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Paper No. 9
Entered: July 31, 2015

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FREEDOM INNOVATIONS, LLC,
Petitioner,

v.

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

Case IPR2015-00641
Patent 8,574,312 B2

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

PAULRAJ, *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 1–22 of U.S. Patent No. 8,574,312 B2 (Ex. 1001, "the '312 patent"). Blatchford Products Ltd. ("Patent Owner") timely filed a Preliminary Response (Paper 6, "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 claims 1, 7, 8, and 16–22 of the '312 patent.

A. Related Proceedings

The parties indicate that the '312 patent is involved in a currently pending district court case, *Blatchford Products Ltd. v. Freedom Innovations, LLC*, Case No. 1:14-cv-00529-SSB. Pet. 2–3; Paper 4, 1.

Petitioner has also filed another Petition for *inter partes* review of the '312 patent based on additional grounds in Case IPR2015-00642. Additionally, Petitioner requests *inter partes* review of a patent related to the '312 patent, U.S. Patent No. 8,740,991 B2 ("the '991 patent"), in Case IPR2015-00640. Pet. 3; Paper 4 at 2.

B. The ’312 Patent (Ex. 1001)

The ’312 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. 1001, 1:13–19.

Figure 1 of the ’312 patent is reproduced below:

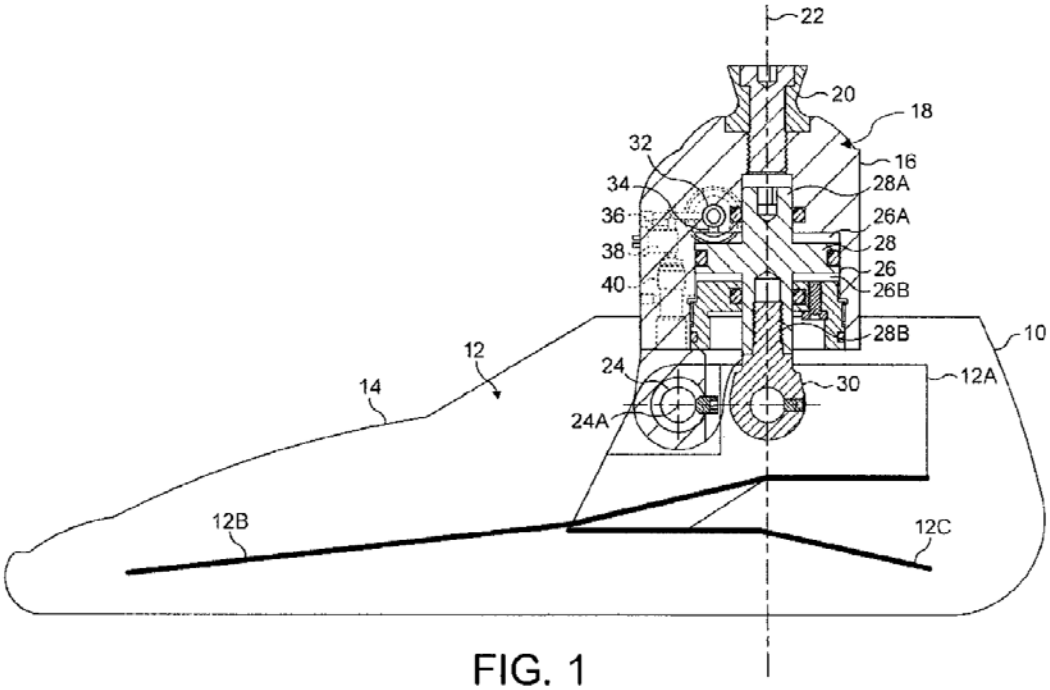

FIG. 1

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 5:64–6:3. Ankle unit 16 comprises joint mechanism 18. *Id.* at 6:4–5. 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 ’312 patent has 22 claims, all of which are being challenged. Claims 1, 16, and 20 are independent, and claim 1 is reproduced below:

> 1. A prosthetic foot and ankle assembly comprising the combination of:
>
> a foot component, and
>
> an ankle joint mounted to the foot component, the ankle joint comprising:
>
> a joint mechanism providing resistance to ankle flexion, wherein the joint mechanism is constructed and arranged such that during walking said resistance is predominantly provided by hydraulic damping whenever the ankle joint is flexed in both dorsi- and plantar-flexion directions.

D. Challenges

Petitioner challenges that patentability of the claims of the '312 patent on the following grounds:

References	Basis	Claims challenged
Koniuk[1]	§ 102(b)	1, 3–7, 16–22
Koniuk and Hellberg[2]	§ 103	2 and 8
Koniuk and Christensen[3]	§ 103	16–22
Koniuk and Mortensen[4]	§ 103	9–15
Townsend[5]	§ 102(b)	1–8 and 16–22
Townsend and Mortensen	§ 103	9–15

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,

[1] U.S. Patent No. 6,443,993 B1 to Koniuk, issued Sept. 3, 2002 (Ex. 1010, "Koniuk").
[2] U.S. Patent No. 6,398,817 B1 to Hellberg, issued June 4, 2002 (Ex. 1014, "Hellberg").
[3] U.S. Patent Application Pub. No. 2005/0171618 A1 to Christensen, published Aug. 4, 2005 (Ex. 1009, "Christensen").
[4] U.S. Patent No. 4,212,087 to Mortensen, issued July 15, 1980 (Ex. 1012, "Mortensen").
[5] U.S. Patent Application Pub. No. 2004/0117036 to Townsend, published June 17, 2004 (Ex. 1011, "Townsend").

