I think to say well, you should have known that they were
4 going to continue with Piepho from the -- between the motion to amend and
5 the reply. I think that does not reflect the situation.

6 Now with regard to your specific question as to does it make a
7 difference between a situation where we had in the 01381 proceeding where
8 we actually have a non-contingent motion to amend versus the 01380
9 proceeding where we have contingent motion to amend I still don't think it
10 makes much of a -- it makes any really difference. Because at the end of the
11 day we're still in the same situation where when we submit our motion to
12 amend we have no idea what the Petitioner will do.

13 JUDGE PESLAK: I want to make sure you understand my question
14 though. Because I understand everything you said, but we have to
15 adjudicate the claims in the original patent. And right now we have a
16 petition that's based on Polinski and Piepho.

17 We have your Patent Owner response where you didn't raise
18 analogous art, and we have you know, a Petitioner reply and your sur-reply.
19 And there's no discussion in the main case of analogous art.

20 So that was really my question. Why waiver is sticker in this case
21 than the other one. And that's what I was asking, really asking to address if
22 you can.

23 MR. ARJOMAND: Okay. Sure. If I misunderstand your question
24 again please let me know. But in my view, I don't think there's any kind of
25 inconsistency or tension. Because in the -- with respect to the issued claims,
26 we are focusing on Polinski. Polinski's deficiencies primarily. And that's an

1 independent basis for which you define the claims patentable, separate from
2 analogous art. So --

3 JUDGE PESLAK: So, then, are you telling us we don't have to
4 consider the analogous art question for the issued claims of the challenged
5 patent?

6 MR. ARJOMAND: Well, to be candid, I think that if you find the
7 claims patentable, the issued claims patentable based on the arguments we
8 made, you don't have to address any analogous art argument. Because the
9 analogous art argument has been teed up in the motion to amend proceeding.

10 JUDGE MARSCHALL: Is it permissible for us to consider that
11 argument at all with respect to the original claims?

12 MR. ARJOMAND: Is it permissible for you to consider analogous art
13 with respect to the issued claims?

14 JUDGE MARSCHALL: Given that it was not briefed with respect to
15 the issued claims.

16 MR. ARJOMAND: I think for the purposes of this hearing, Your
17 Honor, I would say that you don't need to consider analogous art for the
18 issued claims. Because the argument was squarely raised in both cases, the
19 analogous art argument was squarely raised in both cases. In the motion to
20 amend proceedings. And those grounds are different than the grounds that
21 are in the issued claims proceeding.

22 So in the 01380 proceeding, the ground is Torrence in view of Piepho.
23 And in the motion to amend proceeding for the 01381 proceeding, the
24 grounds are -- it's Coxhill '800 in view of Piepho.

1 That's different from what we're faced with in the issued claims,
2 which is Polinski in view of Piepho and Harless. So I think that's our view
3 of the case.

4 I don't know if that still answers your questions, Judge Peslak.

5 JUDGE PESLAK: I think you answered the question, yes.

6 MR. ARJOMAND: Okay. All right.

7 JUDGE MARSCHALL: By a similar token I assume you would
8 object to our relying on any evidence Petitioner submitted with respect to the
9 motion to amend to address the issued claims.

10 MR. ARJOMAND: Yes. Yes, Your Honor.

11 JUDGE MARSCHALL: All right.

12 MR. ARJOMAND: Definitely. Definitely. Definitely.

13 All right. So let me turn now to the issued claims. So turning to Slide
14 1, what we'll discuss on the issued claims is claim construction first, first the
15 construction for the term "end", and then second we'll turn to their
16 construction for "indented at the external surface".

17 Then we'll turn to why Polinski and Piepho are deficient. We'll also
18 address a motivation to combine argument that we presented in our papers
19 with regard to the issued claims. And then we will touch upon Claim 11 that
20 you inquired about, Judge Peslak.

21 After that, we will turn to the substitute claims. And with respect to
22 the substitute claims, now that we've discussed analogous art, we'll probably
23 just discuss the motivation to combine issue between Coxhill '800 and
24 Piepho which is very similar to the motivation to combine argument that
25 we've made with regard to Polinski and Piepho for the issued claims. And

1 then we will address Dependent Claims 16 and 24 that are in the substitute
2 claims as well.

3 So with that, let me turn to -- let me turn to Slide 11. So there is an
4 issue in the case about the construction of the term "end." And I believe
5 Your Honors, in the decision on institution indicated that you wanted further
6 briefing on that term in our papers. And we presented our construction.
7 That's what shown here in Slide 11.

8 In our Patent Owner Response, Paper 15 at page 14, we provided that
9 the proper construction of "end" is an extremity of a shaft body or sleeve
10 under it's plain and ordinary meaning.

11 Now, Petitioner, turning to Slide 12, has provided a broader
12 construction of "end." It agrees that "end" is an extremity of a shaft body or
13 sleeve, but it wants to expand that term to also include an end region. And
14 we think that Petitioner's construction is not supported by the claim
15 language, the specification, and the other evidence in the record whereas our
16 construction is.

17 So let me first turn to the claim language. And I'm going to turn to
18 Slide 15. Slide 15 Your Honors, shows Claim 1. And it shows the term first
19 end and second end highlighted in green. And what it shows in teal are
20 other recitations in the claim that use the word region.

21 So, for example, axial region or tapered axial region. In our opinion,
22 this conclusively establishes that our construction, Patent Owner's
23 construction of end is proper. Petitioner's construction of end isn't proper.
24 Because when Patentee wanted to claim end, specifically in extremity, they
25 claimed end. They used the word "end." And when they wanted to use a
26 broader concept like region, they used the term region.

1 This is, I think, very clear from the claim language. And it would be
2 wrong to now construe "end" in the claim such as in Claim 1 to also include
3 region when other terms in the claim include region.

4 I think that's very evident, turning to Slide 19, from a case -- well, we
5 cited two cases. But particularly the *NeuroGrafix v. Brainlab* case. That's,
6 it's a Federal Circuit 2019 case. And there what we've quoted here, they
7 have a claim there that referred to selected structure and region as separate
8 concepts, with selected structure being something merely located in the
9 region.

10 So, in our view, end is a separate concept from region. And end was
11 specifically claimed, as was region, like axial region. And you can't then
12 somehow modify end to also include region.

13 Now, that position or understanding of the claim language is
14 consistent with the specification. So, for example, if you take a look at the
15 specification it refers to an end region. And here what's shown on Slide 20
16 is actually testimony from Mr. Smith, Petitioner's expert. This is Exhibit
17 1044, paragraph 10.

18 And what Mr. Smith says is that the specification includes end region
19 and radial and tapered end region. These are used to denote when the term
20 end means a portion or region. That's exactly our point. When the spec
21 used the word end region, they meant end region and when they used the
22 word end, they meant an extremity. And so it's wrong for them to somehow
23 now assume in the claim that has both the term region and end, that end
24 somehow in the claim means an end region as well.

25 So turning to Slide 21. This shows some snippets from the
26 specification. For example, at column 5, lines 26 to 35 the patent talks about

1 a tapered region, 113, but it also talks about an upper most end, 301. That's
2 shown at the top left of Figure 3. It also talks about a shaft end surface, 123.

3 In the context of the sleeve, this is Slide 26 --

4 JUDGE PESLAK: Counsel?

5 MR. ARJOMAND: Yes. Yes.

6 JUDGE PESLAK: Can you go back to Slide 21 for a moment,
7 please?

8 MR. ARJOMAND: Yes.

9 JUDGE PESLAK: I read what's in yellow here on the bottom.

10 MR. ARJOMAND: Yes.

11 JUDGE PESLAK: One reading I could see of that is, right,
12 uppermost end 301. And then what seems to be the top surface is the shaft
13 end surface. And that seems to be what you're really trying to claim. But
14 the usage of language in the specification here is to what end is versus the
15 shaft end surface is different. But under your reading of the claim, it appears
16 that you want us to construe the claim at these two items here, 301 and 123
17 are the same thing, but they're described differently.

