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Paper 41
Date: April 29, 2020

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

INTEX RECREATION CORP.,
Petitioner,

v.

TEAM WORLDWIDE CORP.,
Patent Owner.

PGR2019-00015
Patent 9,989,979 B2

Before GEORGE R. HOSKINS, JAMES J. MAYBERRY, and ERIC C. JESCHKE, *Administrative Patent Judges*.

MAYBERRY, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 328(a)

ORDER
Denying Petitioner's Motion to Exclude
37 C.F.R. § 42.64

I. INTRODUCTION

A. Background and Summary

Intex Recreation Corporation ("Intex" or "Petitioner") filed a Petition to institute a post-grant review of claims 1–5 (the "Challenged Claims") of U.S. Patent No. 9,989,979 B2 (Ex. 1004, "the '979 patent"). Paper 1 ("Pet."). Team Worldwide Corporation ("Team Worldwide" or "Patent Owner") filed a Patent Owner's Preliminary Response. Paper 6. We instituted trial on all Challenged Claims and grounds. Paper 7 ("Dec. on Inst.").

After we instituted trial, Patent Owner filed a Patent Owner Response. Paper 21 ("PO Resp."). Petitioner filed a Reply to the Patent Owner Response (Paper 28, "Reply") and Patent Owner filed a Sur-reply to the Reply (Paper 30, "Sur-reply).

Petitioner filed a Motion to Exclude Evidence (Paper 34, "Mot."), Patent Owner filed an Opposition to the Motion (Paper 35, "Opp."), and Petitioner filed a Reply to the Opposition (Paper 37, "Reply to Opp.").

We conducted an oral hearing on February 11, 2020 and the record includes a transcript of the hearing. Paper 40 ("Tr.").

The Board has jurisdiction under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 328(a) and 37 C.F.R. § 42.73. For the reasons that follow, we conclude that Petitioner demonstrates, by a preponderance of the evidence, that all Challenged Claims are unpatentable.

B. Real Parties in Interest

The Petition indicates that, along with the Petitioner Intex, the following entities are real parties in interest: Intex Development Company Ltd.; Intex Industries (Xiamen) Co., Ltd.; Intex Marketing Ltd.; and Intex

Trading Ltd. Pet. 1. Patent Owner identifies itself as the sole real party in interest. Paper 5, 1.

C. Related Matters

According to Patent Owner, the '979 patent is not currently asserted in litigation. PO Resp. 1. Neither party identifies any pending related matters. *See, e.g.*, *id.* at n.1 (indicating that the Board did not institute trial for *inter partes* review proceedings involving the '979 patent and U.S. Pat. No. 8,863,771 B2 (the "'771 patent"), to which the '979 patent claims priority).

D. The '979 Patent and Related Applications

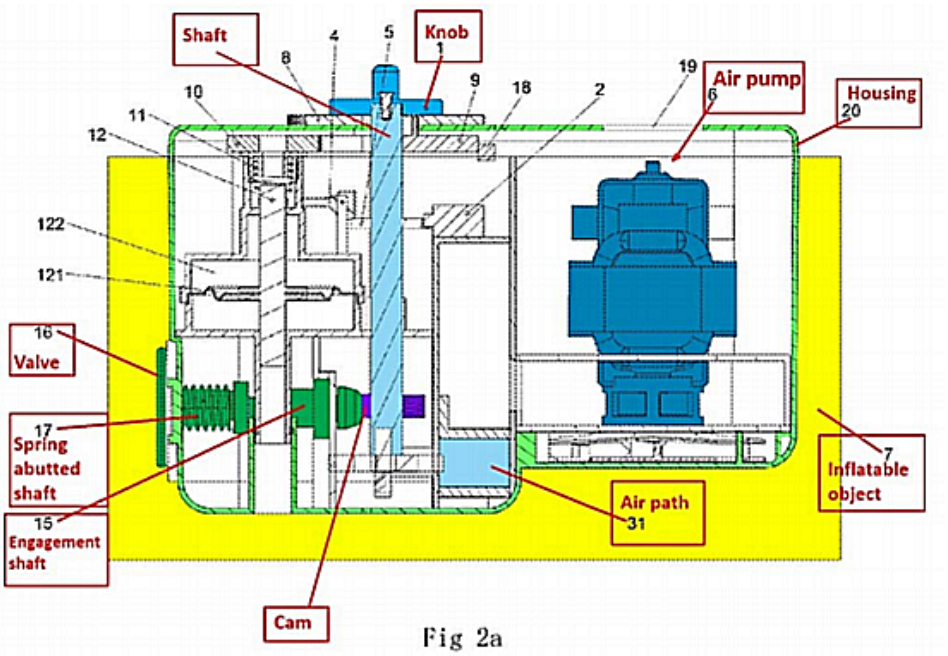
The '979 patent, titled "Inflating Module for Use with an Inflatable Object," issued June 5, 2018 from an application filed August 29, 2014 (U.S. Appl. No. 14/474,073, the "'073 application"). Ex. 1004, codes (21), (22), (45), (54). The '073 application purports to be a division of U.S. Appl. No. 13/112,847 (the "'847 application"), which issued as the '771 patent, and claims priority to Chinese application CN 201010186302.4, filed on May 21, 2010 (the "CN '302 application"). *Id.* at codes (30), (62), 1:7–11.

1. The '979 patent

The '979 patent relates to "an inflating module used . . . to inflate [an] inflatable object and provide supplemental air pressure to the inflatable object when the air pressure of the inflatable object is under a predetermined level." Ex. 1004, 1:15–20. According to the '979 patent, "[t]o avoid the inconvenience caused by [a] leak of the inflatable object, the best policy is that the air pressure of the inflatable object is maintained the entire time when the inflatable object is in use" and "the best option [for that purpose] is to use another air pump to provide additional air pressure to the inflatable

object in time when the air pressure of the inflatable object is decreasing." *Id.* at 1:42–49.

