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Paper No. 8
Entered: July 31, 2015

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FREEDOM INNNOVATIONS, LLC,
Petitioner,

v.

BLATCHFORD, INC., BLATCHFORD PRODUCTS LTD., &
CHAS. A. BLATCHFORD & SONS, LTD.,
Patent Owner.

Case IPR2015-00640
Patent 8,740,991 B2

Before MEREDITH C. PETRAVICK, HYUN J. JUNG, and
CHRISTOPHER G. PAULRAJ, *Administrative Patent Judges.*

JUNG, *Administrative Patent Judge.*

DECISION
Institution of *Inter Partes* Review
37 C.F.R. § 42.108

I. INTRODUCTION

Freedom Innovations, LLC ("Petitioner") filed a Petition (Paper 1, "Pet."), requesting institution of an *inter partes* review of claims 1–9 of U.S. Patent No. 8,740,991 B2 (Ex. 1001, "the '991 patent"). Blatchford Products Ltd. ("Patent Owner") timely filed a Preliminary Response (Paper 5, "Prelim. Resp."). We have jurisdiction under 35 U.S.C. § 314, which provides that an *inter partes* review may not be instituted "unless . . . there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition."

Upon consideration of the Petition and the Preliminary Response, and for the reasons explained below, we determine that Petitioner has shown that there is a reasonable likelihood that it would prevail with respect to at least one of the challenged claims. We institute an *inter partes* review of claim 8 of the '991 patent.

A. Related Proceedings

The parties indicate that the '991 patent is involved in currently pending district court case, *Blatchford Products Ltd. v. Freedom Innovations, LLC*, Case No. 1:14-cv-00529-SSB (S.D. Ohio). Pet. 2 (citing Ex. 1006); Paper 4, 1.

The parties also indicate that Petitioner requests *inter partes* review of a patent related to the '991 patent in Cases IPR2015-00641 and IPR2015-00642. Pet. 2; Paper 4 at 2.

B. The ’991 Patent (Ex. 1003)

The ’991 patent relates to a prosthetic ankle joint mechanism that is arranged to allow limited, damped pivoting movement of a shin component relative to a foot component. Ex. 1003, 1:16–22.

Figure 1 of the ’991 patent is reproduced below:

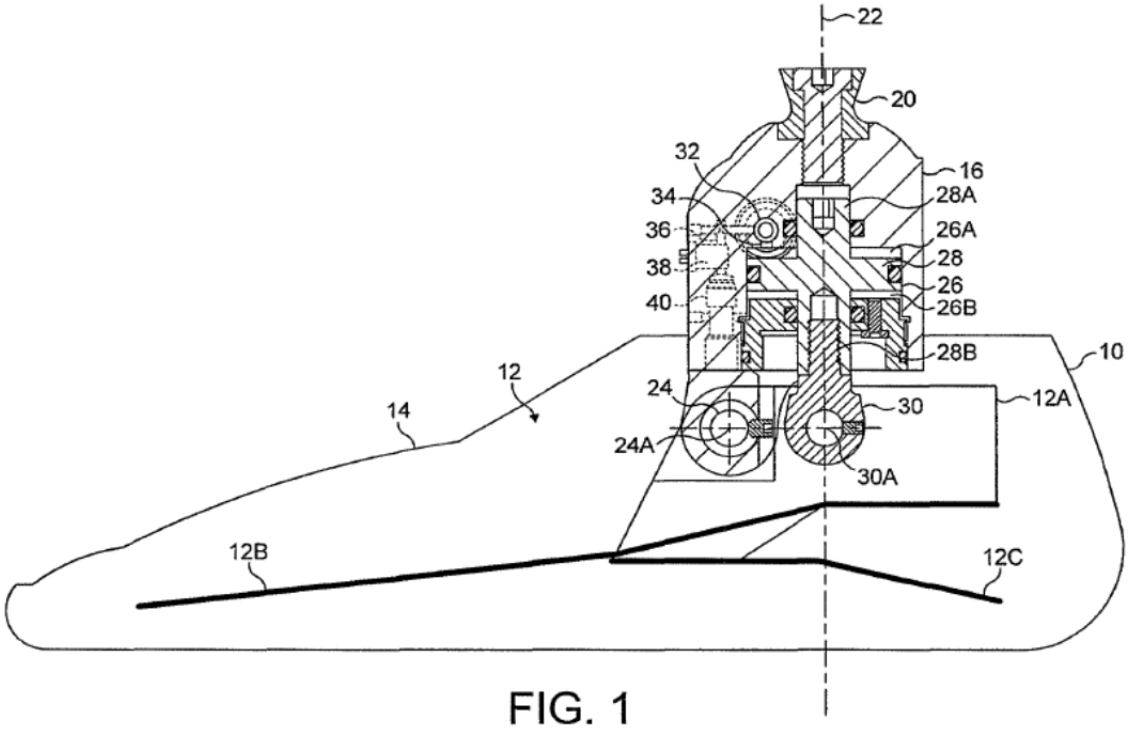

FIG. 1

Figure 1 shows a cross-section of a foot-ankle prosthesis. *Id.* at 5:48–50. The foot-ankle prosthesis includes foot component 10, to which is mounted ankle unit 16. *Id.* at 5:64–6:4. The body of ankle unit 16 forms cylinder 26 having piston 28. *Id.* at 6:11–19. Cylinder 26 and piston 28 form upper and lower chambers 26A, 26B. *Id.* at 6:20–21. Chambers 26A, 26B are linked by two bypass passages 36 that allow flow of hydraulic fluid between chambers 26A, 26B. *Id.* at 6:38–40. One of the bypass passages 36 has non-return valve 40 oriented to allow hydraulic fluid to flow from lower chamber 26B to upper chamber 26A, while the other bypass passage 36 has

its non-return valve 40 oriented for flow in the opposite direction. *Id.* at 6:38–42. Thus, one of the bypass passages is operative when piston 28 moves up, and the other bypass passage is operative when piston 28 moves down. *Id.* at 6:42–44.

Each bypass passage 36 also contains manually adjustable area orifice 38. *Id.* at 6:32–35. Adjustable area orifice 38 in each bypass passage allows for presetting independently the amount of damping for movement of piston 28. *Id.* at 6:49–52.