18 MR. ARJOMAND: I think they both point to the extremity of the
19 shaft. I think that's our point, Your Honor. I mean, yes, one is pointing to,
20 you know, a surface extremity of the shaft and one is point to that -- to the
21 edge of the shaft. But they're both pointing to the extremity of the shaft. So,
22 in our view, that's consistent with what our construction of end is.

23 JUDGE PESLAK: Okay. I understand what you're saying.

24 MR. ARJOMAND: Okay. Great.

25 Turning to Slide 26. This relates to the sleeve. The specification talks
26 about an uppermost end 2015 of the sleeve. Now, I think we sometimes talk

1 about end colloquy. And Mr. Smith talked about the colloquial use of "end,"
2 you know what you use for the colloquial use of end.

3 But when you look at for example, Slide 28, this is from a deposition
4 of Mr. Smith. We asked them, like, what do you understand to be the center
5 of the shaft in Figure 1 of Polinsky, though? You know, and we just pointed
6 and asked him a general question. And he talked about the upper end of the
7 shaft generally indicated at around 34 to 35.

8 I think that sort of establishes that the colloquial use of end is
9 consistent with what we're saying. And we have also evidence in the record,
10 Your Honors, from the dictionary regarding and end being a tip. So we
11 think, when you take a look at the claim language, the specification, the
12 other evidence in the record, end does mean an extremity. And Petitioner is
13 wrong to try to broaden that claim to also include an end region.

14 Now turning to the next claim construction point, we think the best --
15 this is also should be construed in our favor. So, here, I'm on Slide 33. And
16 every claim in the issued claim, in the issued patent, recites at least one
17 group indented at the external surface. And our construction of that is that
18 the groove is basically depressed or recessed in the external surface.

19 Now, Petitioner argues differently. So turning to -- jumping way
20 ahead to Slide 46. They pull from, I think, a Webster's Dictionary -- they
21 pull some definitions of the word "at". And so if you take a look at, on the
22 left-hand side of Slide 46 from, I believe this is from Mr. Smith's
23 declaration. He finds a definition of "at" that says it could be in, on, or near.
24 So, for them, the groove can be near the shaft. It doesn't have to be in or on
25 the shaft based on Petitioner's understanding of the word at.

1 But we think that that's a misreading of the claim. Specifically it's not
2 addressing that the claim recites indented at. And so if you take a look at
3 Slide 43, this is a passage or definition that we obtained from the Oxford
4 English Dictionary. And indented means impressed, struck, or dented in,
5 such to make a depression or hollow in a surface.

6 So in our view, when you take a look at the claim language, indented
7 at the external surface. Indented at provides that meaning of a depression or
8 recess in an external surface.

9 And that's consistent with the specification, Your Honors. I won't go
10 through all the spec cites that we have in the cite, in the presentation. But,
11 for example here, Slide 38 shows Figure 3 of the '090 Patent. There is
12 groove 121a, there is groove 121b, both of those are depressed or recessed
13 into the external surface of the shaft, consistent with our construction.

14 And if we look at the prosecution history, Your Honors, we said when
15 we're describing the invention that -- this is from an amendment that was
16 dated January 25, 2019, this is Slide 44. We said the groove is indented
17 specifically at the external surface, 200, of the main shaft as opposed to
18 being recessed into the sleeve, 124.

19 So with regard to the construction of indented at the external surface,
20 we think that our construction is consistent with the claim language with its
21 use of indented. It's consistent with the specification that always shows the
22 groove being indented or recessed into the surface of the shaft. And it's also
23 consistent with the prosecution history.

24 JUDGE PESLAK: Counsel?

25 MR. ARJOMAND: Yes.

1 JUDGE PESLAK: Let me ask you this question. It really relates to
2 how Petitioner has argued the grounds. But is it really necessary for us to
3 reach this construction? Because as I understand the petition, the petition
4 shows that the grooves are in the sleeve in Harless, not on the shaft. But
5 Petitioner says that it would be obvious to put them on the shaft which
6 would meet your construction. So I'm not sure why we have to construe
7 this. Maybe you can tell me whether you think why it's necessary.

8 MR. ARJOMAND: With respect to indented at?

9 JUDGE PESLAK: Yes.

10 MR. ARJOMAND: I think yes, it's primarily to overcome Harless
11 with respect to the way that they read Harless. As you know -- as you may
12 know from reading the petition, or particularly Mr. Smith's declaration, it's a
13 little unclear what they're arguments are with regard to Harless.

14 And so it wasn't evident to us that they were arguing that it would be
15 obvious to modify Harless to include a groove in the shaft in the way that
16 you had framed it, Your Honor. It might be the case, but that's not how we
17 initially read their papers. And so we think this construction is important for
18 the case.

19 We certainly think that the end construction is important for the case.
20 If you were to construe end in our favor, I think that would end the case or
21 would make the claims patentable in our view. Because as it turns out, I'm
22 turning to the next section with regard to the deficiencies of Polinski and
23 Piepho.

24 They never argued or rebutted our point that if you understand end in
25 the issued claims to mean an extremity, then Polinski and Piepho are missing
26 elements, and there would be no reason to modify Polinski and Piepho in

1 view of those missing elements. So if you were to construe end in our favor,
2 I think the claim, the issued claims would be found patentable.

3 And the reason for that is pretty simple Your Honors. Turning to
4 Slide 52. This just shows an annotated version of Figure 2. And at the top
5 you see near the threaded lug, 34, and the sleeve nut, 35, that's the end of the
6 Polinski shaft. You remember Mr. Smith also called that the end of the
7 Polinski shaft. That's the second end. The second end has no tapered region
8 extending from it. So that's pretty clear.

9 And if you go to Slide 55, Your Honors. This shows Piepho's Figure
10 3. And similar to Polinski, there's this threaded portion that's really the
11 second end of the shaft, the tapered portion of the shaft doesn't begin at the
12 second end, doesn't extend from the second end.

13 So it's clear that Polinski and Piepho are missing this claim limitation.
14 And then we argued in two different ways that it wouldn't be obvious to
15 modify Polinski to meet these claim limitations. First with respect to the
16 shaft being tapered, and then second with respect to the sleeve being tapered.

17 The shaft being tapered is a recitation that's in all three of the issued
18 independent Claims 1, 9, and 14. The sleeve being tapered is an additional
19 recitation in Claims 9 and 14.

20 So with regard to just focusing on the shaft being tapered, if you go to
21 Slide 60, Your Honors, what this is showing is again, an annotated version
22 of Figure 2 of Polinski. And it's important to look at the annular threaded
23 portion 28 -- annular shoulder, I should say, 28. And that meets or threads
24 with the head nut 29. That's at the bottom right of Figure 2. And then the
25 mantle 10 is basically connected, welded to that head nut.

1 And so what Polinski talks about, and this is very clear in this
2 disclosure, what it talks about is that the sleeve is securing that mantle. So
3 sleeve 12, which is shown in green, is securing the mantle 10. And in
4 securing the mantle, it's basically taking the axial load from the mantle as the
5 gyrator crusher is operating.

6 And that's actually explicitly in Polinski. Let me just jump to Slide 81
7 if I may. If you take a look at Slide 81, this is actually a claim in Polinski.
8 It's at column 4, lines 49 to 52. And it says the bearing sleeve is to restrain
9 the axial displacement of the mantle along the shaft.

10 And what Polinski then goes on to say, and this is at Slide 82, is that
11 the heat-shrink type connection between that sleeve that was in green and
12 the journal portion of Polinski basically allows for the load that's on the
13 sleeve to be absorbed by the journal itself.