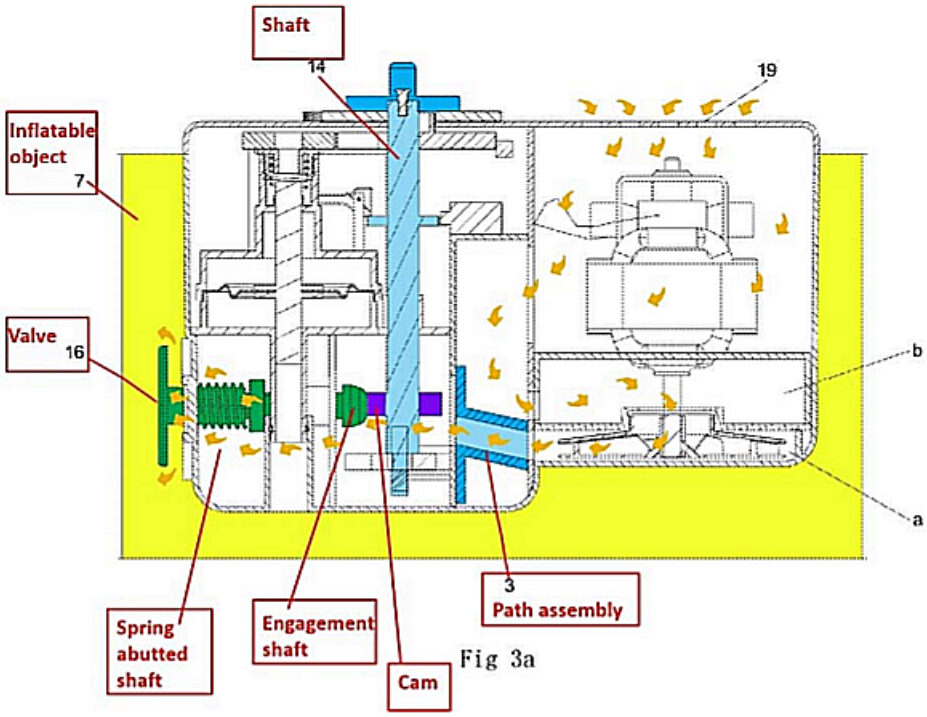
We reproduce a version of Figure 2a from the '979 patent, with annotations added by Petitioner, below.



Pet. 5. Figure 2a depicts "a cross sectional view showing [a] valve controlling assembly in association with [a] pressure sensing assembly." Ex. 1004, 2:38–40. In the annotated version of Figure 2a above, Petitioner added (among other annotations) (1) light green shading to housing 20, (2) yellow shading to inflatable object 7, (3) dark blue shading to air pump 6, (4) green shading to valve 16, spring-abutted shaft 17, and engagement shaft 15, and (5) blue shading to both knob 1 and air path 31. Pet. 4. Significant to our Decision here, Figure 2a includes lead lines 121 and 122. *See* Ex. 1004, Fig. 2a. The Specification states that "[a]fter the supplemental air pressure providing device is in a standby mode, a pressure controlling assembly 121/122 *as described* starts monitoring air pressure in

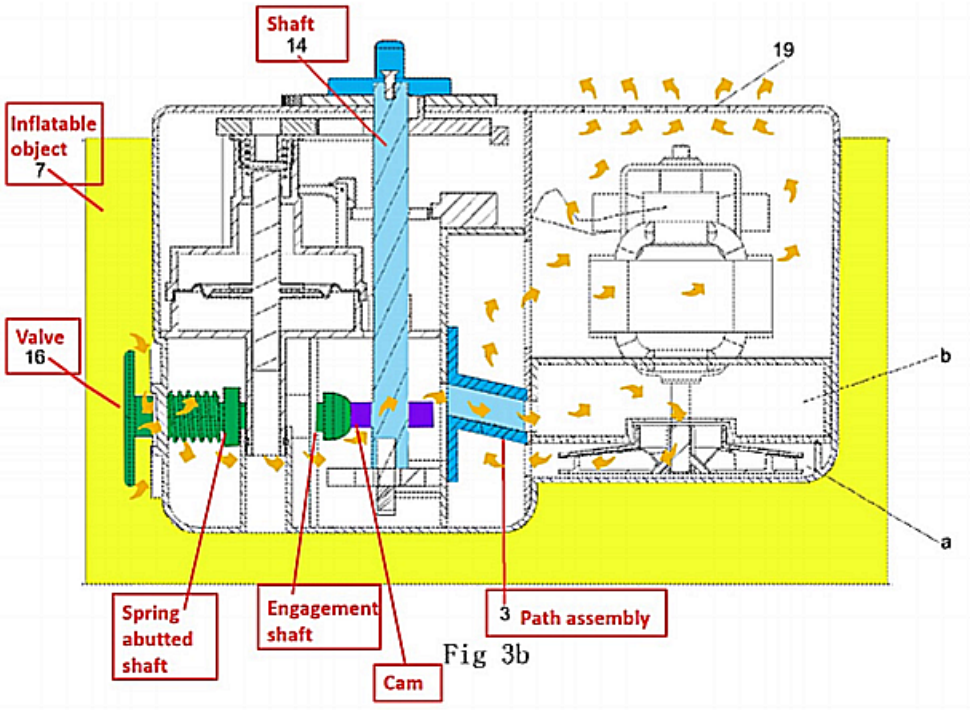
the inflatable object." *Id.* at 4:48–51 (emphasis added). The Specification does not otherwise describe "pressure controlling assembly 121/122."

We reproduce a version of Figure 3a from the '979 patent, with annotations added by Petitioner, below.



