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Paper No. 8
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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 IPR2015-00642
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 1–22 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 IPR2015-00641. 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, 1:13–20.

Figure 1 of the ’312 patent is reproduced below:

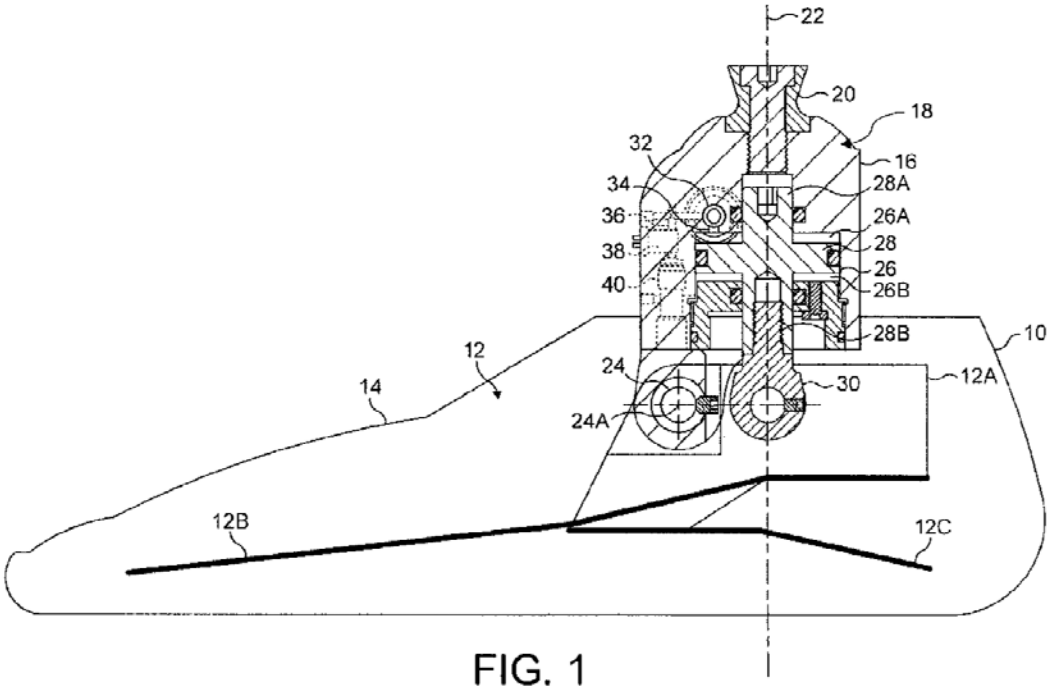

FIG. 1

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 5:64–6:4. 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
Gramnas[1]	§ 102(b)	1–6
Gramnas	§ 103	1–6
Gramnas and Hellberg[2]	§ 103	8
Gramnas and Christensen[3]	§ 103	16–22
Gramnas and Mortensen[4]	§ 103	7 and 9–15
Christensen	§ 103	1, 3–7, and 20–22
Christensen and Hellberg	§ 103	2, 8, 16–19

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 *11–19 (Fed. Cir. July 8, 2015). Under that standard, claim terms are

[1] U.S. 2004/0044417 A1, published Mar. 4, 2004 (Ex. 1008, "Gramnas")
[2] U.S. 6,398,817 B1, issued June 4, 2002 (Ex. 1014, "Hellberg").
[3] U.S. 2005/0171618 A1, published Aug. 4, 2005 (Ex. 1009, "Christensen").
[4] U.S. 4,212,087, issued July 15, 1980 (Ex. 1012, "Mortensen").

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 or Obviousness of Claims 1–6 based on Gramnas

Petitioner contends that claims 1–6 are anticipated by Gramnas, with citations to the disclosure in Gramnas, a claim chart, and a Declaration of Prof. John Michael (Ex. 1005, "Michael Declaration"). Pet. 15–23. Petitioner alternatively contends that Gramnas alone renders claims 1–6 obvious. *Id.* at 24–25.