14 But if you were to taper the journal, as would be what you would have
15 to do to modify Polinski to meet the claim limitation, then you would risk
16 failure because that load was, it being held at -- it was being secured by the
17 sleeve via the shaft would no longer be able to do so because the shaft has
18 been thinned out.

19 So we think that's one basis for finding that there wouldn't be any
20 reason to modify Polinski with regard to the shaft. But we think also with
21 regard to the sleeve. So turning to -- going back to Slide 67. The claims
22 require -- this is actually Slide 66. The claims require the wall thickness at
23 the second end of the sleeve to be greater than the wall thickness at the first
24 end of the sleeve. So that means that from the bottom of the sleeve, it's
25 tapering up.

1 So if you take a look at, for example, Slide 67, based on that threaded
2 shoulder 28 that I was discussing. This is Figure 2 again of Polinski. The
3 first end of the sleeve, the lower end is actually bigger than the, or wider
4 than the second end, which is the top end of the sleeve. So that limitation is
5 not met by Polinski. It's missing in Polinski.

6 If you take a look at Slide 28 that shows Piepho, you can see that
7 there's this flange. And so this again, the first end of the yoke bushing in
8 Piepho is jutting out or wider than the second end of Piepho's yoke bushing.
9 So that limitation is not met.

10 The only way Petitioners were able to argue that this limitation was
11 met by Piepho was to point to the end as being above the flange in the yoke
12 bushing. But if you construe end in our favor, that argument doesn't hold
13 water.

14 And then what we then further argue, and why we don't think, even
15 putting aside the missing elements, there wouldn't be any reason to modify
16 Polinski to make the sleeve's first end thinner than it's second end. Because
17 the whole principle operation of Polinski is to have that threaded shoulder
18 that I was showing you in 67.

19 So in Slide 69, this is from the summary of invention from Polinski.
20 This is Exhibit 1017, column 1, lines 44 to 47. It says, the present invention
21 relates to gyratory crushers in particular to a main shaft and a bearing sleeve
22 arrangement supporting the crusher head or mantle with the crusher. The
23 bearing sleeve arrangement is the key point of Polinski.

24 If you go to Slide 72, what Dr. Kytomaa said is that you would have
25 to essentially reduce that threaded shoulder, or eliminate it to meet the claim
26 limitations. So here in paragraph 71 of his declaration, Exhibit 2007 he

1 says, to achieve the limitation, the sleeve having a tapered wall thickness
2 such as the wall thickness at the second end of the sleeve is greater than the
3 wall thickness at the first end of the sleeve, the threaded shoulder 28, in
4 Polinski that is used to secure via head nut 29, the mantle 10, to a tapered
5 mantle support portion 8 of the shaft must be reduced in thickness or
6 eliminated. However, a POSITA would not be motivated to make that
7 change.

8 And, you know, given the time here I won't go through all the
9 paragraphs from Dr. Kytomaa's declaration, Exhibit 2007, where he explains
10 why he would never reduce, why a person of ordinary skill in the art would
11 never reduce the threaded shoulder 28 of Polinski. Because that's the whole
12 point of Polinski. There's issues with regard to the shoulder providing
13 stiffness and if you don't, if you basically eliminate it or reduce it, it will
14 otherwise lead to failure.

15 So I think one point that Petitioner's Counsel made in the previous
16 hearing was that Dr. Kytomaa's a hired gun, and you know, his credibility
17 should be questioned. I think that's very wrong. But I do think that Mr.
18 Smith's credibility should be questioned in both of these proceedings.
19 Because he had a fundamental lack of understanding of the basic physics
20 that were going on here.

21 So I just want to point you to two points here. So Slide 78, this is
22 from Mr. Smith's testimony deposition. He -- we asked him, would a person
23 of ordinary skill in the art looking at Polinski, specifically Figure 2,
24 understand that the mantle 10, during the operation of the gyrator crusher,
25 exerts axial stresses on sleeve 12? He says, without doing a proper analysis
26 I can't say for sure.

1 Well you know, as I showed you just previously if you take a look at
2 Polinski itself, it makes clear the bearing sleeve is to restrain the axial
3 displacement of the mantle along the shaft. That's Slide 81.

4 Similarly, we asked Mr. Smith, would a person of ordinary skill in the
5 art looking at Figure 2 of Polinski and the Polinski patent in general
6 understand the mantle exerts bending forces on the sleeve? And he was like,
7 I think the forces from the mantle are generally going to be transferred
8 directly into the shaft and the keyways between the shaft and the mantle.
9 That's Slide 80.

10 Well, if you take a look at Slide 83, it's very clear from Polinski that
11 the stress consolations are in addition to substantial stressors generated by
12 the cyclical bending loads applied to the shaft by the mantle during the
13 operation of the crusher. So his view that there weren't cyclical bending
14 loads I think is directly contradicted by Polinski.

15 We have in our papers a more lengthier presentation of this. But the
16 bottom line is that Mr. Smith did not have a good understanding of the
17 physics that were involved here. And Polinski, and the testimony that he did
18 give was completely contradicted by Polinski itself.

19 So with that, unless Your Honors have any further questions, I'll turn
20 over the podium to my colleague Jeff Young.

21 MR. YOUNG: Good afternoon, Your Honors, and may it please the
22 Board. First, thank you for accepting my LEAP petition. I appreciate the
23 opportunity to argue in front of the Board today.

24 Petitioner argues that it would have been obvious to modify Polinski
25 to incorporate grooves into the shaft in view of Harless. However,

1 Petitioner's proposed modification is contrary to Polinski's own stating
2 purpose which is preventing fatigue failure.

3 Today I'd like to provide a discussion of Polinski's purpose and the
4 corresponding structure of Polinski and how it achieves that purpose,
5 grooves and their role as stress raisers as well as fatigue failure and its
6 complexity.

7 I'd like to address Petitioner's assertions that the grooves do not
8 amount to the abrupt changes in cross-sectional area that Polinski is
9 concerned with. And that Shigley would provide a person of skill in the art
10 the ability to design around fatigue failure.

11 I would also like to discuss why the issue of fretting wear adds yet
12 another disincentive to cut grooves into Polinski's shaft. And then --

13 JUDGE MARSCHALL: Wait, we have to pause. We have a frozen
14 screen. Only one so far. It's not just the room.

15 (Pause.)

16 JUDGE MARSCHALL: Judge Peslak, are you with us?

17 JUDGE PESLAK: Yeah, I'm back.

18 MR. MARSHCALL: Excellent. You're a little grainy so I have no
19 confidence you'll remain with us. But we'll see how it goes. I think you just
20 missed 30 seconds.

21 We'll have you pick up where you left off.

22 MR. YOUNG: Sure. I'll give a brief roadmap. So I'm going to
23 discuss Polinski, it's stated purpose and corresponding design, grooves and
24 their role as stress raisers as well as fatigue failure and associated
25 complexities. Petitioner's assertions that grooves don't amount to abrupt
26 changes in the cross-sectional area that Polinski's concerned with.

1 Petitioner's assertions that Shigley would enable a POSITA to design around
2 fatigue failure.

3 I'll also -- sorry -- I'll also discuss fretting wear and how it adds yet
4 another disincentive to cut grooves into Polinski's shaft. And then I'll wrap
5 with a discussion of Claim 11 and Harless.

6 So with respect to Polinski's purpose and design I'd like to start at
7 Slide 94. As you can see, Polinski's asserted invention eliminates abrupt
8 structural discontinuities from normally high-stress regions of the shaft.
9 Polinski discusses issues with previous gyratory rock crusher designs, and
10 that threads were generally cut into the shaft and the mantle was threaded
11 onto the shaft using those threads.

12 The threads and abrupt changes in the cross-sectional area above and
13 below the threaded regions resulted in stress concentrations which when
14 combined with cyclic bending loading resulted in fractures that ultimately
15 rendered the shaft unserviceable.