Pet. 6. Figure 3a depicts "a cross sectional view showing the operation of the valve controlling assembly," which opens "an inflow path to allow air outside the inflatable object to flow into the inflatable object." Ex. 1004, 2:44–47. As compared to annotated Figure 2a above, annotated Figure 3a adds, for example, orange arrows showing the flow path of air when pump 6 is used to inflate object 7. *See id.* at 4:22–26 (discussing how "air pump 6 can be activated to provide air flow into or out of the inflatable object, as can best be seen from F[igures] 3A and 3B").

We reproduce a version of Figure 3b, with annotations added by Petitioner, below.



Pet. 7. Figure 3b depicts "a cross sectional view showing the operation of the valve controlling assembly," which opens "an outflow path to allow air inside the inflatable object to flow out of the inflatable object." Ex. 1004, 2:48–51. As compared to annotated Figure 3a above, in annotated Figure 3b, the orange arrows showing the flow path of air have changed to indicate that pump 6 is deflating object 7. *See id.* at 4:10–21.

We reproduce a version of Figure 11, with annotations added by Petitioner, below.

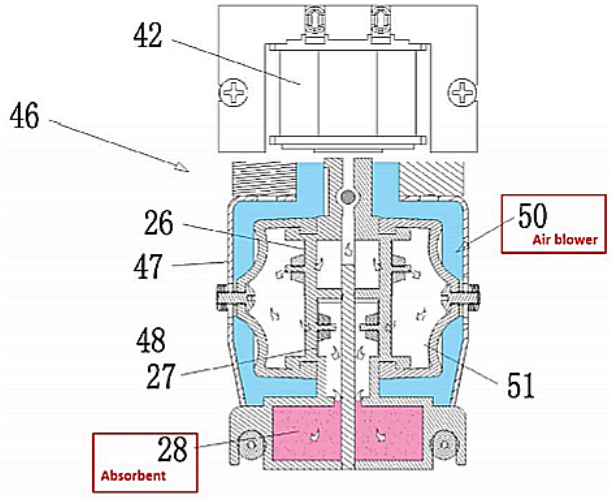


Fig 11

Pet. 8. Figure 11 depicts a "cross sectional view showing the internal structure of the supplemental air pressure providing device." Ex. 1004, 3:9–10. In the annotated version of Figure 11 above, Petitioner added blue shading to air blower 50 and pink shading to absorbent 28. Pet. 7–8. The '979 patent discloses:

> After the supplemental air pressure providing device is in a standby mode, a pressure controlling assembly 121/122 as described starts monitoring air pressure in the inflatable object. Once the air pressure inside the inflatable object is below a predetermined range, the supplemental air pressure providing device will then automatically provide air pressure to the inflatable object to always maintain the air pressure of the inflatable object within a predetermined range.

Ex. 1004, 4:48–56.

2. The '847 application

The '711 patent issued from the '847 application, which was filed May 20, 2011. Ex. 1001, codes (21), (22). The '771 patent identifies the CN '302 application as a priority document. *Id.* at code (30). The '847

application has a nearly identical disclosure as the '979 patent. *Compare* Ex. 1003, 4–26, *with* Ex. 1004. Relevant to this Decision, the '847 application did not include claims that recite a "pressure controlling assembly," but did refer to the "pressure controlling assembly" in the Summary of the Invention and Detailed Description. Ex. 1003, 5, 9, 11–15. The applicant amended the claims of the '847 application to recite the term "pressure controlling assembly" in an amendment filed July 26, 2013. *Id.* at 100–115. The '847 application, as filed, does not associate items 121 and 122 with the "pressure controlling assembly." *Compare id*. at 9, *with* Ex. 1004, 4:48–51. Also, certain item numbers and their associated lead lines were omitted from figures in the '979 patent as compared to the '847 application. *Compare, e.g.*, Ex. 1003, 17 (showing Figure 2a with item 12 identified), *with* Ex. 1004, Fig. 2a (showing no reference number 12). The '847 application does not use the term "primary air pressure." *See* Ex. 1003, 4–16.

3. The CN '302 application

The CN '302 application is directed "to an inflation-deflation control apparatus with an automatic reinflation mechanism." Ex. 1027, 6 ("Technical field")[1]. It includes a detailed description that differs from the disclosure in the '847 and '073 applications. *Compare* Ex. 1027, *with* Ex. 1003, 4–16, *and* Ex. 1004. One specific difference is that the CN '302 application includes, in the description of specific embodiments, a description of an "air pressure control mechanism." *See* Ex. 1027, 18–19; *see also id.* at 2–5 (reciting "air pressure control mechanism" in certain

[1] Exhibit 1027 includes a certified copy of the CN '302 application, in English. Exhibit 1026 includes the Chinese version of the application.

claims). The '979 patent identifies the CN '302 application under "Foreign Application Priority Data." Ex. 1004, code (30); *see also id.* at 1:9–11 (claiming benefit of the CN '302 application). Neither the '847 application nor the '073 application incorporates by reference the disclosure of the CN '302 application. *See* Ex. 1001, code (30), 1:7 (identifying the CN '302 application under "Foreign Application Priority Data," but not in a related application section); Ex. 1003, 1 (same); Ex. 1004, 1:7–11 (incorporating by reference the '847 application but not the CN '302 application).

E. Illustrative Claim

Petitioner challenges claims 1–5. Claim 1 is the sole independent Challenged Claim and is reproduced below:

> 1. An inflating module adapted to an inflatable object comprising an inflatable body, the inflating module used in conjunction with a pump that provides primary air pressure and comprising:
>
> a pressure controlling assembly configured to monitor air pressure in the inflatable object after the inflatable body has been inflated by the pump; and
>
> a supplemental air pressure providing device, wherein the pressure controlling assembly is configured to automatically activate the supplemental air pressure providing device when the pressure controlling assembly detects that the air pressure inside the inflatable object decreases below a predetermined threshold after inflation by the pump, and to control the supplemental air pressure providing device to provide supplemental air pressure to the inflatable object so as to maintain the air pressure of the inflatable object within a predetermined range.