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

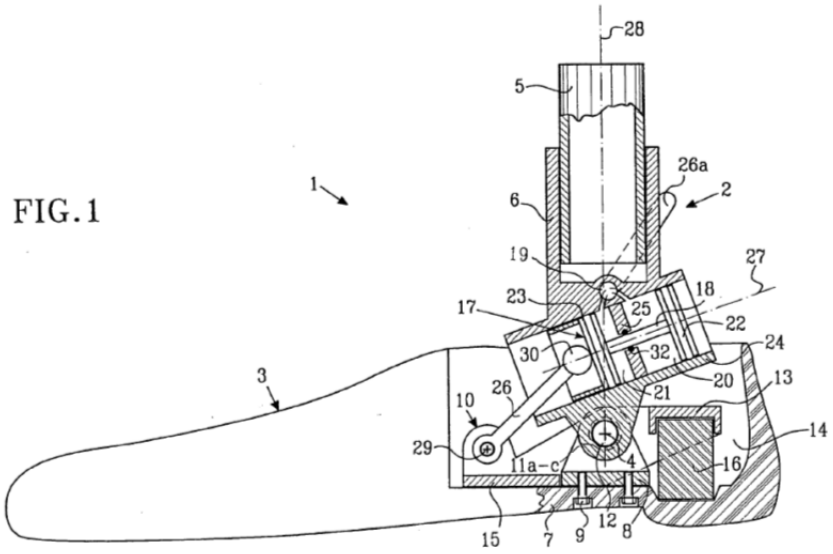

Figure 1 shows the prosthesis. *Id.* ¶ 9. Prosthesis 1 comprises leg prosthesis 2 and foot 3 connected via pivot axle 4 to leg prosthesis 2. *Id.* ¶ 12. Prosthesis 1 further comprises lever arm 10 with first end 13 and second part 15. *Id.* ¶ 13. Lever arm 10 is supported on a shaft so as to pivot around 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 provide 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

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.

To satisfy the "hydraulic damping" requirement, Petitioner relies upon Gramnas's teaching that when the two-way valve 19 is open, "leg prosthesis 2 can be brought from a first extreme position in which the leg prosthesis is angled maximally forwards . . . to a second extreme position in which the leg prosthesis is angled maximally backwards." Pet. 16–17 (citing Ex. 1008 ¶ 17). Petitioner asserts that, during this range of motion, hydraulic damping occurs as fluid is forced through the relatively small orifice shown in Figs. 2a–2c. *Id.* at 17 (citing Ex. 1008, Figs. 2a–2c; Ex. 1005 ¶ 98). Petitioner explains that,

> during 'rollover' (i.e., heel off, weight on front of foot, foot in dorsi-flexion relative to leg), link 26 of *Gramnas* pushes movable piston 18 toward the rear of cylinder 24, forcing fluid through valve 19 to equalize pressure on either side of the piston and thereby creating hydraulic damping in the dorsi-flexion direction.

Id. at 18 (citing Ex. 1005 ¶ 100). Petitioner further explains that during and after "heel strike" (i.e., heel on ground, weight on rear foot), "resistance to plantar flexion in Gramnas is provided by link 26 pulling piston 18 forward in cylinder 24, forcing fluid through valve 19 to equalize pressure, thereby creating hydraulic damping in the plantar-flexion direction." *Id.* (citing Ex. 1008, Fig. 2c, ¶ 15; Ex. 1005 ¶ 105). Petitioner, therefore, concludes that "if valve 19 of *Gramnas* is open during motion of prosthetic leg 2 (e.g., walking), the joint mechanism of the device will predominantly provide damping by the hydraulic piston 18 rather than resilient biasing, resisting ankle flexion in both the dorsi- and plantar direction." *Id.* at 18–19 (citing Ex. 1005 ¶ 107).

Patent Owner responds that "Petitioner mischaracterizes the relevant disclosure related to Figures 2a-2c of the Gramnas reference in an effort to create the illusion that Gramnas discloses an ankle assembly which applies hydraulic damping through multiple phases of the gait cycle during ambulation." Prelim Resp. 8. Patent Owner asserts that, because valve 19 is *closed* once the adjustment of the heel height is made in Gramnas's device, "there is no 'first mode of operation' during ambulation by the user." *Id.* at 9. As such, Patent Owner concludes that "the Gramnas assembly is *not* designed or intended for use in providing resistance to ankle flexion predominantly by hydraulic damping *whenever* the ankle joint is flexed in both dorsi-plantar directions *during walking*." *Id.* at 10. Patent Owner further notes that Gramnas relies on resilient element 16 to absorb the force that occurs during ambulation, which requires that "the additional elements of the assembly must be locked in order for the device to operate as intended." *Id.* at 11 (citing Ex. 1008 ¶ 23).