16 Turning to Slide 97, you can see the configuration in Polinski which
17 my colleague just provided an overview of. The bearing journal, 11, is as
18 you can see perfectly cylindrical. The sleeve is fit to that, and the threads
19 are actually placed in the annular shoulder at the bottom of the sleeve. The
20 mantle is then threaded onto the shoulder, and the sleeve absorbs the axial
21 forces from the mantle.

22 So Polinski's whole point is, keep discontinuities like threads out of
23 the shafts high stress regions to reduce the possibility of fatigue failure. This
24 is because as Polinski recognizes, discontinuities, including grooves, creates
25 stress concentrations that under cyclic loading increase the risk of fatigue
26 failure.

1 This is supported by a well known reference in the art, Shigley. Both
2 experts relied upon Shigley during this proceeding. I'd like to turn to Slide
3 99.

4 Slide 99, Shigley describes that stress concentrations can arise from
5 things like tool marks, holes, notches, grooves, and threads. And at Slide
6 100 Shigley describes that under cyclic and dynamic loading the stress
7 concentration affects are significant.

8 Materials that are often thought of as ductile can fail in a brutal
9 manner under cyclic loading, particularly when there are stress
10 concentrations in the material such as grooves. Dr. Kytomaa's testimony in
11 this case supports the proposition that adding grooves to the shaft would be
12 contrary to Polinski's purpose.

13 Turning to Slide 90 --

14 JUDGE PESLAK: Counsel?

15 MR. YOUNG: Yes, Judge.

16 JUDGE PESLAK: What's your response to Petitioner's argument that
17 Shigley teaches you how to minimize the stress from grooves in the shaft?

18 MR. YOUNG: Thank you, Your Honor. I'd like to turn actually to
19 Slide 105. So at Slide 105, Dr. Kytomaa has actually addressed this issue.
20 Dr. Kytomaa notes that a POSITA would know that fatigue is a complicated
21 failure mechanism that is difficult to predict analytically. Fatigue testing is
22 difficult to set up and run, and requires many samples to generate
23 meaningful data.

24 Additionally, Dr. Kytomaa goes on to note that it would be difficult to
25 predict the loading that would be encountered, and so it would be difficult to
26 set up this testing in the first place.

1 Jumping to Shigley's discussion on this point, if I can find the correct
2 slide. Shigley, at Slide 104, notes that fatigue is a much more complicated
3 phenomenon than static failure. It's only partially understood.

4 Moreover, Patent Owner in this case has submitted that a person of
5 skill in the art would have approximately two years of experience and a
6 bachelor's degree in mechanical engineering. Dr. Kytomaa has testified that
7 a person of such skill would not be comfortable making the proposed
8 modifications to the shaft given the complexities associated with fatigue
9 failure.

10 And moreover, when you look at the stated purpose of Polinski, the
11 question isn't whether it would be possible to add grooves while addressing
12 fatigue. It's whether a person of skill in the art would be motivated to do so
13 given Polinski's specific teachings that its entire objective is to mitigate the
14 risk of fatigue failure present in previous gyratory crusher shaft designs.

15 And we know that introducing grooves would introduce stress
16 concentrations, and it would therefore, as Dr. Kytomaa has testified, increase
17 the likelihood of failure. So a person of skill in the art would not be
18 motivated to do something that would go against Polinski's unstated
19 purpose.

20 And that brings me to another of Petitioner's arguments. Petitioner
21 argues that the grooves wouldn't amount to the abrupt structural changes that
22 Polinski is concerned with in this case. For that, I'd like to turn to Slide 92.
23 We asked Mr. Smith about this issue during his deposition because he had
24 testified that a groove wouldn't amount to these abrupt changes in cross-
25 sectional area.

1 And so we asked Mr. Smith, you know, would a groove have a similar
2 depth to a thread? And Mr. Smith testified that he supposes that they could
3 have a similar depth, that there are probably some instances where these
4 sizes line up. And so the proposition that the grooves wouldn't amount to
5 the types of changes in cross-sectional area that Polinski is concerned with is
6 based on mere speculation as to the depth of any groove that would be added
7 to the shaft.

8 I'd like now to turn to the issue of fretting and why fretting provides
9 yet another reason why a POSITA would not modify Polinski's main shaft as
10 proposed by the Petitioner. So, turning to Slide 108. Slide 108 provides an
11 excerpt from the Piepho reference. Petitioner's ground, again, relies on a
12 combination of Polinski and Piepho, both of which take steps to mitigate
13 fretting damage. Fretting results from small relative motion between bodies
14 in contact, for instance, between a sleeve or a yoke bushing that's
15 interference fit with a shaft, and it's most common at edges between those
16 contacts, such as along a groove.

17 Slide 117, Mr. Smith actually concedes that adding grooves to the
18 shaft would add edges along the contact region between a shaft and a sleeve.
19 And you can see here at the last few lines, Mr. Smith notes that it's possible
20 that adding grooves would increase the likelihood of fretting. While he's not
21 sure that it would lead to a failure, it would likely increase the likelihood of
22 fretting.

23 Importantly, fretting is associated with fatigue failure. So, increasing
24 the likelihood of fretting would, in turn, increase the likelihood of fatigue
25 failure. This is supported at Slide 114 in another reference relied upon in the
26 preceding "Fundamentals of Machine Component Design," by Robert

1 Juvinall. Juvinall notes that the roughness and pitting caused by fretting
2 make the surface more vulnerable to fatigue failure. Reducing fatigue
3 strength is a major consequence of fretting.

4 So that's all to say the record shows that adding grooves increases the
5 likelihood of fretting and, therefore, increases a second path to fatigue
6 failure.

7 Finally, the risks presented by adding grooves to the Polinski shaft
8 outweigh the asserted benefits outlined by Petitioner and Mr. Smith in this
9 proceeding. Petitioner argues that the oil grooves provide benefits with
10 respect to the making or breaking of interference fits. However, Dr.
11 Kytomaa has testified that any such unproven benefits would fail to tip the
12 scales when compared to the concerns of shaft failure.

13 And with that, I'll turn to Slide 118. As you can see here, Dr.
14 Kytomaa testifies that the risk of fatigue failure is an existential threat, and it
15 would be front and center -- a front and center consideration for the
16 POSITA. Mr. Smith has actually agreed that shaft failure would be a major
17 concern. He notes that a POSITA would actually want to design the shaft in
18 a way that the shaft fails less often, because if you're experiencing a lot of
19 shaft failures, then it becomes a major concern.

20 JUDGE MARSCHALL: Excuse me. I have a question, maybe two
21 questions. Just on a gut level, it seems like Harless already discloses
22 grooves, correct?

23 MR. YOUNG: That's correct.

24 JUDGE MARSCHALL: And at least one of those grooves is
25 indented in the shaft, isn't it?

26 MR. YOUNG: That's correct.

1 JUDGE MARSCHALL: So the limitation is taught. You're just
2 saying that it wouldn't be obvious to add a groove to Polinski?

3 MR. YOUNG: Our argument, yes, is that in view of the teachings of
4 Polinski, it would not be obvious to add a groove to Polinski.

5 JUDGE MARSCHALL: But given that Harless, at least over 70 years
6 ago, thought, given all the pros and cons, it was worth adding an indented
7 groove, doesn't that undermine your argument that nobody of skill in the art
8 would think to add an indented groove to a shaft?

9 MR. YOUNG: I don't think so, Your Honor, because you have to,
10 respectfully, you have to look specifically to the teachings of Polinski. And
11 Harless had a specific environment that it was dealing with. It's a shaft
12 connected to a gear hub, and there were specific forces at issue. But when
13 you look to Polinski, which is a gyratory crusher, you have to consider the
14 specific forces that would be at play there, and you have to consider the
15 specific teachings of Polinski and its objectives.