Ex. 1004, 5:46–63.

F. Evidence

Petitioner includes in the record the challenged patent (Ex. 1004), the asserted prior art references (Exs. 1006–1009), and exhibits in support of its arguments (Exs. 1001, 1003, 1005, 1010–1027, 1029, 1031). Also, Petitioner relies on the declaration testimony of Mr. Bernhard Kuchel. Ex. 1002. Patent Owner includes in the record exhibits in support of its arguments (Exs. 2001, 2004–2013, 2020–2023). Patent Owner relies on the declaration testimony of Dr. Glen Stevick. Ex. 2020.

G. Prior Art and Asserted Grounds

Petitioner asserts that claims 1–5 are unpatentable on the following grounds:

Claim(s) Challenged	35 U.S.C. §[2]	Reference(s)/Basis
1–5	112(f)/112(b)	112(f) Indefiniteness
1–5	112(b)	Indefiniteness
1–5	112(a)	Written Description
1	102(a)[3]	Price[4]
2–4	103	Price, Lathrop[5]
3, 4	103	Price, Shan-Chieh[6]
5	103	Price, Wilkinson[7]

[2] We use the Leahy-Smith America Invents Act ("AIA") section numbers, as the grounds of unpatentability are premised on the '979 patent being eligible for post-grant review and, as such, governed by the AIA for a first-to-file application.
[3] The Petition identifies the basis for this ground as "§ 102(b)." Pet. 43. This designation appears to be a reference to the pre-AIA section. The proper AIA section is § 102(a).
[4] Price, US 6,721,980 B1, issued April 20, 2004 (Ex. 1006).
[5] Lathrop, US 7,789,194 B2, issued September 7, 2010 (Ex. 1007).
[6] Shan-Chieh, US 5,716,199, issued February 10, 1998 (Ex. 1008).
[7] Wilkinson, US 7,434,283 B2, issued October 14, 2008 (Ex. 1009).

II. ELIGIBILITY FOR POST-GRANT REVIEW

A. Legal Standard

As a threshold issue, we must determine if the '979 patent is eligible for post-grant review. The post-grant review provisions of the AIA apply to a patent that contains a claim with an effective filing date on or after March 16, 2013. *See* AIA, Pub. L. No. 112-29, 125 Stat. 284 (2011), §§ 3(n)(1), 6(f)(2)(A). The statute defines the "effective filing date" as

> (A) if subparagraph (B) does not apply, the actual filing date of the patent or the application for the patent containing a claim to the invention; or
> (B) the filing date of the earliest application for which the patent is entitled, as to such invention, to a right of priority under section 119, 365(a), 365(b), 386(a), or 386(b) or to the benefit of an earlier filing date under section 120, 121, 365(c), or 386(c).

35 U.S.C. § 100(i)(1).

Determining whether a patent is subject to the first-inventor-to-file provisions of the AIA, and therefore eligible for post-grant review, is straightforward when the patentee filed the application from which the patent issued before March 16, 2013, or when the patentee filed the application on or after March 16, 2013 without any priority claim. The determination is more complex, however, for a patent that issues from a "transition application," that is, an application filed on or after March 16, 2013, that claims the benefit of an earlier filing date. *See* MPEP § 2159.04 (9th ed. rev. 8.2017 Jan. 2018). Entitlement to the benefit of an earlier date under §§ 119, 120, 121, and 365 is premised on disclosure of the claimed invention "in the manner provided by § 112(a) (other than the requirement to disclose the best mode)" in the earlier application. *See* 35 U.S.C. §§ 119(e), 120. Thus, a patent that issues from a transition application is *not* available

for post-grant review if the claimed subject matter complies with the written description and enablement requirements of § 112(a) for an ancestor application *filed prior to March 16, 2013*.

We first consider whether the application that matured into the '979 patent is a transition application, as Petitioner asserts. *See* Pet. 11–12. The '979 patent issued from the '073 application, which was filed after March 16, 2013. Ex. 1004, codes (21), (22). The patent claims priority to the '847 application and the CN '302 application, both filed before March 16, 2013. *Id.* at codes (30), (62), 1:7–11. So, the '073 application is a transition application.

B. Written description support for the '979 patent's claims

Next, we must determine if all of the claims of the '979 patent have written description support in the '847 application.[8] *See, e.g.*, Pet. 20 ("[The term] 'pressure controlling assembly' lacks written description support under Section 112(a)."). The written description inquiry is a question of fact, is context-specific, and must be determined on a case-by-case basis. *Ariad Pharm., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc). The test for sufficiency of support is whether the disclosure of the application relied upon "reasonably conveys to the artisan that the inventor

[8] We need not address whether the claims have written description support in the CN '302 application, which was filed before the '847 application, as the '847 application was filed prior to March 16, 2013. *See* Ex. 1004, code (62). If the '847 application provides adequate written description support for all of the claims of the '979 patent, then the '979 patent is not eligible for a post-grant review. If the '847 application does not provide adequate written description support for any claim of the '979 patent, then the '847 application has broken the priority chain with respect to that claim and any disclosure in the CN '302 application cannot cure that break. *See* Pet. 12 n.6.

had possession at that time of the later claimed subject matter." *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1563 (Fed. Cir. 1991). "One shows that one is 'in possession' of *the invention* by describing *the invention*, with all its claimed limitations." *Lockwood v. Am. Airlines*, *Inc.*, 107 F.3d 1565, 1572 (Fed. Cir. 1997). Of course, in some instances, a patentee can rely on information that is well known in the art to satisfy the written description requirement. *Ariad Pharm.*, 598 F.3d at 1351 ("[T]he level of detail required to satisfy the written description requirement varies depending on the nature and scope of the claims and on the complexity and predictability of the relevant technology."). Also, "drawings alone *may* be sufficient to provide the 'written description of the invention' required by § 112." *Vas-Cath Inc.*, 935 F.2d at 1564.