2012); *In re Cuozzo Speed Techs., LLC*, No. 2014-1301 slip op. at 11–19 (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. 5–7. 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. Anticipation of Claims 1, 3–7, and 16–22 by Koniuk

Petitioner contends that claims 1, 3–7, and 16–22 are anticipated by Koniuk, with citations to the disclosure in Koniuk, a claim chart, and a Declaration of Prof. John Michael (Ex. 1005, "Michael Declaration"). Pet. 15–29.[6]

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:

[6] It appears that the Petition erroneously cites to the '991 patent (Ex. 1003) in certain portions when it intends to cite to paragraphs of the Michael Declaration (Ex. 1005). *See, e.g.*, Pet. 16, 18, 19.

Fig. 3

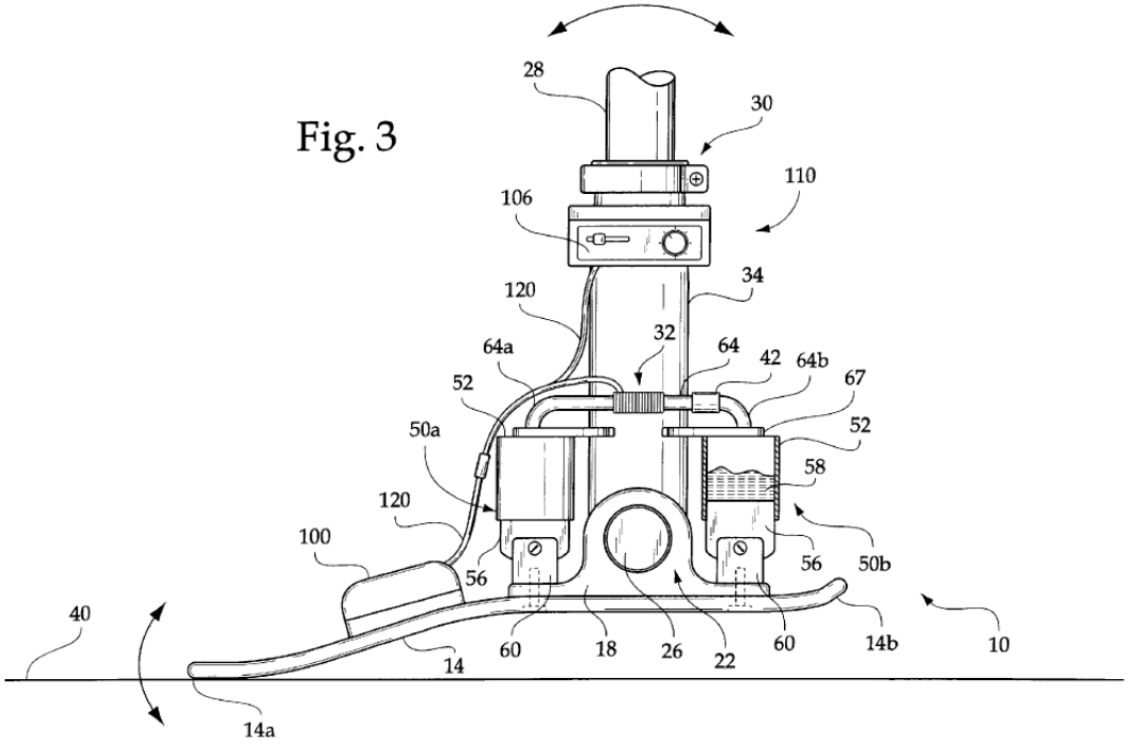

Figure 3 shows an auto-adjusting or auto-leveling prosthetic ankle. *Id.* at 3:52–54. Prosthetic ankle apparatus 10 includes lower base portion 18 that is coupled to an attachment portion 34 via ankle pivot pin 26. *Id.* at 6:5–7. Dynamically controlled damping means 48 selectively provides a level of 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 9:23–26.

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 persons 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. Analysis

Claims 1 and 7

Independent claim 1 recites a prosthetic foot and ankle assembly with an ankle joint mechanism providing resistance to flexion that "is constructed and arranged such that during walking said resistance is predominantly provided by hydraulic damping whenever the ankle joint is flexed in both dorsi- and plantar-flexion directions." Ex. 1001, 11:16–20. Dependent claim 7 further recites that "the resistance to flexion of said joint mechanism in a direction of dorsi-flexion is adjustable." *Id.* at 11:58–60.