We agree with Patent Owner that Petitioner has failed to demonstrate a reasonable likelihood that Gramnas satisfies the hydraulic damping "during walking" requirement of claim 1. 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[e] 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.* (emphasis added). As Petitioner acknowledges, however, hydraulic damping is only provided when two-way valve 19 is open. Pet. 16–17. Petitioner, nonetheless, asserts that the fact that Gramnas does not disclose that valve 19 is open "during walking" does not distinguish apparatus claims 1–6 because an "apparatus claims cover what a device *is*, not what a device *does*." Pet. 19, n.2 (citation omitted). But there is nothing in the record suggesting that the Gramnas device is even capable of operating in such a manner if the valve is left open during walking, i.e., whenever the ankle joint is flexed in both dorsi- and plantar-flexion directions. *Cf. In re Schreiber*, 128 F.3d 1473, 1478–79 (Fed. Cir. 1997) (requiring proof that prior art device was capable of performing all the functions recited in the claim).

Moreover, we also do not find that Petitioner has sufficiently demonstrated a reasonable likelihood of prevailing in its assertion that it would have been obvious to a skilled artisan that Gramnas could be modified to meet this limitation during walking. Pet. 24. Petitioner asserts that leaving the valve 19 open "provides the added benefit of hydraulic

resistance to ankle flexion and extension during walking, such that, during walking, hydraulic resistance is the predominant resistance." *Id.* (citing Ex. 1005 ¶ 116). However, 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.").

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 1–6 as anticipated or rendered obvious by Gramnas.

C. Obviousness of Claim 8 over Gramnas and Hellberg

Petitioner contends that claim 8 is rendered obvious in view of Gramnas and Hellberg, with citations to the disclosures of these references and the Michael Declaration. Pet. 25–27. Petitioner relies upon Hellberg's teaching of a pyramid adapter that may be attached to the lower leg prosthesis. *Id.* (citing Ex. 1014, 1:19–22; Ex. 1005 ¶¶ 163–165). Because Hellberg is not relied upon to make up for the deficiency in Gramnas discussed above, we determine that Petitioner has not demonstrated a reasonable likelihood of prevailing with respect to this obviousness challenge.

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

Petitioner additionally contends that claims 16–22 are rendered obvious in view of Gramnas and Mortensen, with citations to the disclosures of these references, and the Michael Declaration. Pet. 27–34.

To satisfy the requirements of independent claims 16 and 20, Petitioner relies upon the same teachings of Gramnas that we have found to be deficient with respect to claim 1. Pet. 31–33 (cross-referencing claim chart for Limitation [1.4]). Although these claims do not recite "during walking," they nonetheless require that that resistance to ankle flexion "is predominantly provided by hydraulic damping *whenever* the ankle joint is flexed in both dorsi- and plantar flexion directions." Ex. 1001, 12:46–49, 13:1–4 (emphasis added). The term "whenever" suggests that the ankle joint must always be capable of hydraulic damping during operation. As discussed above, however, the Gramnas device does not provide hydraulic damping when valve 19 is closed, *i.e.*, the mode in which the device is intended to be used during walking. Because Christensen is not relied upon to make up for this deficiency in Gramnas, we determine that Petitioner has not demonstrated a reasonable likelihood of prevailing with respect to this obviousness challenge.

E. Obviousness of Claims 7 and 9–15 over Gramnas and Mortensen

Petitioner contends that claims 7 and 9–15 are rendered obvious by the combination of Gramnas and Mortensen, with citations to the disclosures of these references and the Michael Declaration. Pet. 34–43. Petitioner relies upon Mortensen's teaching of a single hydraulic cylinder assembly and a resilient O-ring. *Id.* (citing Ex. 1012, Abstract, 1:35–38, 3:11–13, 44–66, 4:13–15). Because Mortensen is not relied upon to make up for the deficiency in Gramnas discussed above, we determine that Petitioner has not demonstrated a reasonable likelihood of prevailing with respect to this obviousness challenge.