Abutment of piston 28 with the lower wall of cylinder 26 defines the limit of dorsi-flexion of the ankle-foot prosthesis or the anterior tilt of a shin axis relative to the vertical when standing on a horizontal surface. *Id.* at 6:44–49, 62–67. Abutment of piston 28 with the upper wall of cylinder 26 defines the limit of plantar-flexion or a posterior tilt of the shin axis. *Id.* at 6:44–49, 6:67–7:2.

C. Illustrative Claims

The ’991 patent has 9 claims, all of which are being challenged. Claims 1, 8, and 9 are independent, and claims 1 and 8 are reproduced below:

> 1. A prosthetic foot and ankle assembly comprising a combination of:
>
> a foot component, and
>
> an ankle joint mounted to the foot component and having a fixed range of dorsi-plantar flexion during walking, the ankle joint comprising a joint mechanism providing resistance to ankle flexion, wherein the joint mechanism comprises:
>
> a hydraulic linear piston and cylinder assembly having a piston which is movable so as to define a pair of variable-volume chambers, one chamber located on each side of the piston and which is constructed and arranged to provide

hydraulic damping continuously over the range of dorsi-plantar flexion, and

a valve arrangement controlling the flow of hydraulic fluid between said chambers, the valve arrangement comprising first and second adjustable valves respectively comprising first and second orifices each adjustable in area for independently presetting dorsiflexion damping resistance and plantar-flexion damping resistance respectively such that during walking said first orifice is preset to provide hydraulic damping at a first setting whenever the ankle joint is flexed in a dorsi-flexion direction and said second orifice is preset to provide hydraulic damping at a second setting whenever the ankle joint is flexed in a plantar-flexion direction,

wherein the joint mechanism includes a first flexion limiter that limits dorsi-flexion of the joint mechanism to a dorsi-flexion limit and a second flexion limiter that limits plantar-flexion of the joint mechanism to a plantar-flexion limit, thereby defining said fixed range of dorsi-plantar flexion, the first and second flexion limiters comprising mechanical abutments of the joint mechanism.

8. A prosthetic foot and ankle assembly comprising a combination of:

a foot component, and

an ankle joint mounted to the foot component and having a fixed range of dorsi-plantar flexion, the ankle joint comprising a joint mechanism providing resistance to ankle flexion, wherein the joint mechanism comprises:

a hydraulic linear piston and cylinder assembly having a cylinder and a piston, the chamber having a pair of end walls and the piston being movable between the end walls so as to define a pair of variable-volume chambers, one chamber located on each side of the piston and which is constructed and arranged to provide hydraulic damping continuously over the range of dorsi-plantar flexion, and

a valve arrangement controlling the flow of hydraulic fluid between said chambers, the valve arrangement comprising first and second adjustable valves respectively comprising first and second orifices each adjustable in area for independently

> presetting dorsi-flexion damping resistance and plantar-flexion damping resistance respectively such that said first orifice is preset to provide hydraulic damping at a first setting whenever the ankle joint is flexed in a dorsi-flexion direction and said second orifice is preset to provide hydraulic damping at a second setting whenever the ankle joint is flexed in a plantar-flexion direction,
>
> wherein the joint mechanism includes a flexion limiter that limits dorsi-flexion of the joint mechanism to a dorsi-flexion limit, the flexion limiter comprising a resilient elastomeric pad on a chamber end wall or on a face of the piston.

D. Challenges

Petitioner challenges, under 35 U.S.C. § 103:

(1) claims 1 and 3–8 as unpatentable over U.S. Patent No. 6,443,993 B1 to Koniuk, issued Sept. 3, 2002 (Ex. 1010, "Koniuk") and U.S. Patent No. 4,212,087 to Mortensen, issued July 15, 1980 (Ex. 1012, "Mortensen");

(2) claim 2 as unpatentable over Koniuk, Mortensen, and U.S. Patent No. 6,398,817 B1 to Hellberg, issued June 4, 2002 (Ex. 1014, "Hellberg");

(3) claims 1–9 as unpatentable over U.S. Patent Application Pub. No. 2004/0117036 to Townsend (Ex. 1011, "Townsend") and Mortensen;

(4) claim 9 as unpatentable over Koniuk, Mortensen, and Townsend;

(5) claims 1 and 3–8 as unpatentable over U.S. Patent Application Pub. No. 2004/0044417 to Gramnas (Ex. 1008, "Gramnas") and Mortensen;

(6) claim 2 as unpatentable over Gramnas, Mortensen, and Hellberg; and

(7) claim 9 as unpatentable over Gramnas, Mortensen, and Townsend.

II. ANALYSIS

A. Claim Construction

In an *inter partes* review, claim terms in an unexpired patent are interpreted according to their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,766 (Aug. 14, 2012); *In re Cuozzo Speed Techs., LLC*, No. 2014-1301, 2015 WL 4097949, at *5–8 (Fed. Cir. July 8, 2015). Under that standard, claim terms are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

Petitioner submits constructions for "said resistance" and "predominantly provided by hydraulic damping." Pet. 5–6. Patent Owner disputes Petitioner's proposed constructions. Prelim. Resp. 2–5. For purposes of this Decision, we determine that no claim terms need to be construed expressly.

B. Obviousness of Claims 1 and 3–8 over Koniuk and Mortensen

Petitioner contends that claims 1 and 3–8 are rendered obvious in view of Koniuk and Mortensen with citations to the disclosures in Koniuk and Mortensen, a claim chart, and a Declaration of Prof. John Michael (Ex. 1005, "Michael Declaration"). Pet. 10–30.