To assess the priority claim of the '979 patent, we must first construe the relevant claim terms. *See X2Y Attenuators, LLC v. Int'l Trade Comm'n*, 757 F.3d 1358, 1365 (Fed. Cir. 2014) ("Where the claims have not been properly construed, the full scope of the claim is unknown, thereby rendering baseless any determination of written support in an earlier patent."). Once we construe the relevant claim terms, we must next determine if the '847 application disclosure "describ[es] *the invention*, with all its claimed limitations," *Lockwood*, 107 F.3d at 1572, to show "possession of the claimed subject matter as of the filing date," *Ariad Pharm.*, 598 F.3d at 1351.

1. Level of ordinary skill in the art

In construing a claim term, we presume the term carries its "ordinary and customary meaning," which is the meaning "the term would have to a person of ordinary skill in the art" at the time of the invention. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007) (citation

omitted). So, we first determine the level of ordinary skill in the art before beginning our claim construction analysis. The level of skill in the art is "a prism or lens" through which we view the prior art and the claimed invention. *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). In determining the level of ordinary skill in the art, we may consider factors, including the "type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field." *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (internal quotation marks and citation omitted).

Petitioner contends that a person having ordinary skill in the art ("POSA") would have had a "bachelor's degree in mechanical engineering, or an equivalent field, and two years of practical experience in inflatable product pump design" or, alternatively, "[a]n associate's degree in mechanical engineering, or an equivalent field, and four years of practical experience in inflatable product pump design." Pet. 42 (citing Ex. 1002 ¶ 77).

Patent Owner disagrees with Petitioner's characterization of the level of ordinary skill in the art. PO Resp. 53. Patent Owner contends that a person having ordinary skill in the art:

> would have (1) a bachelor's degree in mechanical engineering or an equivalent field, and two years of experience *in working with pneumatic pumps*, or *an advanced degree mechanical engineering or an equivalent field and two years in teaching, research, or experience relating to pneumatic pumps*; or (2) an associate's degree in mechanical engineering, or an equivalent field, and four years of practical experience in inflatable product pump design.

Id. (emphasis added). Both definitions are similar. One difference is the area of experience—"inflatable product pump design" as compared to the broader "pneumatic pumps" for a person having a bachelor's degree. The other difference is that Patent Owner contends that the level of ordinary skill in the art also encompasses an individual with an advanced engineering degree and experience in "teaching, research, or experience relating to pneumatic pumps."

We find that the level of ordinary skill in the art reflects aspects of each party's definition. First, we agree with Petitioner's characterization that the breadth of experience is in the field of inflatable product pump design. The field of "pneumatic pumps" is broad and encompasses pumps with operating parameters outside the needs identified in the '979 patent and prior art of record. *See e.g.*, Ex. 1004, 1:24–32 (identifying the types of inflatable objects as having applications "in hospitals for patients, outdoors for recreations and indoors for comfort"); Ex. 1006, 6:54–65 (identifying a low pressure blower and a low volume supplemental pump); Ex. 1007 (involving a pump for supplying breathing air for a continuous positive airway pressure device); Ex. 1010, 1:19–22, 3:21–27 (disclosing a low output circulation pump for "mattresses, chairs, couches and other patient support devices"); Ex. 1013, 11:34–37 ("The blower provides an air flow of 50 cubic feet per minute, without back pressure, and is capable of generating a maximum pressure of about 30 inches of water."); Ex. 1014, 15:60–16:15 (disclosing gauge air pressures in the range of 0.16 to 0.65 pounds per square inch for an air bed); Ex. 1017, 10:62–64 ("The blower preferably is a 24 v.d.c. model producing 29.29 in Hg at 70 degrees F."). Second, we agree with Patent Owner that the level of ordinary skill in the art encompasses a person with an advanced engineering degree and broader experience, with

the advanced degree compensating for the lack of specific experience with inflatable product pumps.

Accordingly, we find that a person having of ordinary skill in the art at the time of the invention would have had:

> (1) a bachelor's degree in mechanical engineering or an equivalent field, and two years of experience in inflatable product pump design, or an advanced degree in mechanical engineering or an equivalent field and two years in teaching, research, or experience relating to pneumatic pumps; or (2) an associate's degree in mechanical engineering, or an equivalent field, and four years of practical experience in inflatable product pump design.

Also, our claim construction and patentability analyses presented below would reach the same findings and determinations under either party's definition of the level of ordinary skill in the art. *Cf.* Ex. 2020 ¶ 89 ("My opinions expressed in this declaration remain the same under either definition of a POSA.").

2. Claim construction of "pressure controlling assembly"—does the term invoke § 112(f)?

The claim construction standard to be employed in a post-grant review changed to the standard set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303, 1316 (Fed. Cir. 2005) (en banc). *See* Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340, 51,343 (Oct. 11, 2018) (amending 37 C.F.R. § 42.200(b) effective November 13, 2018) (now codified at 37 C.F.R. § 42.200(b) (2019)). That new standard, however, applies to proceedings in which the petition was filed on or after November 13, 2018. The Petition here was accorded a filing date of November 12, 2018. Paper 3, 1. Under the version of Rule 42.200(b) applicable based on the

filing date of the Petition, the Board interprets claim terms in an unexpired patent, such as the '979 patent, using the broadest reasonable construction in light of the specification. 37 C.F.R. § 42.200(b) (2018). Under that standard, we generally give claim terms their ordinary and customary meaning, as would be understood by one of ordinary skill in the art at the time of the invention in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d at 1257.