To satisfy these requirements, Petitioner relies upon Koniuk's teachings of a hydraulic system that provides dynamically controlled damping of a pivoting motion of the ankle prosthesis by controlling the rate of flow of fluid that is transferred from a first internal pressure chamber to a

second internal pressure chamber. Pet. 22–23 (citing Ex. 1010, 6:34–60). Petitioner further relies upon Koniuk's disclosure that different damping levels may be achieved through the dynamically controllable means by altering the resistance to fluid flow through a fluid transfer conduit between the internal pressure chambers, and that a user interface allows for calibration or operation adjustments to the circuits and modules of the auto-adjusting ankle apparatus. *Id.* at 26 (citing Ex. 1010, 6:54–60, 7:36–39).

Patent Owner argues that "Koniuk does not provide hydraulic damping into the dorsi-flexion range under various circumstances" because the "control system and related valve arrangement restrict the permissible range of dorsi-flexion based on the orientation of the lower leg during the gait cycle." Prelim. Resp. 37–38. In particular, Patent Owner points to Koniuk's teaching that, at certain points during the walking (gait) cycle, the ankle joint is set to a second, significantly greater, damping level to maintain a "stiffened" state and prevent further pivoting of the foot. *Id.* at 38 (citing Ex. 1010, 5:22–24, 46–57, Figs. 2E–2F). Based on these disclosures, Patent Owner asserts that "hydraulic damping is not permitted in the dorsi-flexion range of motion when walking over level ground, since Koniuk explicitly discloses that the ankle will be locked at the orthogonal position under these circumstances . . . ." *Id.*

Based on the record before us, we determine that Petitioner has established a reasonable likelihood of prevailing with respect to its assertion that Koniuk anticipates claims 1 and 7. We are unpersuaded by Patent Owner's arguments as applied to these claims. Koniuk specifically teaches, from the perspective of Figure 3, that the device is capable of dynamically controlled hydraulic damping when the attachment portion is pivoted in

either the counter-clockwise direction (i.e., dorsi-flexion) or in the clockwise direction (i.e., plantar-flexion). Ex. 1010, 6:46–60. Moreover, we do not find any basis to conclude, from Koniuk's teaching, that even when the ankle joint is "stiffened" during walking, as the lower leg assumes a plumb vertical position, that Koniuk's apparatus fails to provide hydraulic damping whenever the ankle joint is flexed in both dorsi- and plantar-flexion directions (Claim 1) or provide an adjustable resistance to flexion of the joint mechanism in a dorsi-flexion direction (Claim 7). Rather, even in such a "stiffened state," Koniuk teaches that "the damping level should be set to the second, significantly greater, damping level to effectively prevent pivoting of the foot." *Id.* at 5:22–24. Because it appears that damping continues to occur *throughout* the walking cycle, Petitioner is likely to prevail on its assertion that these requirements are satisfied by Koniuk.

Claims 3–6

Dependent claims 3–6 each require a "flexion limiter" that limits "dorsi-flexion of the joint mechanism to a dorsi-flexion limit." Ex. 1001, 11:31–57. In order to satisfy this requirement, Petitioner asserts that "[t]he top end of cylindrical casing 52 associated with cylinder 50a constitutes a 'dorsi-flexion limiter' because piston 56 contacts the top end of [the] cylindrical casing 52 when it reaches the limit of dorsi-flexion[.]" Pet. 23.

Patent Owner argues that "the limit on dorsi-flexion in Koniuk does not correspond to a 'predetermined relative orientation of the shin component interface to the foot component' as required by Claims 3–5, but is actually determined by the position of the lower leg portion to the true vertical or plumb orientation." Prelim. Resp. 16. Patent Owner further argues that "the relative position of the foot component and shin *are*

'dependent on the orientation of the assembly in space,' contrary to the requirements of Claim 6, and specifically when the same lower leg portion reaches the vertical plumb position as described in the Koniuk patent . . . ." *Id.*

We determine that Petitioner has not established a reasonable likelihood of prevailing in its assertion that Koniuk anticipates claims 3–6. Petitioner's contention that the Koniuk satisfies the "flexion limiter" requirements of these claims is based on the assumption that the piston 56 will contact the top end of the cylindrical casing 52 during dorsi-flexion. Pet. 23. Petitioner, however, does not point to any disclosure in Koniuk indicating that this will necessarily be the case. To the contrary, Koniuk only teaches that the range of pivoting in the dorsi- and plantar-flexion directions is based on the damping levels generated by controlling the magnetic field that is applied to the magnetorheological (MR) fluid contained in the fluid transfer conduit 64. Ex. 1010, 7:46–65.