1. Koniuk (Ex. 1010)

Koniuk relates to an "ankle prosthesis that automatically adjusts to and accommodates a variety of heel heights and surface slopes." Ex. 1010, 1:5–9. Figure 3 of Koniuk is reproduced below:

Fig. 3

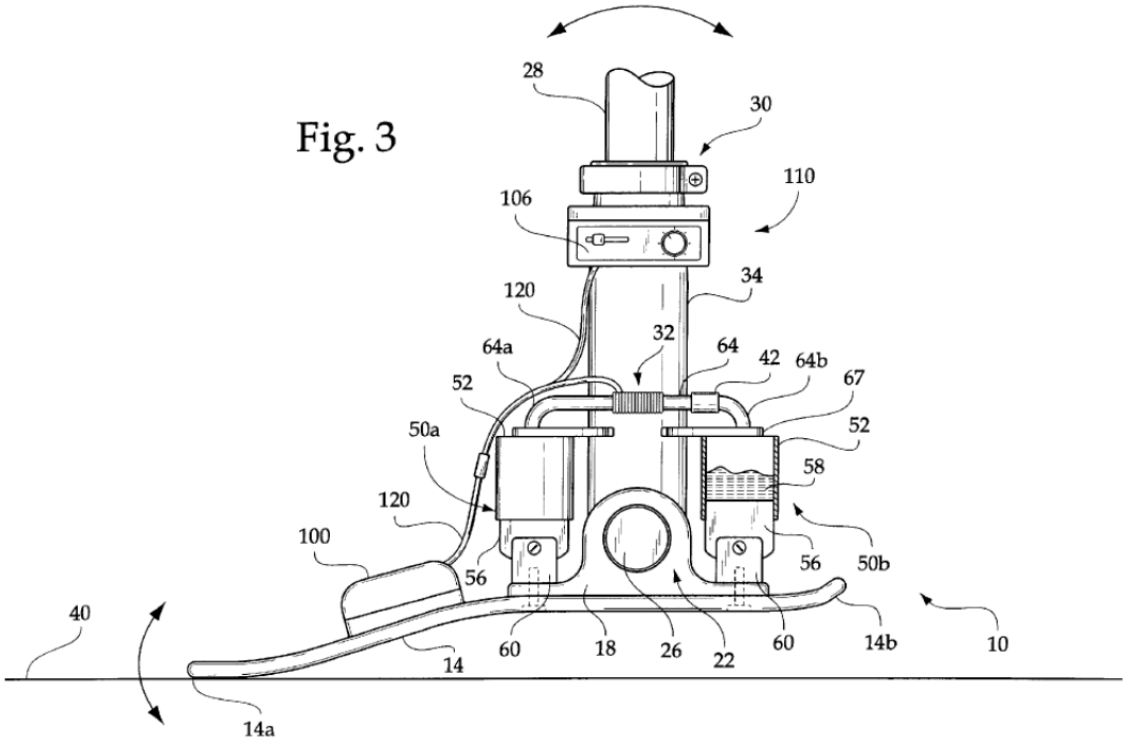

Figure 3 shows an auto-adjusting or auto-leveling prosthetic ankle. *Id.* at 3:54–55. Prosthetic ankle apparatus 10 includes lower base portion 18 that is coupled to an attachment portion 34 via ankle pivot pin 26. *Id.* at 6:5–7. Dynamically controlled damping means 48 selectively provides a level of damping that affects the pivoting of ankle apparatus 10. *Id.* at 6:23–33. In particular, damping means 48 provides one of a first damping level, second damping level, or some intermediate level to dampen the relative motion between base portion 18 and attachment portion 34. *Id.*

Dynamically controlled damping means 48 includes one or more hydraulic cylinders 50a, 50b. *Id.* at 6:34–38. Koniuk states that "[a]lternately, a single hydraulic cylinder may be employed . . . having a plurality of internal pressure chambers 58, further having required fluidic couplings, through which the flow rate of fluid can be set to at least two levels." *Id.* at 9:23–25.

A preferred form of damping controls a rate of flow of fluid from chamber 58 to another chamber 58. *Id.* at 6:38–42. In Figure 3, fluid is transferred through fluid transfer conduit 64 as attachment portion 34 pivots. *Id.* at 6:42–57. Damping level is established by altering the resistance to fluid flow through fluid transfer conduit 64. *Id.* at 6:57–60. Koniuk states that "it is certainly possible to employ conventional damping control arrangements, including piezo-type values, controllable petcock arrangements, and other flow control mechanisms available and known to skilled person who have studied this disclosure." *Id.* at 6:65–7:3. In the most preferred embodiment, damping level is changed by employing magnetorheological ("MR") fluid and magnetic fields that changes the viscosity of the MR fluid flowing through fluid transfer conduit 64. *Id.* at 7:3–11.

2. Mortensen (Ex. 1012)

Mortensen relates to "an improved means for controlling the knee action of the leg prosthetic." Ex. 1012, 1:6–9.

Figure 2 of Mortensen is reproduced below:

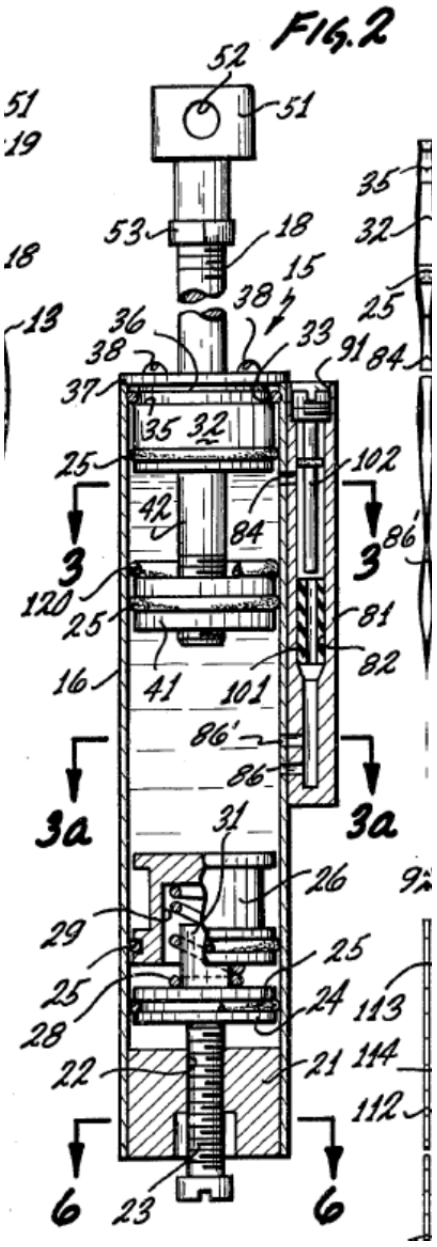

Figure 2 shows a sectional view of a knee control device. *Id.* at 1:60–61. Cylinder 16 includes piston 41. *Id.* at 2:16–18, 43–46. External bypass appendage 81 allows piston 41 to move axially. *Id.* at 2:62–63. External bypass appendage 81 has two axially aligned wells 82, 83, which communicate with the interior of cylinder 16 by apertures 84, 85, 86, 87, 86', 87'. *Id.* at 2:63–3:3. An open end of each well 82, 83 has a threaded

counterbore 91, 92 that receives head 103, 113. *Id.* at 3:4–5, 20, 28–29. Wells 82, 83 control the rate at which a prosthetic leg extends and flexes. *Id.* at 3:11–13. As the leg flexes, piston 41 moves within cylinder 16, thus urging hydraulic oil through apertures 85, 86, 86', 87, 87' so that the oil moves to the other side of the piston. *Id.* at 3:37–50. To control the rate of oil flow, head 103 or 113 is screwed into or out of well 82 or 83. *Id.* at 3:50–52, 65–66.