16 The objective of Polinski is to reduce the possibility of fatigue failure,
17 and we've discussed why adding grooves would increase that risk. And
18 whether you could, in theory, design the shaft in such a way that it would be
19 less -- that it wouldn't fail, the question is whether a POSITA would be
20 motivated to do so, given that adding the grooves would increase the
21 likelihood of failure.

22 And there's Federal Circuit case law that supports that. In *Medtronic*
23 *v. Teleflex*, at Slide 121, the Federal Circuit held that the Board did not err in
24 determining that the destruction of a reference's entire purpose counsels
25 strongly against the finding of obviousness. Likewise, in *Polaris Industries*
26 *v. Arctic Cat*, the Federal Circuit held that -- they vacated the Board's

1 decision that failed to consider whether a modification that runs contrary to a
2 reference's stated purpose would be -- I'm sorry.

3 They vacated the Board's decision that failed to consider whether a
4 modification that runs contrary to a reference's stated purpose would be
5 obvious.

6 JUDGE MARSCHALL: As a general matter, that makes sense. But
7 Harless and other references in the record disclose grooves on shafts, and
8 presumably they're all concerned with fatigue failure and yet they thought
9 that the advantage of the groove outweighed whatever negative impact there
10 would be to fatigue failure. So that's why I'm having a tough time seeing
11 why they wouldn't weigh those pros and cons when considering adding a
12 groove to Polinski as well and come out the same way and add one, at least
13 in some circumstances. There's nothing magic, I guess, about Polinski's
14 structure that I'm seeing that would make it just completely inoperative if
15 you added a groove to it. It looks just like the shafts in the other art that
16 have grooves. So, am I missing something there?

17 MR. YOUNG: Well, I think that ties into Polinski's discussion of a
18 failure that was actually encountered in these shafts. So in Polinski's
19 background section, and I can't point to the slide offhand because I don't
20 recall where it is, but Polinski specifically addresses the fact that when you
21 did have these threads in the shaft and you connected the mantle directly to
22 the shaft via those threads, there were issues with shaft failure. It was
23 actually the Coxhill '922 reference, which is one of the exhibits in this case.

24 JUDGE MARSCHALL: So those are threads, not fluid grooves,
25 correct?

1 MR. YOUNG: Those are threads, not fluid grooves. Polinski
2 describes them as structural discontinuities. And so, we view it as
3 essentially removing one issue, and you would just be adding another issue
4 back into the shaft. You take out the threads, but then you would be adding
5 new discontinuities that raise the likelihood of failure.

6 JUDGE MARSCHALL: I understand your position. Thank you.

7 MR. YOUNG: Thank you, Your Honor. Your Honor, your question
8 does raise a point in that another Federal Circuit case holds that when there
9 are advantages and disadvantages -- it's *Winner*, I don't recall the exact case.

10 JUDGE MARSCHALL: *Winner v. Wang*.

11 MR. YOUNG: *Winner v. Wang*, yes. The Federal Circuit has held
12 that when there are advantages and disadvantages, you have to weigh the
13 pros and cons. And so, our position is that the cons associated with adding
14 the grooves in this case significantly outweigh any advantages. As Dr.
15 Kytomaa has testified, failure is an existential threat. If you cause the shaft
16 to fail, then the entire machine is rendered unusable.

17 If there are no further questions, Your Honor, on this point, I'd like to
18 turn now to Claim 11. So, as has already been discussed, Petitioner has
19 dropped their arguments with respect to Claim 11. And so, for at least that
20 reason, our position is that Claim 11 is patentable.

21 JUDGE MARSCHALL: We still have the arguments in the petition
22 that are in the record.

23 MR. YOUNG: And I will address Petitioner's arguments here. So
24 Claim 11 recites that an end retainer includes a recess extending
25 circumferentially at the perimeter region to allow axial movement of the

1 sleeve into the recess. Regardless of whether Petitioner has dropped its
2 request to cancel Claim 11, it is patentable over Harless.

3 Here on Slide 125, you'll see a modified version of Figure 7 that
4 Petitioner has submitted. The portion colored in brown is labeled end
5 retainer. This is a washer, as disclosed in Harless. Petitioner has moved the
6 washer away from the shaft and colored, you can see what appears to be a --
7 what Petitioner has colored in to show as a shoulder to the right of the
8 washer, and has labeled that as a recess. However, this is not actually
9 disclosed in Harless.

10 First, the washer does not have that shoulder feature. It's not
11 described in Harless. Petitioner actually appears to concede that the washer
12 is flat in their filings. As you can see, turning to Slide 126, what's actually
13 shown in Harless is that the washer is positioned flush in contact with the
14 sleeve.

15 Granted, Harless does disclose that you can move the washer away
16 from the sleeve, which would inevitably create a gap between the washer
17 and the sleeve. However, that is not what's claimed. What's claimed is that
18 there's an end retainer that includes a recess that extends circumferentially
19 and allows the sleeve to move into that recess.

20 JUDGE MARSCHALL: If it did have a shoulder, would that meet
21 the claimed recess requirement?

22 MR. YOUNG: No, Your Honor, I don't think so. If it had a shoulder
23 -- regardless, every figure in Harless, in the way that it's described, there is
24 no recess between the retainer and the sleeve. The shoulder would simply
25 act as a seat, but the washer always remains in flush contact with the sleeve.

1 So the sleeve cannot move into the recess when the washer is attached to the
2 shaft.

3 JUDGE MARSCHALL: Well, there is some backing away teaching
4 in Harless, right? Where you can back out the washer. That would create a
5 space, at least, between the washer and the end of the shaft. Would that
6 meet the recess limitation?

7 MR. YOUNG: No, I don't think so, because the end retainer would
8 not include a recess that allows the sleeve to move into the recess. The
9 washer would simply have to be backed off, and when you remove any
10 components, or move any component away from something else, there
11 would be a gap, right? The component still doesn't actually include a recess
12 as claimed.

13 JUDGE MARSCHALL: If it had a shoulder, wouldn't it then have a
14 recess?

15 MR. YOUNG: Well, Your Honor, first I'd like to just point out that
16 there is no disclosure of a shoulder in Harless. Mr. Smith testified in his
17 declaration that there appeared to be a shoulder. However, when we asked
18 him about this on cross, Mr. Smith was not able to identify any shoulder. He
19 actually pointed out that it appears to be a chamfer of a shaft.

20 So there's nothing in Harless, and Mr. Smith has contradicted himself
21 as to what is actually disclosed with respect to the washer. Our position is
22 that the washer does not have any shoulder, and again, Petitioner has
23 indicated in its reply to the revised motion to amend that the washer is
24 entirely flat.

1 JUDGE MARSCHALL: In Figure 5, I think that's debatable. There
2 arguably is a shoulder, so it's just not altogether clear. But it may be moot if
3 they're dropping that claim entirely.

4 MR. YOUNG: I would just like to point out with respect to Figure 5,
5 as you'll see in Figure 5, Figure 5 shows that the washer is still placed in
6 flush contact with the sleeve, regardless of whether there's any shoulder.
7 And so, simply porting the washer over to Figure 7 wouldn't result in a
8 washer position such that there is a recess. A person of skill in the art
9 looking to that would see that those are two independent embodiments, and
10 you couldn't simply take that washer and move it over to Figure 7 to create
11 the recess.

12 JUDGE MARSCHALL: Okay. Thank you.

13 MR. YOUNG: With that, Your Honor, if there are no further
14 questions, I'll turn it back over to my colleague Mehran.

15 Change of plans. Your Honors, I'd like to transition to our discussion
16 of fatigue failure as it relates to the new grounds presented against the
17 substitute claims. As I just previously noted, Petitioner's arguments that it
18 would have been obvious to incorporate grooves into the bearing journal of
19 Polinski fail to account for the complexities of fatigue failure and ignore the
20 underlying purpose of the design in Polinski, which is preventing fatigue
21 failure.