F. Obviousness of Claims 1, 3–7, and 20–22 over Christensen

Petitioner also contends that claims 1, 3–7, and 20–22 are rendered obvious by Christensen, with citations to the reference, a claim chart, and the Michael Declaration. Pet. 44–55.

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. Christensen teaches the use of an "energy transfer medium" or "energy transfer mechanism" that "allows the energy transferred between the [foot] members to be varied. *Id.* ¶ 36.

Figure 7 of Christensen is reproduced below:

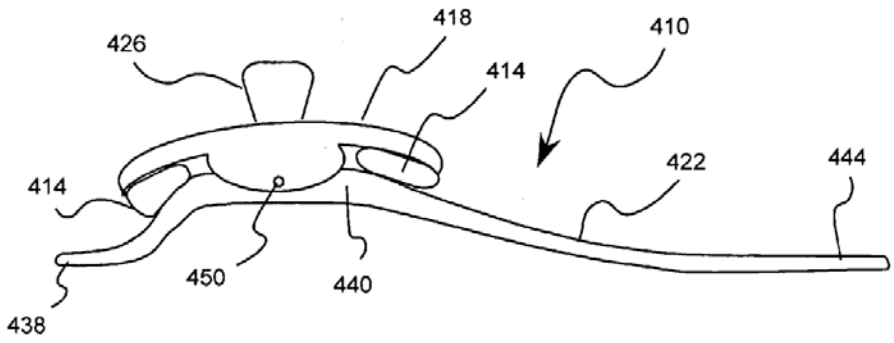

FIG. 7

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.

Additionally, another embodiment of Christensen's prosthetic foot is depicted in Figure 9a, reproduced below:

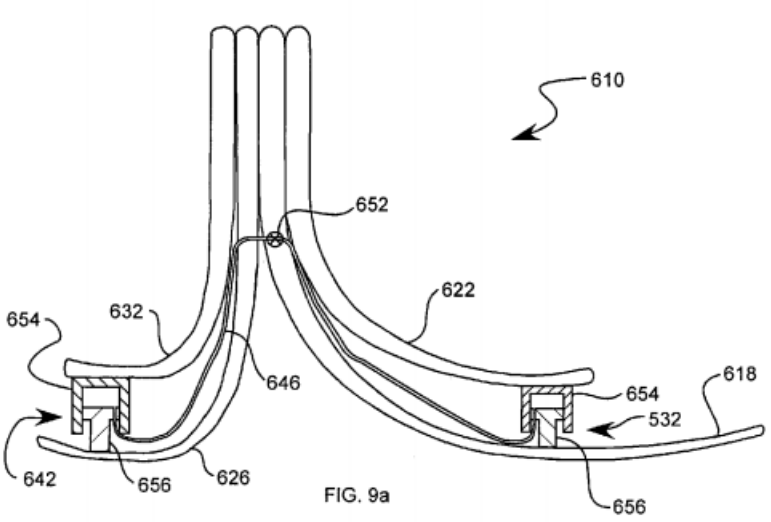

FIG. 9a

Figure 9a depicts a prosthetic foot with an "energy transfer mechanism . . . that variably resists flow of a fluid through a variable orifice. *Id.* ¶ 66. "The foot device 610 can include a primary elongated forefoot member 618, a secondary forefoot member 622, a primary heel member 626, and a secondary heel member 632." *Id.* ¶ 74. The primary and secondary foot members 618 and 622 can act as elongated resilient springs that can

store energy during deflection. *Id.* Furthermore, the energy transfer mechanism includes "first and second enclosures 636 and [532] . . . formed by chambers [654] and pistons 656" with the pistons 656 coupled to a first member 618, 626 away from the user, and the chambers 654 coupled to a second member 622, 632 closer to the user. *Id.* ¶ 78. Christensen also discloses that the first and second enclosures 636, 532 are "fluidly connected by a fluid path 646" such that fluid disposed in the first and second enclosures 636, 532 can flow therebetween. *Id.* ¶ 76. The fluid path 646 includes a valve mechanism 652 to vary the resistance to fluid flow through the fluid path. *Id.* ¶¶ 71, 77.