A resilient O-ring 120 is disposed floating between piston 41 and sleeve 32 to absorb any force between the two members. *Id.* at 4:13–15.

3. Analysis

Petitioner argues that Koniuk discloses most of the limitations of claims 1 and 3–8. Pet. 10–16 (citing Ex. 1005 ¶¶ 31–35, 37, 39, 40; Ex. 1010, 2:30–37, 4:13–15, 4:43–45, 6:4–10, 23–33, 34–36, 6:38–7:3, 7:66–8:5, 8:21–32, 9:23–29, Fig. 3). Petitioner relies on Mortensen for teaching "a single, linear hydraulic cylinder 16 and piston 41," "two hydraulic passageways and an adjustable two-valve system for controlling the flow of hydraulic fluid between opposite regions in the hydraulic cylinder 16," and the limitations of claims 3, 5, and 8. Pet. 16–20 (citing Ex. 1005 ¶¶ 61–62; Ex. 1012 Abstract, 1:35–38, 2:6–15, 31–32, 3:11–13, 44–66, 4:13–15, 30–39, Figs. 1–2).

As for the rationale for combining Koniuk and Mortensen, Petitioner contends that it would have required only routine effort for the person of ordinary skill in the art to combine Koniuk and Mortensen so that the apparatus of Koniuk would have included a damping means with a single, linear hydraulic cylinder and piston. Pet. 20–21 (citing Ex. 1005 ¶¶ 32–35, 37, 57–60; Ex. 1010, 9:20–26).

Petitioner also contends that "*Koniuk* and *Mortensen* both teach fluid passageways and a valve system to control hydraulic fluid," that "*Koniuk* specifically suggests that *any* flow control mechanism 'known to skilled persons' can be used," that "it would have required only routine effort for a [person of ordinary skill] to incorporate *Mortensen*'s valve system having two separately adjustable valves coupled with a single, linear hydraulic cylinder and piston assembly," and that "[t]here would have been nothing unpredictable or unexpected in controlling fluid flow and adjusting resistance in this manner because *Koniuk* explicitly suggests that *any* prior art means can be used." Pet. 21–22 (citing Ex. 1005 ¶¶ 59–60; Ex. 1010, 6:60–67, 7:1–3, 9:20–26; Ex. 1012 Abstract).

Patent Owner responds that "the cited portion of the specification of Koniuk reveals . . . that Koniuk does *not* encourage wholesale substitutions for the desired flow control arrangement in a manner that would fundamentally change important aspects of the operation of his device." Prelim. Resp. 20 (discussing Pet. 25). Patent Owner argues that Koniuk "only indicates that alternative flow control systems to Koniuk's preferred arrangement may be utilized, but then only to the extent they *also* permit the intended manner of operation." *Id.* (citing Ex. 1010, 6:60–7:3). Patent Owner also argues that "possible alternatives all must possess the ability to perform in the intended manner, including the requisite ability to rapidly *change* the rate of flow . . . to implement the required adjustment from a first damping level to a second damping level *during the gait cycle*" and "in particular, for the specific purpose of *locking* the ankle at the particular point where the lower leg reaches the vertical or 'plumb' position in space." *Id.* at 20–21 (citing Ex. 1010, 4:46–48, 5:19–31, 5:46–63). Patent Owner, thus,

argues that Petitioner fails to demonstrate that a person of ordinary skill would have had reason to select and combine the prior art in the manner asserted. *Id.* at 22. We agree with Patent Owner.

Koniuk is titled "SELF-ADJUSTING PROSTHETIC ANKLE APPARATUS" and relates to an "ankle prosthesis that automatically adjusts." Ex. 1010, 1:2–3, 6–9. In the "Summary of the Invention," Koniuk states that the "invention further includes a dynamically controllable damping means." *Id.* at 2:39–40. Koniuk further states that "the advantage of selectively and dynamically alternating between a first and second damping level may result in a much more natural gait and walking motion, along with the ability to automatically adjust the prosthetic ankle of the invention." *Id.* at 3:1–6. Koniuk also teaches that its ankle prosthesis "automatically adjusts . . . most preferably with little or no input from a wearer" and "the actual damping level will most preferably be changeable in a rapid and virtually noise free fashion." *Id.* at 2:48–51. Koniuk expressly defines "dynamically controlled damping level" and "damping level" to indicate that "in real-time, a level of damping applied resisting motion between the base portion and the attachment portion can be changed, most preferably in a rapid, step-wise manner." *Id.* at 4:41–46.

Petitioner's assertion that one of ordinary skill in the art would have substituted Mortensen's external bypass appendage 81 that includes head 103, 113 for the coil and MR fluid arrangement of Koniuk does not explain why such an ordinarily skilled artisan would have selected heads 103, 113 that are screwed manually to control damping in the apparatus of Koniuk. In particular, Petitioner does not explain how the proposed modification is consistent with Koniuk's teachings of a "self-adjusting prosthetic ankle

apparatus" or "ankle prosthesis that automatically adjusts" with "dynamically controllable damping means" that "result[s] in a much more natural gait and walking motion, along with the ability to automatically adjust the prosthetic ankle of the invention." Ex. 1010, 1:2–3, 6–9, 2:39–40, 3:1–6.

Also, to the extent that Petitioner is arguing that one of ordinary skill in the art would have used Mortensen's external bypass appendage 81 together with Koniuk's damping means, Petitioner's proposed rationale does not explain why the inclusion of both arrangements would have been necessary, desirable, or even operable.

Accordingly, based on the record before us, we determine that Petitioner has not shown a reasonable likelihood that it would prevail with respect to the challenge of claims 1 and 3–8 as unpatentable over Koniuk and Mortensen.