As will be evident from our analysis, we attempt to construe only the claim term "pressure controlling assembly" to determine if the '979 patent is eligible for post-grant review. Independent claim 1 recites, in relevant part, "a pressure controlling assembly configured to monitor air pressure in the inflatable object after the inflatable body has been inflated by the pump." Ex. 1004, 5:50–52. Claim 1 also recites:

> wherein the pressure controlling assembly is configured to automatically activate the supplemental air pressure providing device when the pressure controlling assembly detects that the air pressure inside the inflatable object decreases below a predetermined threshold after inflation by the pump, and to control the supplemental air pressure providing device to provide supplemental air pressure to the inflatable object so as to maintain the air pressure of the inflatable object within a predetermined range.

Id. at 5:53–63. Petitioner contends that the term "pressure controlling assembly" invokes the requirements of 35 U.S.C. § 112(f) and we should construe the term as a means-plus-function term. Pet. 20–24, 45–51. In our Decision instituting trial, we preliminarily construed the term "pressure controlling assembly" as a means-plus-function claim term. Dec. on Inst. 18–27. We revisit this construction on the complete trial record.

We start our inquiry of whether the term "pressure controlling assembly" invokes § 112(f) by determining if the claim term uses the word "means." "[T]he use of the word 'means' in a claim element creates a rebuttable presumption that § 112[(f)] applies. . . . Applying the converse, [the Federal Circuit has] stated that the failure to use the word 'means' also creates a rebuttable presumption—this time that § 112[(f)] does not apply." *Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1348 (Fed. Cir. 2015) (en banc in relevant part). The term "pressure controlling assembly" does not use the word "means." *See* Ex. 1004, 5:50–52; Pet. 46–47 (recognizing that the term does not recite "means").

The Federal Circuit emphasizes "that the essential inquiry is not merely the presence or absence of the word 'means' but whether the words of the claim are understood by persons of ordinary skill in the art to have a sufficiently definite meaning as the name for structure." *Williamson*, 792 F.3d at 1348. To overcome the presumption that § 112(f) does not apply, the burden is on Petitioner to "demonstrate[] that the claim term fails to 'recite sufficiently definite structure' or else recites 'function without reciting sufficient structure for performing that function." *Id.* at 1349; *see Advanced Ground Info. Sys., Inc. v. Life360, Inc.*, 830 F.3d 1341, 1347 (Fed. Cir. 2016) ("In determining whether this presumption has been rebutted, the challenger must establish by a preponderance of the evidence that the claims are to be governed by § 112[(f)]."); *see also Diebold Nixdorf, Inc. v. Int'l Trade Comm'n*, 899 F.3d 1291, 1299–1300 (Fed. Cir. 2018) ("[I]n appropriate cases, a party advocating that a claim limitation that does not recite the word 'means' is subject to § 112[(f)] can overcome the presumption against its application solely by reference to evidence intrinsic to the patent.").

Accordingly, our first inquiry is whether Petitioner establishes, by a preponderance of the evidence, that "pressure controlling assembly" is a means-plus-function term.

Patent Owner, citing *Zeroclick, LLC v. Apple Inc.*, 891 F.3d 1003 (Fed. Cir. 2018), argues that Petitioner has not rebutted the presumption that the term "pressure controlling assembly" does not invoke § 112(f) by showing that the term is a nonce word. Sur-reply 4–5. As we detail below, we do not agree.

We determine that Petitioner has met its burden in demonstrating that the term "pressure controlling assembly" is a means-plus-function term, invoking the requirements of 35 U.S.C. § 112(f). We determine that the intrinsic evidence on which Petitioner relies is sufficient to overcome the presumption that the lack of the word "means" indicates that the term does not invoke § 112(f). *See Diebold Nixdorf, Inc.*, 899 F.3d at 1299–1300.[9] In our analysis below, we review the intrinsic evidence, extrinsic evidence (and, particularly whether the extrinsic evidence would support a finding that the term is used in common parlance or by persons of skill in the pertinent art to designate structure, including either a particular structure or a class of structures), and relevant case law.

[9] Patent Owner argues that Petitioner's expert did not counter Dr. Stevick's testimony and that "Petitioner's attorney argument is insufficient to carry its burden." Sur-reply 8. Specifically, Patent Owner argues that "Petitioner failed to provide testimony to support its allegations, and thus did not meet its burden of proof." *Id.* As the Federal Circuit makes clear, Petitioner may overcome the presumption with reference to the intrinsic record only. *Diebold Nixdorf, Inc.*, 899 F.3d at 1299–1300. Also, as we detail in our analysis below, Dr. Stevick's testimony on this issue is entitled to little weight.

a) Intrinsic record

We start with the words of claim 1. Petitioner contends that a person having ordinary skill in the art "would not have understood [the term] 'pressure controlling assembly' to have a sufficiently definite meaning as the name for structure." Pet. 47 (referencing Ex. 1002 ¶¶ 83–84). Petitioner argues that the claim 1 "simply recite[s] that the 'pressure controlling assembly' is configured to perform . . . functions, without reciting any structure for performing those functions." *Id.* Petitioner adds that the Specification does not disclose what the "pressure controlling assembly" is or what performs the recited functions. *Id.* at 21–24.