2. Analysis

Petitioner relies on Christensen's teaching of an energy transfer mechanism that variably resists fluid flow, depicted in Figure 9a, as satisfying the claim requirement of a joint mechanism in which resistance to ankle flexion "is predominantly provided by hydraulic damping whenever the ankle joint is flexed in both dorsi- and plantar-flexion directions." Pet. 51–52 (citing Ex. 1009, ¶¶ 66–67, 69, 77–78; Ex. 1005 ¶ 134). Petitioner further relies on Christensen's teaching of the structure depicted in Figure 7, in which the resilient and energy storing second foot member 422 can be pivotally attached to the first member 418, as satisfying the other requirements of claim 1. *Id.* at 50–51 (citing Ex. 1009, Abstract, ¶¶ 36, 54, 64–65; Ex. 1005 ¶ 223). Petitioner also relies upon these teachings to satisfy the requirements of claims 3–7 and 20–22. *Id.* at 52–55. Petitioner asserts that a skilled artisan would have been motivated "to substitute, with a reasonable expectation of success, *Christensen*'s energy transfer medium 414 with *Christensen*'s energy transfer mechanism (including the fluid

chambers 654, pistons 656, fluid path 646, and valve mechanism 652) to arrive at the claimed apparatus." Pet. 49.

With respect to the requirements of the "flexion limiter" of claims 3–6, Petitioner relies upon Christensen's teaching that "[t]he first and second enclosures [532] and 642 can be compressible between a first position in response to a relatively larger load or force, and a second position in response to a relatively smaller load or force," which allows dimensions to be changed such that lesser or greater amounts of fluid can pass through the variable orifice 652. *Id.* at 52–53 (citing Ex. 1009 ¶ 78, Figs. 7, 9a; Ex. 1005 ¶ 143). Mr. Michaelson explains in his Declaration that "the top end walls of the chambers 654 limit the maximum displacement of the pistons 656," thereby serving as mechanical end-stops. Ex. 1005 ¶¶ 144–147.

Based on the record before us, we determine that Petitioner has demonstrated a reasonable likelihood of prevailing in its assertion that the challenged claims are obvious based on Christensen. We are unpersuaded by Patent Owner's arguments.

In particular, Patent Owner argues that there is no basis for making the proposed modification because, in describing the embodiment of Figure 7 with a pivotal "attachment member," "Christensen specifically disclosed an arrangement which utilizes sealed resilient elements that do not involve fluid transfer between assemblies, much less hydraulic damping as required by the claims." Prelim. Resp. 35. Patent Owner further argues that Christensen is not concerned about "providing an ankle assembly applying resistance predominantly through hydraulic damping . . . as distinguished from Christensen's bifurcated foot structures, with assemblies interposed therebetween, for the distinct purpose of controlling the stiffness of the foot

assembly." *Id.* at 36. Christensen, however, discloses specifically that the "energy transfer medium" of the embodiment in Figure 7 and the "energy transfer mechanism" of the embodiment in Figure 9a serve similar functions, which is to "allow[] the energy transferred between the [foot] members to be varied, thus varying the stiffness or response of the foot." Ex. 1009 ¶ 36. Moreover, Christensen states that the variable orifice in the energy transfer mechanism can be used to adjust the resistance to fluid flow to either provide a "stiffer feel and greater resistance response" or a "softer feel and a lesser resistance response." *Id.* ¶ 67. We, therefore, determine based on these teachings that Petitioner has sufficiently demonstrated the likely obviousness of the claims based on the substitution of one functionally equivalent element for another. "Express suggestion to substitute one equivalent for another need not be present to render such substitution obvious." *In re Fout*, 675 F.2d 297, 301 (CCPA 1982). The result of the proposed modification would be a device in which resistance to ankle flexion is predominantly provided by hydraulic damping.