Claims 16–22

Independent claim 16 recites that "at least one of the foot component and the shin component includes a resilient section allowing resilient dorsi-flexion of at least an anterior portion of the foot component relative to the shin axis." Ex. 1001, 12:51–54. Dependent claims 17–19 depend from claim 16, and recite further limitations on the foot component or resilient section. Independent claim 20 recites that the prosthetic foot/ankle assembly "constitutes a Maxwell-model damper/spring combination comprising a damper element and a spring element, wherein the damper element is said ankle joint and the spring element is a spring component arranged in series with the ankle joint." *Id.* at 13:6–10. Dependent claims 21 and 22 depend

from claim 20, and recite further requirements of the spring component in such an assembly.

To satisfy these requirements, Petitioner points to the disclosure in Koniuk that the "damping level is achieved . . . to allow the weight of the wearer to be supported upon the foot blade 14" and that the foot is allowed to "flex once it is lifted and then again contacts the ground surface." Pet. 27–29 (citing Ex. 1010, 7:59–65). Petitioner further relies upon the '312 patent's disclosure that the hydraulic damper may be coupled to "conventional foot elements." *Id.* at 27. Although the '312 patent recognizes that conventional foot elements were known in the art, Petitioner has not identified any basis on this record to conclude that foot blade 14 of Koniuk either includes a resilient section allowing for dorsi-flexion in an anterior portion or that it satisfies the requirement for a Maxwell-model damper/spring combination.

Petitioner, therefore, has not established a reasonable likelihood of prevailing with respect to claims 16–22 based on Koniuk alone.

C. Obviousness of Claims 2 and 8 over Koniuk and Hellberg

Petitioner contends that claims 2 and 8 are rendered obvious in view of Koniuk and Hellberg, with citations to the disclosures of these references and the Michael Declaration. Pet. 29–31. The teachings of Koniuk are discussed above.

1. Hellberg (Ex. 1014)

Hellberg relates to "an adjustment device for an artificial arm or leg." Ex. 1014 at 1:9–10. Hellberg recognizes the importance of the prosthesis "be[ing] adjusted in both the angular and translatory direction, so that the user does not apply load in an unnatural way to the prosthesis." *Id.* at 1:19–

22. Hellberg teaches that the adjustment device includes an "angular adjustment means . . . comprised of . . . a pyramid adapter . . . which is attached . . . to a . . . prosthesis member." *Id.* at 2:57–63. Figure 2 of Hellberg is reproduced below:

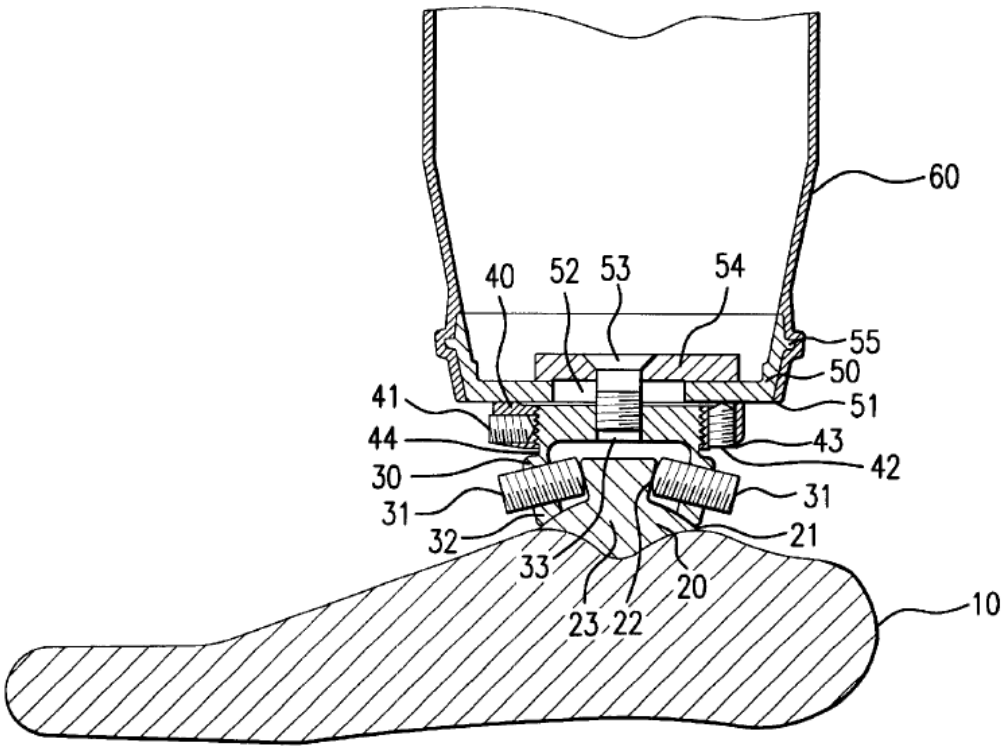

FIG.2

Figure 2 of Hellberg shows a pyramid adapter 20 coupling an artificial foot 10 with a lower leg prosthesis sleeve. *Id.* at 3:48–54.