Mr. Kuchel explains that the language of claim 1 associated with the "pressure controlling assembly" recites functions that the "pressure controlling assembly" is configured to perform without providing any structure that performs those functions. Ex. 1002 ¶¶ 83–84. Petitioner contends that, "[b]ecause [claim 1] describe[s] 'pressure controlling assembly' solely in relation to its functions, the term is a means-plus-function term." Pet. 47–48 (footnote omitted). These functions "are . . .[,] in short, monitoring air pressure, automatically activating the supplemental air pressure providing device, detecting that the air pressure inside the inflatable object has decreased below a predetermined threshold after inflation, and controlling the supplemental air pressure providing device to provide supplemental air pressure." *Id.*at 48–49 (citing Ex. 1004, claim 1; Ex. 1002 ¶ 86).

Patent Owner responds that "pressure control and pressure controlling assemblies were devices that were well-known to artisans prior to the effective filing date of the '979 [p]atent and the '847 [a]pplication." PO Resp. 19–20. Patent Owner adds that "[t]he term itself is descriptive to" a

person having ordinary skill in the art. *Id.* at 20. That is, Patent Owner's position is that the term connotes definitive structure to a person having ordinary skill in the art. *See, e.g.*, Tr. 36:22–37:2 ("So, . . . if [I] see pressure controlling assembly, I know it's a type of device, what type of device it is, I can go find one in the marketplace, it's been known for decades and decades. It's a very well-known device to people of skill in the art.").

Patent Owner lists the functions for which the recited pressure controlling assembly of claim 1 is configured, functions consistent with the functions identified by Petitioner. Patent Owner contends that a person having ordinary skill in the art:

> would interpret the pressure controlling assembly of the '979 [p]atent as a pressure sensor component which can be set with a threshold and a predetermined range to control a pressurized system. The pressure controlling assembly has an output that can be supplied to a pump to maintain pressure in the system as a control loop.

PO Resp. 22–23.

Patent Owner also argues that Petitioner's analysis of the claim language is "incomplete" as it "highlights only some language of the terms and downplays the apparatus recitations of the terms." PO Resp. 43 (emphasis omitted). Patent Owner identifies the terms "inflatable object," "inflatable body," "inflating module," "pump," and "supplemental air pressure providing device" as structural terms that are "substantial and inter-related in claim 1." *Id.* at 44. Patent Owner concludes "[t]herefore, contrary to Petitioner's assertions, claim 1 is not merely a functional recitation of the 'pressure controlling assembly,' and is therefore not a means-plus-function claim." *Id.* at 44–45. In the Sur-reply, Patent Owner argues that the language of claim 1 does not recite four separate functions but, instead,

provides connections with other structural components recited in claim 1. Sur-reply 5–6. As Patent Owner asserted at oral argument, the presence of these other structures in the claim shows a linkage between the pressure controlling assembly and other structures, so "that you can find where [the pressure controlling assembly] is . . . [i]f you look at the drawings." Tr. 63:19–22.

We agree with Petitioner's characterization of claim 1. Claim 1 recites "a pressure controlling assembly configured to monitor air pressure in the inflatable object after the inflatable body has been inflated by the pump." Ex. 1004, 5:50–52. This language requires the recited "pressure controlling assembly" to be configured (or designed) to perform the function of monitoring air pressure. This requirement indicates the structure for which the air pressure is monitored (the inflatable object), but otherwise does not identify any structure to perform the monitoring function. *See* Pet. 47. Additionally, claim 1 recites that the pressure controlling assembly is configured "to automatically activate the supplemental air pressure providing device when the pressure controlling assembly detects that the air pressure inside the inflatable object decreases below a predetermined threshold after inflation by the pump," and also is configured "to control the supplemental air pressure providing device to provide supplemental air pressure to the inflatable object so as to maintain the air pressure of the inflatable object within a predetermined range." Ex. 1004, 5:54–63. Again, these recitations identify functions for which the recited "pressure controlling assembly" is configured, or designed, to perform. The functions act upon a structure other than the "pressure controlling assembly" (a supplemental air pressure providing device), but the recitations otherwise do not identify any structure to perform the activating or controlling functions.

See Pet. 47. As such, the claim terms are written at least primarily (if not entirely) in functional terms. *Cf. MTD Prods. Inc. v. Iancu*, 933 F.3d 1336, 1343 (Fed. Cir. 2019) ("[T]he rest of the 'claim language of the disputed phrase is primarily . . . functional. . . . While the claim language reciting that the mechanical control assembly is 'coupled to the left and right drive units' connotes structure, the claim language reciting what the mechanical control assembly is 'configured to' do is functional."). Indeed, the language of claim 1 associated with the "pressure controlling assembly" resembles a traditional means-plus-function claim limitation, with the phrase "pressure controlling assembly" replacing the word "means." *Cf. Williamson*, 792 F.3d at 1350 ("Appellees note that the 'distributed learning control module' limitation is drafted in the same format as a traditional means-plus-function limitation, and merely replaces the term 'means' with 'nonce' word 'module,' thereby connoting a generic 'black box' for performing the recited computer-implemented functions.").

We now turn to the term itself—"pressure controlling assembly." Petitioner argues that the term does not "have a sufficiently definite meaning as the name for structure." Pet. 47 (referencing Ex. 1002 ¶¶ 83–84). "One way to demonstrate that a claim limitation fails to recite sufficiently definite structure is to show that, although not employing the word 'means,' the claim limitation uses a similar 'nonce word that can operate as a substitute for "means" in the context of § [112(f)].'" *MTD Prods. Inc.*, 933 F.3d at 1341 (citing *Williamson*, 792 F.3d at 1350). We find that the term "pressure controlling assembly" is a "black-box" phrase, as the term "assembly" is similar to other terms that the Federal Circuit has held to be nonce terms, with the phrase "pressure controlling" a functional descriptor. *See id.* at 1343 ("[W]e agree with the Board that the term 'mechanical control