22 Petitioner's arguments that it would have been obvious to modify the
23 Coxhill '800 shaft to incorporate oil grooves similarly ignores the teachings
24 presented in Polinski that the Coxhill shaft was already prone to fatigue
25 failure. Here at Slide 97, you can see the description of the prior art
26 provided in Polinski.

1 Polinski teaches that previous crusher designs, such as U.S. Patent
2 4,034,922 to Coxhill, cut threads, as I previously discussed, into the main
3 shaft and attach the mantle to the main shaft. Polinski further teaches that
4 this arrangement is prone to fatigue failure, because the abrupt changes in
5 cross-sectional area above and below the threads create high stress
6 concentrations that ultimately result in fractures and render the shaft
7 unserviceable.

8 JUDGE PESLAK: Counsel, which slide are you on?

9 MR. YOUNG: Slide 97, Your Honor -- 197.

10 JUDGE PESLAK: The first one or the second one?

11 MR. YOUNG: This is the second slide back.

12 JUDGE MARSCHALL: 197.

13 JUDGE PESLAK: Okay. Thank you.

14 MR. YOUNG: My apologies.

15 JUDGE MARSCHALL: Again, I have the argument. Yagi teaches,
16 in other words, in the motion to amend context, more grooves on shafts, no
17 problem. So why wouldn't it be obvious, or why wouldn't a POSITA, even
18 recognizing some disadvantages, think that grooves, at least for fluid, would
19 be positive to have?

20 MR. YOUNG: That again brings me back to the same point that you
21 have to weigh the advantages with the disadvantages. And particularly with
22 respect to Coxhill, we know that the Coxhill shaft is prone to fatigue failure.
23 Yagi is, again, a different context. It's a coupling connection between, I
24 don't recall exactly, the machinery, but a high-speed rotating component. It's
25 not subject to the same stresses that are at issue in a gyratory crusher.

1 We know from Polinski that the Coxhill shaft has failed. The entire
2 invention of Polinski resulted because of those failures in shafts, like the
3 configuration described in Coxhill. So we know Coxhill already failed. It
4 was already prone to failure. Adding these grooves adds yet another layer of
5 stress concentrations into the shaft.

6 A person of skill in the art knowing the complexities of fatigue failure
7 and knowing the stresses at issue with respect to Coxhill, and knowing that
8 Coxhill was prone to failing under these conditions would understand that
9 adding these grooves was a risk, and that the risk is shaft failure. You risk
10 rendering your entire machine unserviceable.

11 I'd like to turn now to Slide 200. Mr. Smith, when asked whether he
12 was aware of any issues with the shaft in Coxhill, noted that he hadn't seen
13 anything that indicated that the Coxhill shaft was prone to failure, and he
14 thinks that it would have been designed in a way that it works properly.
15 Here at Slide 201, Dr. Kytomaa notes that a petitioner would understand that
16 introducing additional grooves into Coxhill could increase the risk of
17 catastrophic fatigue failure.

18 Mr. Smith's position, as clear from his testimony, is based on the false
19 assumption that Coxhill was not prone to failing under fatigue loading. In
20 contrast, Dr. Kytomaa is aware of the fact, based on the teachings of
21 Polinski, that Coxhill was prone to fatigue failure. As I noted, the Coxhill
22 reference described in Polinski is Coxhill '922.

23 I'd like to turn back to Slide 199, just as a clarifying point. The
24 reference relied upon by the Petitioner is actually the Coxhill '800 reference.
25 But when you compare the figures and the disclosure of Coxhill '922 and
26 Coxhill '800, they're essentially identical. This is the primary figure in both

1 of these patents. As you can see, in this side-by-side comparison, they have
2 an essentially identical structure. The threads are cut into the shaft and the
3 crusher mantle is attached to the main shaft. So the teachings of Polinski
4 with respect to Coxhill '922 clearly apply to Coxhill '800, and Dr. Kytomaa
5 testified to that.

6 JUDGE MARSCHALL: Wouldn't the threading context and the fact
7 that you're coupling something rigidly introduce arguably more stress than a
8 mere conduit for oil, and therefore whatever problems they're encountering
9 with threads wouldn't necessarily transfer over to a simple oil conduit, which
10 doesn't bear a load in the same way as a thread?

11 MR. YOUNG: I understand your question, Your Honor. Thank you
12 for it. Being a simple lawyer, I'm not certain Dr. Kytomaa has testified to
13 the fact that adding grooves to the shaft would increase the likelihood of
14 fatigue failure. He's testified that a person of skill in the art would not be
15 motivated to do so because they would understand that it could increase the
16 risk of catastrophic fatigue failure.

17 And so, this is Dr. Kytomaa's testimony that machining grooves into
18 these shafts, they could increase the risk of catastrophic fatigue failure. And
19 this is a modification that a person of skill in the art would not be willing to
20 undertake given his or her experience level in the field. Finally, turning to
21 Slide 205. Yeah, I'd also, let me find this testimony quickly. Dr. Kytomaa
22 has testified actually that grooves and threads are similar. And I will have to
23 see if I can find that in the record for you. We can do that on record.

24 JUDGE MARSCHALL: I believe that he said that. I'll take your
25 word for it.

1 MR. YOUNG: Finally, I just want to point out, as my colleague
2 mentioned earlier, various references at issue here have been considered
3 during prosecution of the application resulting in the '090 patent. The
4 Coxhill '825 reference, which is Exhibit 2028 in the present proceeding, was
5 considered by the examiner. And as you can see here, page 1 of the Coxhill
6 '825 patent, it discloses an essentially identical gyratory pressure structure.

7 JUDGE PESLAK: Counsel?

8 MR. YOUNG: Yes.

9 JUDGE PESLAK: When you say considered by the examiner, are
10 you saying it was on an IDS that the examiner initialed, or was there an
11 actual office action?

12 MR. YOUNG: So the Coxhill '825 reference is not relied upon by the
13 examiner in a rejection. I believe it was cited by the examiner. I don't recall
14 whether it was submitted by the applicant or whether it was cited by the
15 examiner. I can check on that and we can get back to you on rebuttal.

16 JUDGE PESLAK: Okay. Thank you.

17 JUDGE MARSCHALL: Addressing Claim 16, was that your co-
18 counsel?

19 MR. YOUNG: My co-counsel will be addressing Claim 16. With
20 that, Your Honor, if there are no further questions, I'll turn it back over to
21 my co-counsel.

22 JUDGE MARSCHALL: Great. Thanks.

23 MR. ARJOMAND: I assume we're going to go a little bit into our
24 rebuttal time, Your Honors. So turning to Claims 16 and 24, I think it's best
25 to understand these claims are directed to various recitations relating to an
26 oil path and an internal oil path.

1 So here in Slide 212, this shows Figure 3 annotated. And what
2 Claims 16 and 24 recite, they recite an oil path consisting of five elements.
3 There's the fluid inlet that's shown at the top of Figure 3. A first groove and
4 a second groove. Those are shown on the right of Figure 3 here on Slide
5 212. An axially extending channel to couple the first and second groove.
6 That's shown here on the right as well of Figure 3, and then an internal oil
7 path. And the internal oil path consists of the first conduit and the second
8 conduit.

9 So Claims 16 and 24 are consisting of framework where there's five
10 limitations, the fluid inlet, the first groove, the second groove, the axially
11 extending channel, and an internal oil path. And then the internal oil path
12 has two limitations consisting of, again, first conduit and a second conduit.

13 And from what we can glean from Petitioner's challenge to Claims 16
14 and 24, they're principally relying on Yagi. Yagi has three embodiments.
15 The first embodiment here on Slide 214, this shows Figures 3A and 3B.
16 And if you can take a look at the figure on the left, there is an axial oil
17 passage 22 that feeds into a radial oil passage 23, and then that feeds a single
18 groove 24. So that embodiment doesn't meet the claim limitations.