C. Obviousness of Claim 2 over Koniuk, Mortensen, and Hellberg

Petitioner contends that claim 2 is rendered obvious in view of Koniuk, Mortensen, and Hellberg with citations to the disclosures of these references and the Michael Declaration. Pet. 30–32.

1. Analysis

Petitioner relies on Hellberg for the limitation of a "pyramid alignment interface," as recited in claim 2. Pet. 30–31 (citing Ex. 1005 ¶¶ 64–68; Ex. 1014, 1:9–10, 19–22, 3:48-54, 4:44–47). Petitioner also provides a rationale for combining Koniuk with Hellberg. *Id.* at 31–32 (citing Ex. 1003, 2:66–3:2, 6:53–59; Ex. 1005 ¶¶ 66–71; Ex. 1014, 1:19–22).

Petitioner's reliance on Hellberg and rationale for combining Koniuk with Hellberg do not make up for the deficiency in the combination of

Koniuk and Mortensen discussed above. For the reasons discussed above, Petitioner has not shown a reasonable likelihood that it would prevail with respect to the challenge of claim 1, from which claim 2 depends, as unpatentable over Koniuk and Mortensen.

Therefore, based on the record before us, we determine that Petitioner has not shown a reasonable likelihood that it would prevail with respect to the challenge of claim 2 as unpatentable over Koniuk, Mortensen, and Hellberg.

D. Obviousness of Claims 1–9 over Townsend and Mortensen

Petitioner contends that claims 1–9 are rendered obvious in view of Townsend and Mortensen with citations to the disclosures of these references, a claim chart, and the Michael Declaration. Pet. 32–46.

1. Townsend (Ex. 1011)

Townsend relates to "a high performance prosthetic foot providing improved dynamic response capabilities." Ex. 1011 ¶ 1. Figure 28 of Townsend is reproduced below:

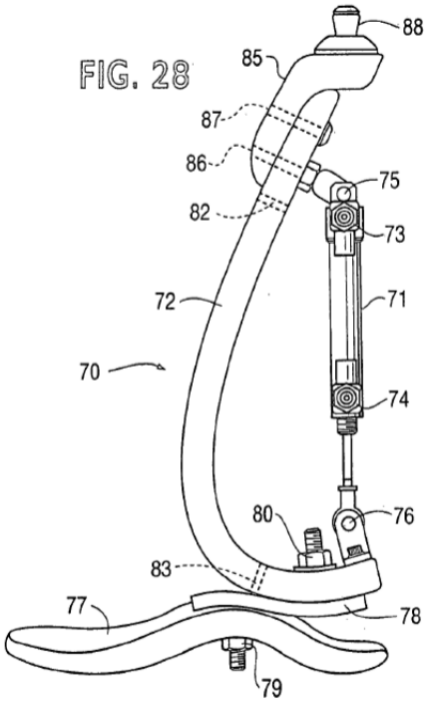

Figure 28 shows prosthetic foot 70 wherein a motion limiting, dampening device is connected between respective ends of a calf shank. *Id.* ¶¶ 36, 94. Prosthetic foot 70 includes a calf shank range of motion limiter and dampener device 71. *Id.* ¶ 94. Device 71 is a two-way acting piston cylinder unit in which pressurized fluid is provided through fittings 73, 74. *Id.* ¶ 95. Device 71 has two variable controls, one for compression and one for expansion, to permit adjustment of the extent of motion of the calf shank during force loading and unloading. *Id.*

Prosthetic foot 70 shown in Figure 28 is similar to those shown in Figures 3–5, 8, and 23–27. *Id.* ¶ 94. In describing Figures 3–5, Townsend states that "fastener 8, coupling element 11 and longitudinally extending openings 9 and 10 constitute an adjustable fastening arrangement for attaching the calf shank to the foot keel to form an ankle joint area of the prosthetic foot." *Id.* ¶ 51.

2. Analysis

Petitioner argues that Townsend discloses the limitations of claims 1–9. Pet. 32–35 (citing Ex. 1011, Abstract, ¶¶ 7, 28–32, 94–101, 105, Figs. 28, 30; Ex. 1005, ¶¶ 74–76, 83, 85–89, 91–93), 37–46 (citing Ex. 1011 ¶¶ 5, 7, 9, 73, 75, 94, 95, 96, 97, 100, 105, Fig. 28, claims 1, 2). In particular, Petitioner argues that Townsend satisfies the limitations of a prosthetic foot and ankle assembly comprising a foot component and an ankle joint because "it discloses a prosthetic foot/ankle and a two-way adjustable hydraulic piston-and-cylinder assembly 71 that 'limits extent of the motion' the prosthesis undergoes during gait." Pet. 32–33 (citing Ex. 1011, Abstract). Petitioner also argues that "[j]oint mechanism 71 is a hydraulic linear piston and cylinder assembly with variable-volume chambers on either side of the piston, which provides hydraulic damping continuously over the range of motion." *Id.* at 33 (citing Ex. 1011 ¶ 7).

In its claim chart, Petitioner cites claims 1 and 24 of Townsend as teaching the "ankle joint" requirement of claims 1 and 8 of the '991 patent. Pet. 37, 43. For the "ankle joint" of claim 9, Petitioner states that "[a]nkle joint 71 is connected pivotally at 76 and has a fixed range of dorsiplantar flexion about the first pivotal connection 76." Pet. 44 (citing Ex. 1011, Fig. 32).

Patent Owner responds that "the section of the Townsend device that actually corresponds to the ankle is depicted and described as *fixed* mechanical structures that serve only as points of attachment." Prelim. Resp. 33 (citing Ex. 1011 ¶¶ 5, 51).

Patent Owner's arguments are persuasive. Claim 1 requires "an ankle joint . . . comprising a joint mechanism . . . wherein the joint mechanism

comprises: a hydraulic linear piston and cylinder assembly." Claims 8 and 9 also require an ankle joint comprising a joint mechanism that comprises a hydraulic linear piston and cylinder assembly.