We are also not convinced, at this stage, by Patent Owner's arguments that Christensen does not disclose the claimed "flexion limiter." Prelim. Resp. 37. Patent Owner contends that the compressibility of the enclosures of the energy transfer mechanism, referred to in paragraph 78 of the reference, does not "limit the degree of dorsi-flexion of an *ankle mechanism* as required by the claim." *Id.* Patent Owner further contends that "[t]here is no disclosure or suggestion of a result of limiting the range of motion for any purpose." *Id.* Patent Owner makes similar arguments concerning the requirements of claims 4–6. *Id.* at 38–39. Christensen, however, specifically teaches that the enclosures formed by the chambers and pistons

in the energy transfer mechanism of the embodiment in Figure 9a can be compressed, resulting in a smaller dimension, such as height. Ex. 1009 ¶ 78. The incorporation of that mechanism in the pivotally attached embodiment of Figure 7 would appear to limit the degree of dorsi-flexion in an ankle mechanism. Therefore, based on the Michael Declaration and the teachings of the reference, we determine that Petitioner has demonstrated that these claim requirements are likely satisfied by the modified Christensen device. Ex. 1005 ¶¶ 142–153.

With respect to claims 20–22, Patent Owner argues that Petitioner does not address the requirement that the damper element and the spring element in the "Maxwell-model damper/spring combination" must be arranged *in series* rather than in parallel. Prelim. Resp. 39–40. The Michael Declaration explains, however, that "one of ordinary skill in the art would have understood that the elongate spring of the foot member 422 acts in series with the hydraulic damping of the energy transfer mechanism." Ex. 1005 ¶ 139. Thus, based on the current record, we determine that Petitioner has sufficiently demonstrated a reasonable likelihood that Christensen satisfies the requirements of these claims.

G. Obviousness of Claims 2, 8, and 16–19 over Christensen and Hellberg

Petitioner contends that claims 2, 8, and 16–19 are rendered obvious by the combination of Christensen and Hellberg, with citations to the references and the Michael Declaration. Pet. 55–56. Petitioner asserts, based on Hellberg, that it would have been obvious to include a pyramid adapter to attach the lower leg prosthesis, and to adjust the angular orientation of the lower leg prosthesis relative to the heel or toe portion 438,

444 of the foot member 422, including at an angle of least 3° relative to the vertical towards the toe portion 444, for proper positioning of the lower leg prosthesis. *Id.* at 56 (citing Ex. 1014, 1:19–22; Ex. 1005 ¶ 166). Based on the record before us, we determine that Petitioner has made a sufficient showing as to these claims for institution on this obviousness ground.

H. Obviousness of Claims 9–15 over Christensen and Mortensen

Petitioner contends that claims 9–15 are rendered obvious by the combination of Christensen and Mortensen, with citations to the references and the Michael Declaration. Pet. 56–59.

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:

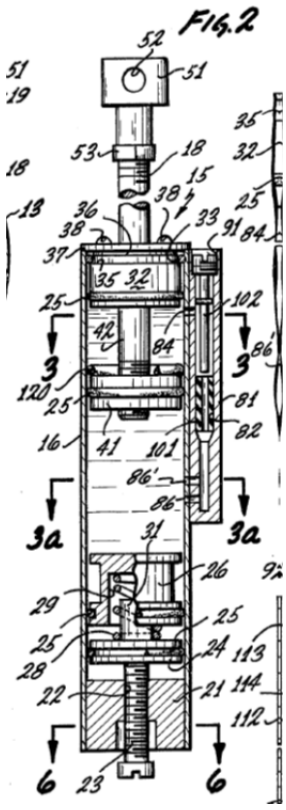

Figure 2 shows a sectional view of a knee control device. *Id.* at 1:60–61. Cylinder 16 includes piston 41. *Id.* at 2:16–18, 43–46. External bypass appendage 81 allows piston 41 to move axially. *Id.* at 2:62–63. External bypass appendage 81 has two axially aligned wells 82, 83, which communicate with 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, 113 is screwed into or out of well 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. *Id.* at 4:13–15.

2. Analysis

With respect to claims 9–14, Petitioner asserts that "[b]oth *Christensen* and *Mortensen* teach a hydraulic damping assembly for providing resistance to relative movement between two components of a prosthesis," and "[i]t would have been routine for a POSA to substitute, with a reasonable expectation of success, *Christensen*'s energy transfer mechanism with a single, linear hydraulic cylinder and piston assembly, as taught by *Mortensen*, because the prior art expressly suggests such an arrangement." Pet. 58. As evidence of what a skilled artisan would have

known, Petitioner cites to the teaching of another reference, Koniuk,[5] that "[t]he damping means may be provided . . . with a plurality of hydraulic cylinders having fluidic couplings," but that "[a]lternately, a single hydraulic cylinder may be employed . . . having a plurality of internal pressure chambers . . . [and] fluidic couplings, through which the flow rate of fluid can be set to at least two levels." *Id.* at 57.