19 If you go to Slide 215, this shows the second embodiment of Yagi.
20 Here we have, again, an axial oil passage 42. That feeds into the radial oil
21 passages 43 and 45, and then that feeds two grooves, 44 and 46. This
22 recitation or this embodiment doesn't have the axially extending channel
23 that's recited in Claims 16 and 24. So this embodiment doesn't meet the
24 claim language.

25 And then turning to Slide 216, this is the third embodiment of Yagi.
26 And so what Yagi is showing here in Figures 5A, 5B, and 5C, but I think it's

1 easier to look at Figure 5A, it shows an axial oil passage 62 that feeds a
2 radial oil passage 63, and then that feeds groove 65. And then there's a
3 connecting oil groove 66 that feeds the first oil groove 64.

4 So basically, in this embodiment of Yagi, the axial oil passage and the
5 radial oil passage feed the further groove, which is groove 65. And then that
6 goes back and feeds groove 64 in comparison to our claimed invention
7 where we feed the internal oil path, the first inlet and the second -- the first
8 conduit and the second conduit feed the first groove, and then that in turn,
9 through the axial extending channel, feeds the second groove.

10 And there are reasons that there's benefits to this approach. The
11 patent actually speaks about this. So turning to, for example, Slide 224.
12 This is from the '090 patent, column 3, lines 2 through 13. It says that such
13 an arrangement is advantageous to reduce the axial length of any internal
14 bore through the main shaft. Minimizing an axial length of an internally
15 extending fluid supply conduit is advantageous to a manufacturer as the use
16 of very long and thin drills should be avoided.

17 And I think this claim sort of lends itself best visually. So what that's
18 getting at is in the context of the patent, that fluid inlet is connected to the
19 first conduit. See how short that is compared to, if you take a look at Figure
20 5A of Yagi, that fluid conduit, that axial oil passage 62 goes really deep into
21 the shaft.

22 So we think it's pretty clear that Yagi doesn't meet the claim
23 limitations of 16 and 24. What the Petitioner has done is that they've made
24 two obviousness arguments. They've done a kind of design choice
25 argument, and then they've also done an obvious to try argument. So on

1 design choice, I think it's important just to kind of center ourselves first on
2 the case law.

3 So this is Slide 229, and this is the *Cutsforth* case. And it says merely
4 stating that a particular placement of an element is a design choice does not
5 make it obvious. And if you take a look at what Petitioner has done, they
6 pretty much have just basically said it's a design choice. So let me go back
7 to Slide 223. This is the paper 33 at page 15. They said the design choice to
8 port to one or the other grooves does not make any material difference to the
9 functionality of the device and is merely a design decision.

10 So it's basically a very high level argument that they're presenting
11 based on design choice. And the case law says that that's not enough.

12 So going back to Slide 228, we cited a case *In re Chu*. A portion of it
13 is shown here on the slide. And if I could just direct your attention to the to
14 the bottom right, there's a setting to *In re Gal*. And they say that finding an
15 obvious design choice is precluded where the claim structure and the
16 function of performs are different from the prior art.

17 Well, here we've established the claim structure is different. And I
18 think the function is also different because there's really quite a bit of
19 advantage in having a short fluid or short axial conduit compared to a longer
20 axial conduit that's shown in Yagi.

21 And to that end, we have provided testimony from Dr. Kytomaa. This
22 is in Slide 226. This is Exhibit 2022, paragraph 55. He says that having this
23 shorter oil path has a number of advantages. It requires less oil to fill this --
24 oil volume to fill the system. Less time is needed to pump the oil to reach
25 the desired pressure. There's less cleanup. There's less machine time. So

1 there are definitely functional benefits to the approach that's not evident at
2 all in Yagi's Figure 5 or the third embodiment.

3 Also, turning to obvious to try, that one, I think, is even more
4 problematic for Petitioner. Here on Slide 230, they just kind of at, again, a
5 very high level, say the obvious to try choosing from a number of identified
6 predictable solutions with a reasonable expectation of success. But we know
7 that there aren't a finite number of identified predictable solutions. They
8 haven't established that.

9 And so if you take your attention to Slide 232, this is the *Rolls-Royce*
10 case that we cited in our briefing. And at the top right, it says that the broad
11 selection of choices for further investigation available to a person of
12 ordinary skill included any degree of sweep. That case was about the sweep
13 angle for, I believe, an airplane motor.

14 And the key point there was that there was so many different angles of
15 sweep available that there couldn't be sort of a finite number of choices.

16 And that's our position here, that they haven't really established a
17 finite number of choices, and that sort of kills their obvious to try argument.
18 So unless Your Honors have any further questions, we'll reserve the rest of
19 our time for rebuttal.

20 JUDGE MARSCHALL: I think that's it. You've got about 12
21 minutes left.

22 MR. ARJOMAND: Okay. Thank you.

23 JUDGE MARSCHALL: You've got 38 minutes left. It's not required,
24 but --

25 MR. SANKS: I just need this 12. That's about all I need. All right.
26 To begin with, I want to touch again on analogous art. *Ex parte Goodyear*

1 *Tire & Rubber Co.*, 230 USPQ 357, found that -- the predecessors to this
2 board concluded that clutches and brakes were analogous art. I bring that up
3 again to show the narrowing that Patent Owner is trying to make isn't
4 appropriate. I mean, we're still in the same arena. We're trying to do the
5 same thing.

6 As for the comment that we're relying solely or independently on the
7 classifications, no, we're just using that to show a further example or
8 showing that this is an analogous art field. We're not trying to say, look at
9 the classifications alone, take the case law, take everything else. This is, it's
10 analogous art. And again, I'm speaking primarily with respects to Piepho.

11 As for the end region versus the end, yes, the end, we're talking the
12 extremity, but again, it's not defined in the specification. I mean, it's just
13 not. I mean, as Your Honors pointed out, element 301 and 123 are not the
14 same thing. They're pointing to the same location. One is the uppermost
15 end, and the other is referring to the shaft in surface. Now, as for these
16 grooves --

17 JUDGE PESLAK: Counsel, let me ask you a question about your
18 claim construction.

19 MR. SANKS: Yes.

20 JUDGE PESLAK: So, if we weren't to adopt Patent Owner's
21 construction, and I know Petitioner's position is its plain and ordinary
22 meaning, but what would be the outer limits of the end if it's more than just
23 the very top surface of the shaft? And is there something in the patent itself
24 that would educate us on how far the end extends?

25 MR. SANKS: I think that's part of where my argument is. There isn't
26 truly something there that's defining what the end is. I mean, the argument,

1 it's the extremity, but the whole upper end of the shaft is arguably the end
2 extremity. That's, I guess, part of our concern. It's not defined.

3 JUDGE PESLAK: Well, let me ask you this, then. If I look at
4 Piepho, right? There's a tapered portion of the shaft.

5 MR. SANKS: Correct.

6 JUDGE PESLAK: And on top of that, there's a threaded portion with
7 a lug nut. So, if I just take Piepho at its disclosure, why is that tapered
8 portion at the end?

9 MR. SANKS: Just a minute, Your Honor. Well, I believe you could
10 make an argument that the nut end could be identified as the end. Again,
11 I've just -- it's not defined in the specification.

12 JUDGE MARSCHALL: The nut is not part of the shaft, right?

13 MR. SANKS: No, it's not.

14 JUDGE MARSCHALL: But the threads are at least integral with the
15 shaft, right? Are the threads part of the taper? In the highlighting of
16 Polinski, at least it seems like the orange portion, this is page 16 of the
17 petition, does not extend to the yellow threaded portion. But it's not entirely
18 clear to me what you're alleging, where the tapered portion ends. I assume it
19 does not include the threads.