Townsend's Abstract states that a "prosthetic foot (70) incorporates a foot keel (77) and a calf shank (72) connected to the foot keel to form an ankle joint area of the prosthetic foot." The Abstract, however, does not indicate that device 71 forms part of the ankle joint area. Also, Petitioner cites paragraph 7 of Townsend, which states that the "prosthetic foot can also include a device to limit the extent of the motion of the upper end of the calf shank in response to force loading and unloading the calf shank during use of the prosthetic foot." Pet. 33 (citing Ex. 1011 ¶ 7). It further teaches that "[i]n one embodiment, the device is a piston-cylinder unit connected between the upper and lower ends of the calf shank and containing at least one pressurized fluid to limit the extent of motion and also dampen the energy being stored or released during calf shank compression and expansion." Ex. 1011 ¶ 7. But, paragraph 7 does not indicate that the device, which can be a piston-cylinder unit, is an ankle joint or part of an ankle joint. Further, Petitioner cites claims 1 and 24 of Townsend. However, these claims do not require an ankle joint or ankle coupler, and thus, do not teach that device 71 forms or is part of an ankle joint. Moreover, Townsend's claim 18, which is not relied upon by Petitioner, indicates that "an adjustable fastening arrangement connecting the lower end of the calf shank to the foot keel to form an ankle joint area" is an *additional* element to the recited device of claim 1. Ex. 1011, Cl. 18.

As pointed out by Patent Owner, Townsend also describes in its "Disclosure of Invention" that an "adjustable fastening arrangement attaches

the curved lower end of the calf shank to the upwardly arched midfoot portion of the foot keel to form an ankle joint area of the prosthetic foot." Ex. 1011 ¶ 5. In describing Figures 5, 8, and 15, Townsend states that "the fastener 8, coupling element 11 and longitudinally extending openings 9 and 10 constitute an adjustable fastening arrangement for attaching the calf shank to the foot keel to form an ankle joint area of the prosthetic foot." Ex. 1011 ¶ 51. Townsend also describes that "prosthetic foot 70 . . . is similar to those in FIGS. 3–5, 8, 23 and 24 and FIGS 25–27, but further includes a calf shank range of motion limiter and dampener device 71 on the foot to limit the extent of the motion of the upper end of the calf shank with force loading and unloading of the calf shank." Ex. 1011 ¶ 94. These portions of Townsend describe device 71 as a "calf shank range of motion limiter and dampener device." They do not teach that device 71 is a "joint mechanism" or "ankle joint." The Petition does not cite any portion of Townsend that indicates device 71 dampens the ankle joint area of Townsend. Also, Petitioner does not explain why one of ordinary skill in the art reading Townsend would have understood device 71 to be part of an ankle joint.

In view of the foregoing, based on the record before us, we determine that Petitioner has not shown a reasonable likelihood that it would prevail with respect to the challenge of claims 1–9 as unpatentable over Townsend and Mortensen.

E. Obviousness of Claim 9 over Koniuk, Mortensen, and Townsend

Petitioner contends that claim 9 is rendered obvious by Koniuk in view of Mortensen and Townsend with citations to the disclosures of these references and the Michael Declaration. Pet. 46–48.

1. Analysis

Petitioner relies on Townsend for teaching the recited "pyramid alignment interface" of claim 9. Petitioner's reliance on Townsend and the stated rationale for combining Koniuk and Townsend do not make up for the deficiency in the combination of Koniuk and Mortensen discussed above, which is also applicable to claim 9. Therefore, for the reasons discussed above, Petitioner has not shown a reasonable likelihood that it would prevail with respect to the challenge of claims 1 and 3–8 as unpatentable over Koniuk and Mortensen.

For the same reasons discussed above with respect to the proposed combination of Koniuk and Mortensen, based on the record before us, we determine that Petitioner has not shown a reasonable likelihood that it would prevail with respect to the challenge of claim 2 as unpatentable over Koniuk, Mortensen, and Hellberg.

F. Obviousness of Claims 1 and 3–8 over Gramnas and Mortensen

Petitioner contends that claims 1 and 3–8 are rendered obvious by Gramnas and Mortensen with citations to the disclosures of these references, a claim chart, and the Michael Declaration. Pet. 48–59.

1. Gramnas (Ex. 1008)

Gramnas discloses "a device in a leg prosthesis provided with a foot which via a pivot axle is connected to the leg prosthesis and wherein the angular position between the foot and the leg prosthesis is adjustable to a desired angular position." Ex. 1008 ¶ 1. Figure 1 of Gramnas is reproduced below:

FIG. 1

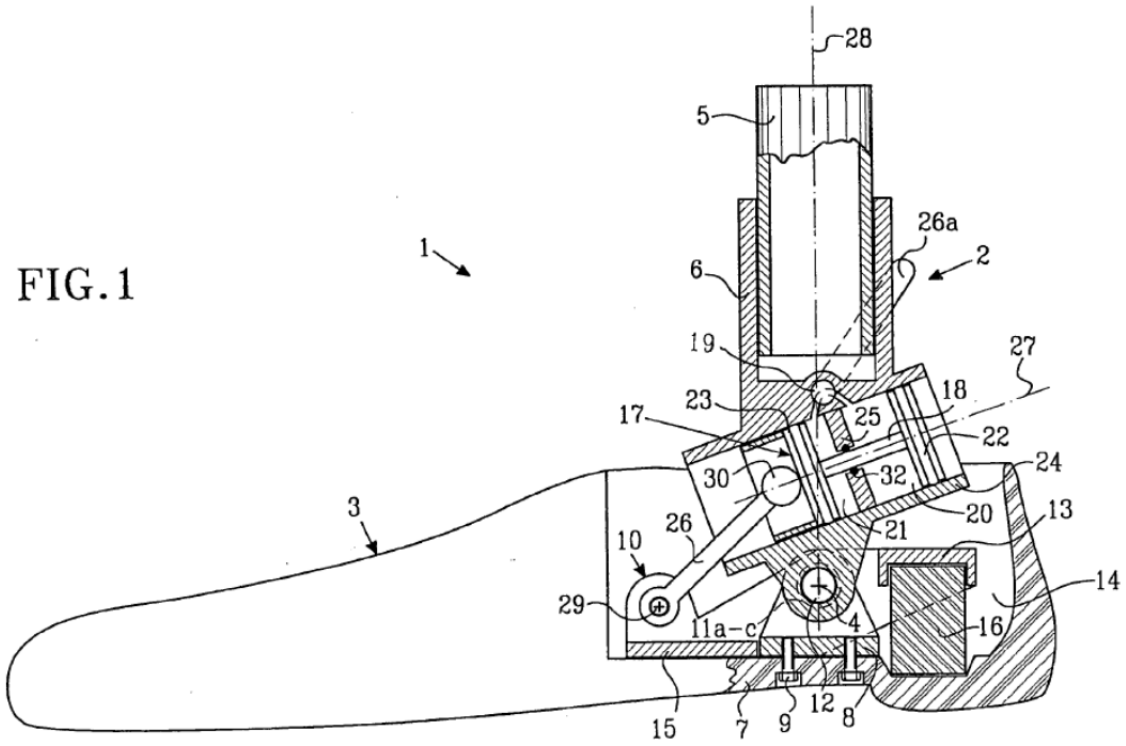

Figure 1 shows the prosthesis. *Id.* ¶ 9. Prosthesis 1 comprises leg prosthesis 2 and foot 3 connected via pivot axle 4 to leg prosthesis 2. *Id.* ¶ 12. Prosthesis 1 further comprises lever arm 10 with first end 13 and second part 15. *Id.* ¶ 13. Lever arm 10 is supported on a shaft so as to pivot around pivot axle 4. *Id.* First end 13 cooperates with first means (resilient element) 16 to permit limited rotation of foot 3 with respect to leg prosthesis 2. *Id.* ¶¶ 13, 18.

Second means 17 is "arranged to permit a stepless adjustment of the angle between the prosthesis and the foot in the initial position." *Id.* ¶ 13. Second means 17 comprises piston 18 which moves within cylinder 24, and piston 18 includes flanges 22, 23. *Id.* ¶ 15. Ring wall 25 divides cylinder 16 into chambers 20, 21. *Id.* Two-way valve 19 in an open condition permits flow between chambers 20, 21. *Id.* Thus, valve 19 when shut prevents such flow, and chambers 20, 21 can keep piston 18 in a desired position in

cylinder 24. *Id.* Second means 17 accordingly provides a first condition in which rotation between lever arm 10 and leg prosthesis 2 is permitted and a second condition in which an unrotatable connection is made between lever arm 10 and leg prosthesis 2. *Id.* ¶ 15.

At heel strike when walking, first means or resilient element 16 compresses as shown in Figure 3. *Id.* ¶ 23. In Figure 3, "the two-way valve is shown in a closed position in which the channel between the two chambers 20, 21 are closed." *Id.*

2. Analysis

Petitioner argues that Gramnas discloses most of the limitations of claims 1 and 3–8. Pet. 48–52 (citing Ex. 1005 ¶¶ 134–142, 147, 149, 152; Ex. 1008 ¶¶ 12–17, 25, Figs. 1, 2a–2c). Petitioner relies on Mortensen for teaching "a single, linear hydraulic cylinder and piston" and "two hydraulic passageways and a two-valve system for controlling the flow of hydraulic fluid between opposite regions in the hydraulic cylinder 16." Pet. 52–53 (citing Ex. 1005 ¶¶ 153–157; Ex. 1012, Abstract).

For the recited ankle joint having a fixed range of dorsi-plantar flexion during walking and hydraulic linear piston and cylinder assembly of claim 1, Petitioner argues that "*Gramnas* discloses an adjustable hydraulic ankle joint in which the range of motion is limited via a two-chamber hydraulic piston-and-cylinder assembly" and that the "mechanism continually provides resistance via 'stepless' hydraulic damping in both the dorsi and plantar directions . . . in a range fixed by the mechanical limits of the linear, two-chamber hydraulic device." Pet. 48–49 (citing Ex. 1008 ¶ 13). In its claim chart, Petitioner cites Gramnas's teaching of the second means 17. Pet. 54–55 (citing Ex. 1008 ¶¶ 13, 15). For the recitations in

independent claim 8, Petitioner refers to its arguments for corresponding limitations in claim 1. Pet. 58–59.

Petitioner also contends that a person of ordinary skill in the art "would have been motivated to incorporate the features of *Mortensen*'s two-valve system to the hydraulic mechanism of *Gramnas* for adapting the *Gramnas* prosthesis to a variety of users and applications," "to adapt the *Gramnas* prosthesis for users of varying weight by adjusting the resistance to ankle flexion, as taught by *Mortensen*, depending on the user's weight," and "to incorporate the *Mortensen* valve system to the *Gramnas* prosthesis for 'individual adaption' of ankle flexion resistance depending on the user's activities." Pet. 53–54 (citing Ex. 1005 ¶¶ 166–167; Ex. 1009 ¶ 9). Petitioner further contends that "[t]here would have been nothing unpredictable or unexpected in incorporating the *Mortensen* valve system to the *Gramnas* hydraulic mechanism as both *Gramnas* and *Mortensen* teach a known system for hydraulically damping the flexion of two components of a prosthesis." Pet. 54 (citing Ex. 1005 ¶ 166).

Patent Owner responds that "the Gramnas assembly is *not* designed or intended for use in providing 'a fixed range of dorsi-plantar-flexion *during walking*,' nor does the assembly provide '. . . hydraulic damping continuously over the range of dorsi-planter-flexion' as required by the claims." Prelim. Resp. 47 (citing Ex. 1008 ¶ 25). Patent Owner also argues that "the hydraulic linear piston and cylinder assembly is 'constructed and arranged' in order to provide 'hydraulic damping continuously over the range of dorsi-plantar-flexion," but Gramnas relies on resilient element 16 to absorb the force that occurs during ambulation. *Id.* at 48 (citing Ex. 1008 ¶¶ 14, 23).