2. Analysis

Claim 2

Claim 2 also requires a "flexion limiter limiting dorsi-flexion of the joint mechanism to a dorsi-flexion limit," and further recites that "the shin connection interface is arranged to allow connection of a shin component at

different anterior-posterior tilt angles . . . ." Ex. 1001, 11:21–30. As discussed with respect to claims 3–6 above, Petitioner has not established a reasonable likelihood of proving that Koniuk teaches the "flexion limiter" requirement of the claims. Petitioner does not rely upon any teachings of Hellberg to make up for this deficiency. We, therefore, determine that Petitioner has not established a reasonable likelihood of prevailing with respect to its assertion that the combination of Koniuk and Hellberg render claim 2 obvious.

Claim 8

Claim 8 requires "at least one pyramid alignment interface allowing adjustment of shin axis orientation in an anterior-posterior direction with respect to the foot component." Ex. 1001, 11:61–64. Petitioner argues that it would have been routine to modify the Koniuk ankle apparatus such that its prosthetic limb clamp

> includes a pyramid adapter 20 to attach to a lower leg prosthesis sleeve 60 and adjust the angular orientation of the lower leg prosthesis relative to the foot blade 14, including at an angle of least 3° relative to the vertical towards the front portion 14a, as disclosed by *Hellberg*.

Pet. 30 (citing Ex. 1014, 1:19–22). Petitioner notes that "the '312 patent itself recognizes that such pyramid interfaces were conventional and well known to the POSA." *Id.* (citing Ex. 1001 at 2:66–3:2).

Patent Owner argues that "Koniuk actually discloses a device that is intended to provide an *automatic* adjustment capability between the attachment portion 34 and the foot element through his microprocessor control, and eschews any approach based on mechanical adjustments." Prelim. Resp. 21 (citing Ex. 1010 at 1:27–33, 60–64). We determine that

Petitioner has established a reasonable likelihood of prevailing with respect to its obviousness assertion of claim 8. Although Koniuk states that "mechanical heel adjusting means and methods have been difficult to set or calibrate, and do not solve the problem regarding an automation adjusting to heel height changes, or inclining and declining surfaces," there is nothing in the reference that teaches away from the inclusion of a mechanical adjusting means altogether. Ex. 1010 at 1:60–63. *See In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004) (prior art does not constitute a teaching away when it "does not criticize, discredit, or otherwise discourage the solution claimed"). We do not understand Petitioner's obviousness contention to require the replacement of the automatic adjustment means in Koniuk with a mechanical adjustment means.

As noted in the Michael Declaration, an inverted pyramid design "allow[s] incremental realignment of the prosthesis throughout its useful lifespan," and "permits interchanging of components without losing the overall alignment." Ex. 1005 ¶ 161. Therefore, based on the current record, we determine that Petitioner has demonstrated a reasonable likelihood of prevailing in its assertion a skilled artisan would have found it obvious to include a pyramid adapter allowing for the required angular adjustments in the Koniuk apparatus.

D. Obviousness of Claims 16–22 over Koniuk and Christensen

Petitioner additionally contends that claims 16–22 are rendered obvious in view of Koniuk and Christensen, with citations to the disclosures of these references and the Michael Declaration. Pet. 31–34.

1. Christensen (Ex. 1009)

Christensen relates to a prosthetic ankle foot device including first and second prosthetic members. Ex. 1009, Abstract. Christensen teaches that the prosthetic foot device can have a "variable stiffness response," and includes a foot member that "defines an elongated spring capable of storing energy during deflection." *Id.* ¶ 11. Figure 7 of Christensen is reproduced below:

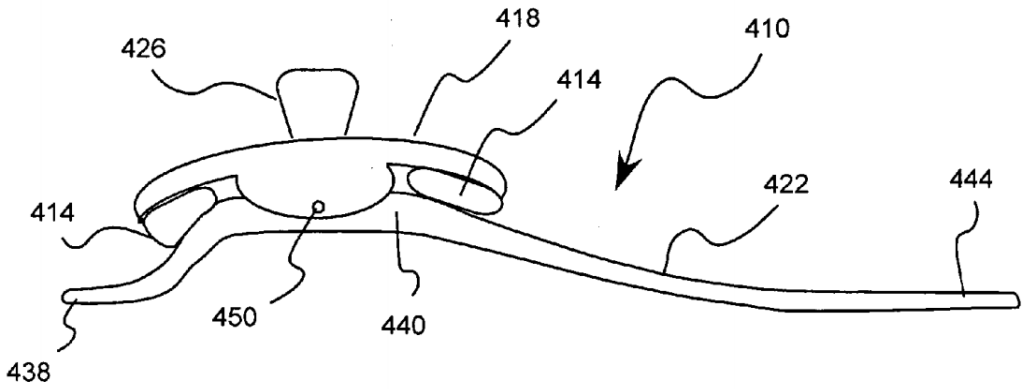

FIG. 7

Figure 7 depicts a prosthetic foot device 410 with an "energy transfer medium 414," and first and second members 418 and 422. *Id.* ¶ 64. The second member 422 curves "downwardly and forwardly to a toe section 444 at a toe location of toes of a natural foot, and [] downwardly and rearwardly to a heel section 438 at a heel location of a natural heel." *Id.* Christensen also describes an ankle member 418 pivotally attached to the second member 422 and including an attachment section 426 for a lower leg prosthesis of an amputee. *Id.* According to Christensen, "[t]he second member 422 can be [a] resilient and energy storing foot member that

deflects or flexes, storing energy, and can be formed of a fiber reinforced resin material, such as a graphite-reinforced resin." *Id.* In other embodiments, "[t]he secondary foot member also defines a spring, and thus deflects and stores energy, and provides an additional resistance response." *Id.* ¶ 67.