Patent Owner argues that "Mortensen does not disclose anything concerning an ankle assembly or issues unique to controlling relative motion between the foot and ankle over changing terrain," and that "Christensen discloses positioning his assemblies both anterior and posterior to the hinge point in the arrangements shown in both Figure 7 and Figure 9a as conceded by Petitioner, and even in its proposed reconstructed assembly." Prelim. Resp. 42–45. In light of the different nature of the mechanisms in Christensen and Mortensen, Patent Owner argues that Petitioner has not provided any meaningful motivation for incorporating Mortensen's single hydraulic cylinder and valve assembly into the Christensen prosthetic. *Id.*

We determine that Petitioner has made a sufficient showing as to the obviousness of claims 9–14. As support for substituting Mortensen's single hydraulic piston-cylinder assembly into Christensen's arrangement, Petitioner relies upon the Michael Declaration, which indicates that "one of ordinary skill in the art would have recognized from the prior art that a single, linear hydraulic cylinder with a plurality of internal regions and fluid passageways to control the flow rate of fluid between the regions was a

[5] U.S. 6,443,993 B1, issued Sept. 3, 2002 (Ex. 1010, "Koniuk"). The Petition cites to Ex. 1012, 9:23–28, but this appears to be intended as a reference to Koniuk (Ex. 1010) and not Mortensen (Ex. 1012). Pet. 57–58. Koniuk is relied upon in the Petition for IPR2015-00641.

known solution for providing damping resistance to ankle flexion of a prosthesis." Ex. 1005 ¶ 223. The Michael Declaration further attests that "it would have been routine for one of ordinary skill in the art to substitute *Christensen*'s energy transfer mechanism with a single, linear hydraulic cylinder and piston assembly, as taught by *Mortensen*," and that "[o]ne of ordinary skill in the art would have a reasonable expectation of successfully substituting for a single, linear hydraulic cylinder and piston assembly because both *Christensen* and *Mortensen* teach a hydraulic damping assembly for providing resistance to relative movement between two components of a prosthesis." *Id.* ¶ 224. Moreover, as further evidence of the knowledge of those skilled in the art, Petitioner points to the teaching in Koniuk that a single hydraulic cylinder mechanism may be employed in an ankle joint mechanism. Ex. 1010, 9:23–28. Petitioner has therefore demonstrated, based on the current record, a reasonable likelihood that a skilled artisan would have considered it desirable to utilize a single hydraulic cylinder arrangement in conjunction with the energy transfer mechanism of Christensen.

With respect to claim 15, Petitioner relies upon Mortensen's teaching of an O-ring 120 to resiliently absorb the force applied to the piston as it contacts an end portion of the hydraulic cylinder. Pet. 59 (citing Ex. 1012, 4:13–15; Ex. 1005 ¶¶ 229–230). Petitioner asserts that it would have been obvious to incorporate such a resilient O-ring "to the top ends of *Christensen*'s pistons 656 to resiliently absorb contact between the pistons 656 and the top end walls of the hydraulic chambers 654, preventing wear to the prosthesis components and trauma to the device and user." *Id.* Based on

the record before us, we determine that Petitioner has made a sufficient showing as to the obviousness of claim 15.

In sum, Petitioner has demonstrated a reasonable likelihood of prevailing with respect to its assertion that claims 9–15 are obvious over the combination of Christensen 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, 3–7, and 20–22 of the ’312 patent based on Christensen alone, of claims 2, 8, and 16–19 based on the combination of Christensen and Hellberg, and claims 9–15 based on the combination of Christensen 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 claims 1–22 of U.S. Patent No. 8,574,312 B2 based on the following grounds of unpatentability:

A. Claims 1, 3–7, and 20–22 under 35 U.S.C. § 103(a) as obvious over Christensen;

B. Claims 2, 8, and 16–19 under 35 U.S.C. § 103(a) as obvious over Christensen and Hellberg; and

C. Claims 9–15 under 35 U.S.C. § 103(a) as obvious over Christensen 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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