We agree with Patent Owner. Claim 1 requires "an ankle joint . . . having a fixed range of dorsi-plantar flexion during walking" that comprises "a hydraulic linear piston and cylinder assembly . . . constructed and arranged to provide hydraulic damping continuously over the range of dorsi-plantar flexion." Gramnas states that "FIG. 3 shows the prosthesis during loading of the heel." Ex. 1008 ¶ 11. Gramnas also states that "[i]n FIG. 3, the prosthesis is shown under load of the heel at walk" and that "[a]t heel strike at walk the rubber element 16 will be compressed." *Id.* ¶ 23. Gramnas further states that "[o]ther details are common with FIG. 1 and are therefor not described, however the two-way valve is shown in a closed position in which the channel between the two chambers 20, 21 are closed." *Id.* Also, Petitioner acknowledges that hydraulic damping is provided when two-way valve 19 is open. Pet. 50. After describing movement of piston 18 when valve 19 is open, Petitioner states that "[h]ydraulic damping occurs because, during this range of motion, fluid is forced through the relatively small orifice illustrated in Figures 2a-2c." Pet. 50 (also citing Ex. 1005 ¶ 141). Further, Petitioner's rationale for modifying Gramnas with the teachings of Mortensen does not explain why the ordinary skilled artisan would have modified Gramnas further to open two-way valve 19 or Mortensen's two-valve system so that Gramnas's piston and cylinder assembly is arranged to provide damping continuously over a range of flexion during walking, as required by claim 1. To the contrary, Gramnas specifically teaches that the valve should remain closed during walking, and Petitioner does not point to any evidence as to why a skilled artisan would have considered it desirable to provide hydraulic resistance during walking for such a device. *See In re Giannelli*, 739 F.3d 1375, 1380 (Fed. Cir. 2014)

("Physical capability alone does not render obvious that which is contraindicated.").

Claim 8 recites "an ankle joint . . . having a fixed range of dorsi-plantar flexion" that comprises "a hydraulic linear piston and cylinder assembly . . . constructed and arranged to provide hydraulic damping continuously over the range of dorsi-plantar flexion." As compared to claim 1, claim 8 does not require the piston and cylinder assembly to be arranged to provide damping continuously over a range of flexion during walking.

In addition to arguments that address hydraulic damping continuously over a range of flexion while walking (Prelim. Resp. 45–47), Patent Owner responds that "Gramnas' structure actually relies on 'resilient element 16' that is said to serve as a 'shock absorber' . . . during ambulation" (*id.* at 48 (citing Ex. 1008 ¶¶ 14, 23)) and that "Gramnas *specifically* teaches that the valve is *closed* during use so that no movement of the piston is possible" (*id.*). Patent Owner, thus, argues that Gramnas "in no way refer[s] to any movement of the piston-cylinder assembly during walking to provide continuous hydraulic damping as required by the claims." *Id.* at 49 (citing Ex. 1008 ¶ 23).

Because claim 8 does not require the piston and cylinder assembly to be arranged to provide damping continuously over a range of flexion during walking, Patent Owner's arguments as applied to claim 8 are not persuasive.

Patent Owner also contends that Gramnas "nowhere mentions the need or desire to restrict the extent of the flow in one direction or the other, nor would such a restriction be desirable in the arrangement of Gramnas as actually designed to operate." Prelim. Resp. 50 (citing Ex. 1008 ¶ 15). Patent Owner therefore argues that "there is no demonstrated motivation for

the proposed modification of Gramnas nor would such a modification be consistent with Gramnas' design and intended mode of operation." *Id.*

Patent Owner's argument against Petitioner's rationale for combining Gramnas and Mortensen is not persuasive. Petitioner's rationale does not rely on an explicit motivation in Gramnas. Instead, Petitioner asserts, *inter alia*, that one of ordinary skill in the art would incorporate Mortensen's two-valve system to Gramnas' hydraulic mechanism to adapt the Gramnas prosthesis to a variety of users and users of varying weight.

Thus, based on the record presented, we determine that Petitioner has not shown a reasonable likelihood that it would prevail with respect to the challenge of claims 1 and 3–7 as unpatentable over Gramnas and Mortensen, but has shown a reasonable likelihood of prevailing with respect to the challenge of claim 8 as unpatentable over Gramnas and Mortensen.

G. Obviousness of Claim 2 over Gramnas, Mortensen, and Hellberg

Petitioner contends that "[t]o the extent *Gramnas* does not explicitly disclose a 'pyramid alignment interface,' as recited in claim 2, *Hellberg* . . . does" and "[i]t would have been obvious to combine the pyramid alignment interface of *Hellberg* with the prosthetic ankle mechanism of *Gramnas* for the reasons explained above in § VII.2." Pet. 59–60.

Section VII.2 of the Petition argues that claim 2 is rendered obvious by Koniuk in view of Mortensen and Hellberg and describes the disclosure of Hellberg. Pet. 30–32. That section also provides a rationale for combining Koniuk and Hellberg, but does not provide a rationale for combining Gramnas, Mortensen, and Hellberg. Pet. 31–32. Nor does it make up for the deficiency in the combination of Gramnas and Mortensen discussed above, which is also applicable to dependent claim 2.

Thus, based on the record before us, we determine that Petitioner has not shown a reasonable likelihood that it would prevail with respect to the challenge of claim 2 as unpatentable over Gramnas, Mortensen, and Hellberg.

H. Obviousness of Claim 9 over Gramnas, Mortensen, and Townsend

Petitioner contends that "[t]o the extent *Gramnas* in view of *Mortensen* does not teach the 'pyramid alignment interface' and 'displaced in an anterior-posterior direction' limitations of claim 9, these features would have been obvious in view of *Townsend* for the reasons explained above in § VII.4." Pet. 60.

Section VII.4 of the Petition argues that claim 9 is rendered obvious by Koniuk in view of Mortensen and Townsend and describes the disclosure of Townsend. Pet. 46–48. That section also provides a rationale for combining Koniuk and Townsend, but does not provide a rationale for combining Gramnas, Mortensen, and Townsend. Pet. 47–48.

Thus, based on the record before us, we determine that Petitioner has not shown a reasonable likelihood that it would prevail with respect to the challenge of claim 9 as unpatentable over Gramnas, Mortensen, and Townsend.

III. CONCLUSION

For the foregoing reasons, we determine that Petitioner has demonstrated that the information presented in the Petition and in the Preliminary Response shows that there is a reasonable likelihood that Petitioner would prevail in proving the unpatentability of claim 8 of the '991 patent as unpatentable over Gramnas and Mortensen.

At this stage of the proceeding, the Board has not made a final determination as to the patentability of any challenged claim or any underlying factual and legal issues.

IV. ORDER

Accordingly, it is:

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review is hereby instituted as to claim 8 of U.S. Patent No. 8,740,991 B2 based on the ground that claim 8, under 35 U.S.C. § 103(a), is rendered obvious by Gramnas and Mortensen;

FURTHER ORDERED that *inter partes* review commences on the entry date of this Order, and pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial; and

FURTHER ORDERED that the trial is limited to the grounds of unpatentability listed above, and no other grounds of unpatentability are authorized for *inter partes* review.

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