2. Analysis

Petitioner asserts that it would have been obvious to modify Koniuk's foot blade 14 by including a resilient section in a front portion in order to allow the front portion to "'deflect and/or move with respect to the' attachment portion [] and the axis of the prosthetic limb." Pet. 32–33 (citing Ex. 1009 ¶ 53, Ex. 1005 ¶ 173). Petitioner further asserts that "[t]he modified foot blade 14 of *Koniuk* being 'an elongated spring capable of storing energy during deflection,' . . . as taught by *Christensen*, acts in series with the damping means, such that, as a 'load is applied to the [] foot member . . . , the [] foot member defines a spring that deflects,' . . ., and a 'damping level is achieved . . . to allow the weight of the wearer to be supported upon the foot blade 14.'" *Id.* at 33 (citing Ex. 1009 ¶¶ 11, 67, Ex. 1010, 7:59–62). Petitioner contends that the rationale for making such a modification is that "*Christensen* teaches that the toe portion 444 of the foot member 422 deflects relative to the ankle member 418 to provid[e] a soft, cushioned feel." *Id.* (citing Ex. 1009 ¶ 53). Petitioner also states that there would have been nothing unpredictable or unexpected in developing the claimed resilient foot combination based on the combination of Koniuk and Christensen "because the '312 patent recognizes that such a resilient foot component was conventional and well known to a POSA." *Id.* at 34 (citing Ex. 1001, 9:64–67).

Based on the record before us, we determine that Petitioner has shown a reasonable likelihood of prevailing with respect to its assertion that claims 16–22 are obvious based on the combination of Koniuk and Christensen. We are unpersuaded by Patent Owner's arguments. Patent Owner argues that there would have been no motivation to incorporate a flexible foot structure with Koniuk's apparatus because Koniuk "stresses the importance of providing a *stiffened* structure that provides a solid grounding upon contact with the ground and that only permits the foot to 'flex' upon de-energizing the coil to permit relative movement." Prelim. Resp. 44 (citing Ex. 1010, 5:16–27). Although Koniuk teaches increasing the "stiffness" of the foot when it is lifted to effectively prevent pivoting of the foot and provide stable grounding while the user takes a step with respect to the other foot (Ex. 1010, 5:16–27), we find no basis in the record to conclude that this feature of Koniuk's apparatus is inconsistent with the use of a "resilient" foot structure as taught by Christensen. The "stiffness" that Koniuk refers to is with respect to the pivoting of the foot about the ankle joint. Furthermore, we determine based on the current record that there is a reasonable likelihood that the soft, cushioned feel of the foot taught in Christensen is at least partly attributable to the "resilient and energy storing foot member," even though it is possible to adjust the feel and softness of the foot by adjusting the variable viscosity fluid in the energy transfer medium. Ex. 1009 ¶¶ 64–65.

E. Obviousness of Claims 9–15 over Koniuk and Mortensen

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. 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:

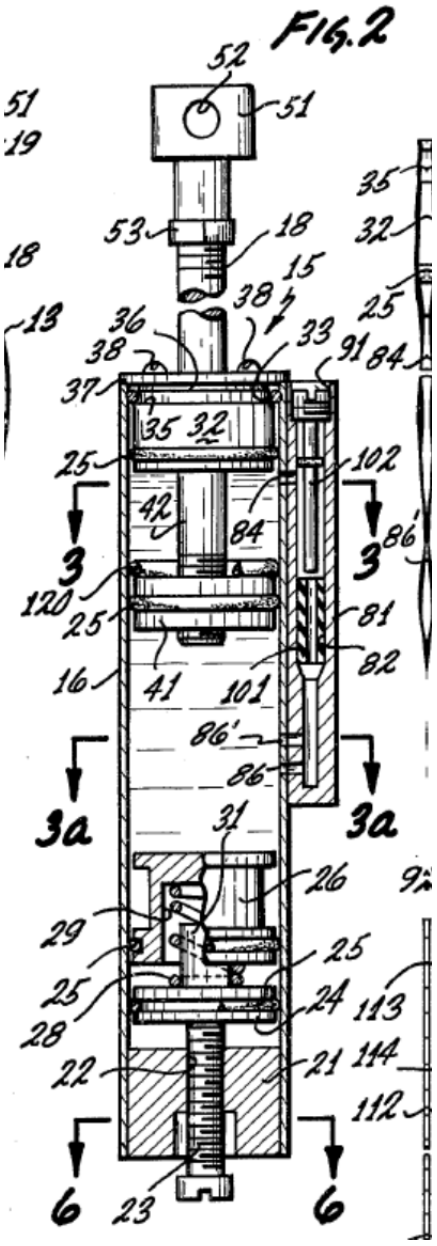

Figure 2 shows a sectional view of a knee control device. *Id.* at 1:60–61. Cylinder 16 includes piston 41. *Id.* at 2:16–18, 43–46. External bypass

appendage 81 allows piston 41 to move axially. *Id.* at 2:61–63. 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, 113 is screwed into or out of wells 82, 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.