20 MR. SANKS: It does not.

21 JUDGE MARSCHALL: It does not, okay. So I think the question is
22 -- I see Petitioner's position as fairly strong if it just says second end,
23 because end can be more general than the furthest extremity, as one of the
24 references, I believe it's Polinski, talks about the taper at an end. So it's
25 consistent with that. I think the closer question is when it says the taper is
26 extending from the second end. That may suggest that it's at the extremity

1 of the end, and that's where I think it's a very close issue. So how did it
2 extend from an end without being at the furthest extremity of the shaft?

3 MR. SANKS: Well, if you extend from the end -- I guess I look at it
4 with respect to an arm. If you extend from the end, again how far do you go
5 to say that's the end? I mean, if I wear a watch at the end, but if I can wear
6 one up here if I wanted to or multiple. I mean it's, I just think it's a vague
7 term.

8 JUDGE MARSCHALL: Okay. I understand your position.

9 MR. SANKS: Also, with respect to analogous art, Patent Owner's
10 essentially taking the position that Piepho isn't analogous art with respect to
11 the original claims, but then it is analogous art with respect to the amended
12 claims. And I don't think you can have it both ways. I mean, either it's
13 analogous art or it's not analogous art.

14 As for grooves, the issue Petitioner has with grooves is, depending on
15 the depth and the width of the grooves, that is what will cause the fatigue or
16 the fretting or the failure. Again, in this, there's no discussion about the
17 depth or anything about the width of the grooves.

18 Going back to Harless, as pointed out, there's plenty of prior art
19 references that disclose and teach grooves. Now trying to pierce it down and
20 say, well, it's going to cause these issues, as Mr. Smith pointed out, yeah, it
21 can be designed around. Patent Owner's saying it can't or it's difficult. They
22 didn't say it was impossible to, they just said it would be difficult to. So
23 having the grooves, again, there's no definition there other than saying that
24 there's grooves and there is prior art that says grooves are -- there's grooves
25 in the prior art.

1 And as for Claim 11, I kind of maintain the argument I made this
2 morning in the other case. I understand it does look like it was dropped. I
3 do think the prior art is still sufficient to address it. I understand it was still
4 addressed by the Patent Owners, but still maintain it is also invalid. And
5 unless there's any questions.

6 JUDGE MARSCHALL: I think that's it.

7 MR. SANKS: All right. Thank you.

8 MR. YOUNG: Thank you, Your Honors. I just wanted to quickly
9 address your question, Judge Peslak. Coxhill '825 was submitted via IDS.
10 You can find that on page 45 of Exhibit 1001-1.

11 JUDGE PESLAK: Okay. Thank you.

12 MR. YOUNG: Okay. I'd like to address a couple of Petitioner's
13 points and also attempt to address one of your questions, Judge Marschall.
14 Turning to Slide 92, Petitioner testified that there was nothing in the record
15 with respect to the depth of threads and grooves. However, as I previously
16 noted, Mr. Smith did testify during his deposition that the depth of a groove
17 could be similar to the depth of a thread. He noted that in some instances the
18 sizes of these would likely line up.

19 JUDGE MARSCHALL: It's not so much the size as that or the
20 thread. It's being used as a kind of a critical point physically to join two
21 structures rigidly. And that's a much different stress concentration than an
22 oil groove, even if they're the same size.

23 MR. YOUNG: Thank you, Your Honor. That brings me to Slide 90,
24 which includes testimony from Dr. Kytomaa. Dr. Kytomaa noted that the
25 bearing journal 11, that's in Polinski, which has removed the threads, is still
26 subjected to substantial stresses generated by the cyclic bending loads

1 applied to the shaft by the mantle during operation of the crusher. And that
2 adding an oil groove to the bearing journal would have a similar effect to the
3 threads as described by Polinski.

4 So, although you've removed the threads and the direct connection to
5 the mantle, you still have the mantle exerting substantial stresses on that
6 region of the shaft given its connection to the sleeve. There is still going to
7 be -- that is where the loads are still going to be introduced. You don't have
8 the threads, but if you introduce those grooves, you still have the
9 discontinuities. You still have the stress concentrations.

10 And under the substantial stresses, Dr. Kytomaa has testified that this
11 would have a similar effect to the threads and that this would have been
12 evident to a person of ordinary skill in the art. If there are no further
13 questions, I'll turn it back over to my co-counsel.

14 MR. ARJOMAND: Your Honors, unless there are any further
15 questions with respect to claim construction, analogous art, the deficiencies
16 of Polinski and Piepho, we're ready to rest.

17 JUDGE MARSCHALL: I have one question on the end issue.

18 MR. ARJOMAND: Yes.

19 JUDGE MARSCHALL: In the challenged patent, there is shown and
20 claimed an end retainer, which I'm sure you're familiar with. And yet, even
21 though there's an end retainer on the end of the shaft, the structure still has a
22 second end and a tapered region extending from the second end as claimed.
23 So I'm wondering why the presence of some threads may not be analogous
24 to the end retainer. And therefore, even in the prior art that has some threads
25 on the end, it still has a second end and a tapered region extending from that
26 end.

1 MR. ARJOMAND: One second, Your Honor. So let me just make
2 sure I'm tracking what you're saying. Are you referring to Claim 10? Is that
3 the claim that you're looking at?

4 JUDGE MARSCHALL: Yeah, Claim 10 depends from Claim 9. It
5 includes the second end and the tapered region extending from an end, as
6 well as an end retainer.

7 MR. ARJOMAND: That's right.

8 JUDGE MARSCHALL: And as shown in Figure 2, you have an end
9 retainer 125 on top of the end of the shaft, on top of that second end,
10 correct? And the tapered region does not extend all the way to the top of the
11 end retainer, right?

12 MR. ARJOMAND: Right. In Figure 2, the end retainer is 125.
13 That's right, Your Honor.

14 JUDGE MARSCHALL: So I'm wondering if that's a similar situation
15 to the prior art that has a threaded portion at the furthest extremity of the
16 shaft where it could still arguably have a second end and a tapered region
17 extending from a second end, even though it has some threads that extend
18 beyond the tapered region. Is that similar to Figure 2 in the challenged
19 patent where you have an end retainer that extends beyond the tapered
20 region?

21 MR. ARJOMAND: Well, it's interesting because we actually think
22 that claim supports our position. So here on Slide 18, one of the reasons that
23 we highlighted this claim was that it does mention a perimeter region. And
24 so I think, this is not directly responsive to the point that you're making, but
25 there is a portion of Claim 10 that also seems to support our view that you
26 would read end as an extremity, not as something broader than that

1 extremity to include a region because here you're able to claim a perimeter
2 region.

3 But going specifically to your point, I guess I would disagree with that
4 point. Yeah. The point is that I believe that it's further comprising an end
5 retainer, so that's a separate element from the shaft.

6 JUDGE MARSCHALL: And because the threads are part of the shaft
7 in the prior art, that's the distinction?

8 MR. ARJOMAND: Exactly.

9 JUDGE MARSCHALL: Okay. I understand your position.

10 MR. ARJOMAND: And just for the record, we agree with you on
11 extending. We had a number of slides and arguments in the record
12 regarding extending. We just, in the interest of time, skipped them in our
13 presentation on claim construction. But we did talk about extending in the
14 context of Slide 13, for example, Exhibit 2007, paragraph 23 of Dr.
15 Kytomaa's declaration.

16 JUDGE MARSCHALL: Great.

17 MR. ARJOMAND: If there are no further questions, we'll rest.

18 JUDGE MARSCHALL: Okay. That's it.

19 MR. ARJOMAND: Thank you.

20 JUDGE MARSCHALL: Thank you, everybody, for your time today.
21 Everybody did a great job representing their positions, and this is very
22 helpful. This hearing is adjourned.

23 (Whereupon, the above-entitled matter went off the record at 2:54
24 p.m.)

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