2. Analysis

Claims 9–14

Dependent claim 9 recites "a hydraulic linear piston and cylinder assembly and a valve arrangement controlling the flow of hydraulic fluid" that "allow[s] individual setting of dorsi- and plantar-flexion damping resistances." Ex. 1001, 11:65–12:4. Claims 10–14 further depend upon claim 9 and include further requirements for the hydraulic linear piston and cylinder assembly and a valve arrangement, e.g., "an adjustable damping orifice." *Id.* at 12:8–34.

For these claims, Petitioner relies on Mortensen for teaching "a single, linear hydraulic cylinder and piston for controlling flexion of a prosthesis," which includes "two hydraulic passageways and a valve system for controlling the flow of hydraulic fluid between opposite regions in the

hydraulic cylinder 16 caused by linear movement of the piston 41 within the cylinder 16." Pet. 35–36 (citing Ex. 1012, Abstract, 1:35–38, 2:6–15, 31–32, 3:11–13, 44–66, 4:13–15, 30–39, Figs. 1–2). Petitioner further asserts that Mortensen also teaches that the device includes one-way valves with "adjustable heads 103, 113 that each individually control the hydraulic fluid flow between the opposite regions in the hydraulic cylinder 16 by screwing into and out of wells 82, 83 of the passageway." *Id.* at 36 (citing Ex. 1012, 3:11–13, 44–66, Figs. 4–5).

As for the rationale for combining Koniuk and Mortensen, Petitioner asserts that Koniuk specifically teaches that a "single hydraulic cylinder" may be alternative employed that includes "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 37 (citing Ex. 1010, 9:20–26). Petitioner therefore 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, and that there would have been nothing unpredictable or unexpected regarding such a modification because Koniuk expressly suggests such an arrangement. *Id.* at 37 (citing Ex. 1005 ¶¶ 200–206, Ex. 1010, 9:20–23).

Patent Owner responds that "Koniuk does *not* advocate wholesale substitutions of the desired flow control mechanisms in a manner that would fundamentally change important aspects of the operation of his device." Prelim. Resp. 27 (discussing Pet. 25). Patent Owner argues that the cited portion of Koniuk "indicates that alternative flow control systems to Koniuk's preferred arrangement may be utilized [, but only] to the extent

they *also* provide the intended manner of operation[.]" *Id.* (citing Ex. 1010 6:60–65). Patent Owner also argues that any valve system proposed for Koniuk must include "the requisite ability to rapidly *change* the rate of flow . . . to implement the required, instantaneous change from a first damping level to a second damping level *during the gait cycle*." *Id.* at 30 (citing Ex. 1010, 2:59–63, 5:19–24, 5:40–58). Patent Owner, thus, argues that Petitioner fails to demonstrate that a person of ordinary skill had reason to select and combine the prior art in the manner asserted. *Id.* at 31.

Koniuk is titled "SELF-ADJUSTING PROSTHETIC ANKLE APPARATUS" and relates to an "ankle prosthesis that automatically adjusts." Ex. 1010, 1:2–3, 7–9. In the "Summary of the Invention," Koniuk states that its "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 1:7–9, 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 incorporated Mortensen's single, linear hydraulic cylinder and piston does

not explain why such an ordinarily skilled artisan would have selected a mechanism that requires manual screwing to control damping in the "self-adjusting prosthetic ankle apparatus" of Koniuk. Although Koniuk indicates that a single hydraulic cylinder may be alternative employed for the dynamic damping means, Koniuk also emphasizes that it must have the "required fluidic couplings, through which the flow rate of fluid can be set to at least two levels, enabling the establishing of a first damping level and a second damping level." Ex. 1010, 9:20–26. Moreover, Koniuk indicates that the device must be able to rapidly change the rate of flow in order to achieve a dynamically controlled damping level. *Id.* at 4:46. Petitioner has not adequately explained how these capabilities could be achieved if the manual hydraulic mechanism of Mortensen was utilized in the Koniuk apparatus.

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 9–14 as unpatentable over Koniuk and Mortensen.

Claim 15

Claim 15, like claims 2–6, requires a "flexion limiter limiting dorsi-flexion of the joint mechanism to a dorsi-flexion limit," as well as a "cushioning device for increasing resistance to dorsi-flexion as flexion of the ankle joint apparatus approaches said dorsi-flexion limit." Ex. 1001, 12:35–40. Petitioner relies upon Mortensen's teaching of a "resilient O-ring," but does not point to any other teaching of a "flexion limiter." Pet. 44 (citing Ex. 1012, 2:31–32. As discussed with respect to claims 3–6 above, Petitioner has not established a reasonable likelihood of proving that Koniuk teaches the "flexion limiter" requirement of the claims. Petitioner does not

rely upon any teachings of Mortensen to make up for this deficiency. We, therefore, determine that Petitioner has not established a reasonable likelihood of prevailing with respect to its assertion that the combination of Koniuk and Mortensen renders claim 15 obvious.

F. Anticipation of Claims 1–8 and 16–22 by Townsend

Petitioner contends that claims 1–8 and 16–22 are anticipated by Townsend with citations to the disclosures of the reference and the Michael Declaration. Pet. 44–53.

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:

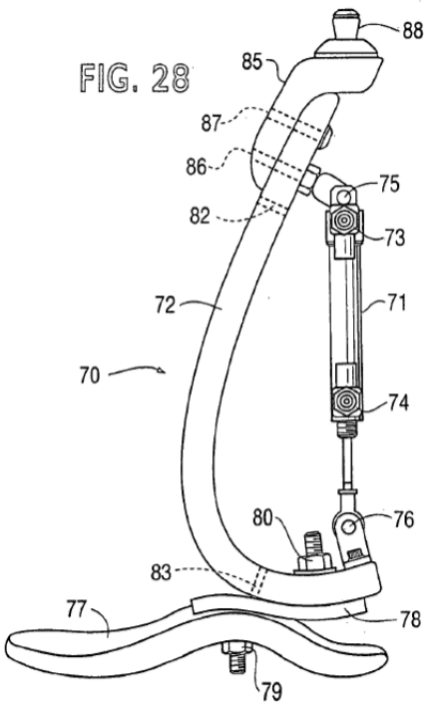

Figure 28 shows prosthetic foot 70 wherein a motion limiting, dampening device is connected between respective ends of a calf shank. *Id.* ¶¶ 36, 94. Prosthetic foot 70 includes a calf shank range of motion limiter

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 satisfies the limitations of a prosthetic foot and ankle assembly comprising a foot component and an ankle joint because "[it] includes a joint mechanism 71 that is a two-valve two-chamber adjustable cylindrical hydraulic piston" Pet. 44 (citing Ex. 1011, Abstract, Figs. 28–32; Ex. 1005 ¶ 71). Petitioner also cites claims 1 and 24 of Townsend. Pet. 46.

Patent Owner responds that "the portions of the Townsend device that correspond to the ankle are depicted and described as *fixed* mechanical structures that serve only as points of attachment." Prelim. Resp. 49 (citing Ex. 1011 ¶¶ 5, 51). Patent Owner's arguments are persuasive. Claim 1 of the '312 patent requires an "ankle joint comprising: a joint mechanism providing resistance to ankle flexion" predominantly by hydraulic damping. Ex. 1001, 11:13–18. Claims 16 and 20 include similar requirements. *Id.* at 12:44–47, 12:65–13:2.

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." Ex. 1011, Abstract. Townsend further states 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." *Id.* ¶ 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." *Id.* ¶ 51. None of these portions of Townsend teach that a device, such as the device 71 of Figure 28, is part of or forms an ankle joint.

Also, Petitioner cites paragraph 7 of Townsend, which states that "[t]he 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. 46–47 (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." *Id.* Paragraph 7 of Townsend, however, 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. *Id.* at 46. 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.

We, therefore, determine that Petitioner has not shown a reasonable likelihood that it will prevail with respect to its assertion that Townsend anticipates any of the challenged claims.

G. Obviousness of Claims 9–15 over Townsend and Mortensen

Petitioner contends that claims 9–15 are rendered obvious over the combination of Townsend and Mortensen. As discussed above, Petitioner has failed to demonstrate that Townsend teaches an "ankle joint" as required by the claims. Petitioner does not rely upon any teaching in Mortensen to make up for this deficiency. Pet. 53–60. Therefore, Petitioner has also not shown a reasonable likelihood of prevailing with respect to its obviousness challenge based on Townsend and Mortensen.

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 claims 1 and 7 of the '312 patent based on Koniuk alone, of claim 8 based on the combination of Koniuk and Hellberg, and claims 16–22 based on the combination of Koniuk and Christensen.

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 claims 1, 7, 8, and 16–22 of U.S. Patent No. 8,574,312 B2 based on the following grounds of unpatentability:

A. Claims 1 and 7 under 35 U.S.C. § 102(b) as anticipated by Koniuk,

B. Claim 8 under 35 U.S.C. § 103(a) as obvious over Koniuk and Hellberg, and

C. Claims 16–22 under 35 U.S.C. § 103(a) as obvious over Koniuk and Christensen;

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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