assembly' is similar to other generic, black-box words that this court has held to be nonce terms similar to 'means' and subject to § [112(f)]."); *Williamson*, 792 F.3d at 1349–51 (holding that § 112 ¶ 6 applied to "distributed learning control module" because "'[m]odule' is a well-known nonce word that can operate as a substitute for 'means' in the context of § 112, para. 6" and "[t]he prefix 'distributed learning control' does not impart structure into the term 'module'"); *see also Mass. Inst. of Tech. v. Abacus Software*, 462 F.3d 1344, 1354 (Fed. Cir. 2006) (determining that "colorant selection mechanism" did not connote sufficient structure to one of ordinary skill in the art and that § 112 ¶ 6 applied) ("*MIT*"); *Mas-Hamilton Grp. v. LaGard, Inc.*, 156 F.3d 1206, 1214 (Fed. Cir. 1998) (affirming that "lever moving element" invokes § 112 ¶ 6); *see, e.g.*, *Askeladden L.L.C. v. Dig. Verification Sys. LLC*, IPR2018-00745, Paper 9 at 8 (PTAB Aug. 24, 2018) ("In this case, 'assembly' is used as a generic place-holder for anything that performs the recited function, much as the word 'means' does."). But this finding does not end our inquiry.

"Claims are interpreted in light of the written description supporting them, and that is true whether or not the claim construction involves interpreting a 'means' clause." *MTD Prods. Inc.*, 933 F.3d at 1342. "[A] patentee may avoid application of § 112[(f)] by acting as a lexicographer and providing its own structural definition of a nonce term in the specification by '"clearly set[ting] forth a definition of the disputed claim term' other than its plain and ordinary meaning."'" *Id.* For the reasons discussed below, we find that the Specification does not support a determination that the term "pressure controlling assembly" recites sufficient structure. Also, we do not discern, nor do the parties direct us to, any

disclosure in the '979 patent where the patentee acted as its own lexicographer and clearly defined the term "pressure controlling assembly."

The detailed description of the '979 patent describes a "pressure controlling assembly" in one sentence: "After the supplemental air pressure providing device is in a standby mode, a pressure controlling assembly 121/122 as described starts *monitoring air pressure* in the inflatable object." Ex. 1004, 4:48–51 (emphasis added). This statement describes the "pressure controlling assembly" in functional terms (with the exception of the reference to drawing items 121/122, which we discuss below). *See* Pet. 50 ("While the last sentence listed above refers to '121/122' in the figures, there is absolutely no description or identification in the specification as to what, if anything, these structures are."). The only additional discussion in the detailed description that arguably could be attributed to the pressure controlling assembly is the following sentence: "Once the air pressure inside the inflatable object is below a predetermined range, the supplemental air pressure providing device will then automatically provide air pressure to the inflatable object to always maintain the air pressure of the inflatable object within a predetermined range." Ex. 1004, 4:51–56; *see* PO Resp. 34–35 (arguing that this language describes the operation of switches for the supplemental air pressure providing device). These functions are associated with the supplemental air pressure providing device, but are arguably tied also to the monitoring function of the pressure controlling assembly ("[o]nce the air pressure inside the inflatable object is below a predetermined range"). We note, however, that the detailed description does not *expressly* tie the pressure controlling assembly to these functions.

Other than the claims, the only other uses of the phrase "pressure controlling assembly" in the '979 patent Specification are statements in the summary of the invention:

> The primary objective of the present invention is to provide a controlling mechanism for operation of an air pump that is used in an inflatable object. The controlling mechanism includes a valve controlling assembly responsible for open/close operation of a valve, *a pressure controlling assembly* responsible for sensing pressure difference to selectively activate the operation of the valve and a linkage assembly interactively sandwiched between the valve controlling assembly and *the pressure controlling assembly* to sense the operation of *the pressure controlling assembly* and consequently operate the movement of the valve controlling assembly.
>
> In a preferred embodiment of the present invention, another objective of the present invention is that the actuation/deactivation of the air pump is controllable by the valve controlling assembly, *the pressure controlling assembly* or the linkage.
>
> In a preferred embodiment of the present invention, another objective of the present invention is that *the pressure controlling assembly* is actuated by resilience force, atmospheric/inflatable object pressure or the combination thereof.
>
> In a preferred embodiment of the present invention, another objective of the present invention is to have an automatic supplemental air pressure providing device in association with the operation of the air pump such that whenever there is a pressure decrease in the inflatable object, without the actuation of the air pump, the supplemental air pressure providing device is able to automatically provide air pressure to the inflatable object to maintain the inflatable object pressure at a predetermined level.
>
> Another objective of the present invention is that the valve controlling assembly is able to select one of air paths for air to flow in/out of the inflatable object.

Ex. 1004, 1:62–2:27 (emphasis added). These statements do not provide any structural description of the "pressure controlling assembly." *See* Pet. 50 ("As can be seen from these references, the [S]pecification does not disclose any structure for performing the claimed functions, but rather refers to 'pressure controlling assembly' only in relation to its functions.") (referencing Ex. 1002 ¶¶ 87–88). Further, the description ties the "pressure controlling assembly" to a "valve controlling assembly" and a "linkage assembly" located between the valve controlling assembly and the "pressure controlling assembly." Nothing in this description expressly ties the "pressure controlling assembly" to a supplemental air pressure providing device.

Figure 2a of the '979 patent,[10] which we reproduce below, is the only figure that includes reference numbers 121 and 122.

[10] The parties acknowledge that the originally-filed '847 application description did not associate items 121 and 122 with the pressure controlling assembly. *See, e.g.*, Tr. 10:15–18 (Petitioner's counsel), 52:15–19 (Patent Owner's counsel); Ex. 1003, 9 (providing the text of the originally-filed '847 application describing the pressure controlling assembly), 101 (amending the specification of the '847 application to associate items 121/122 with a pressure controlling assembly).

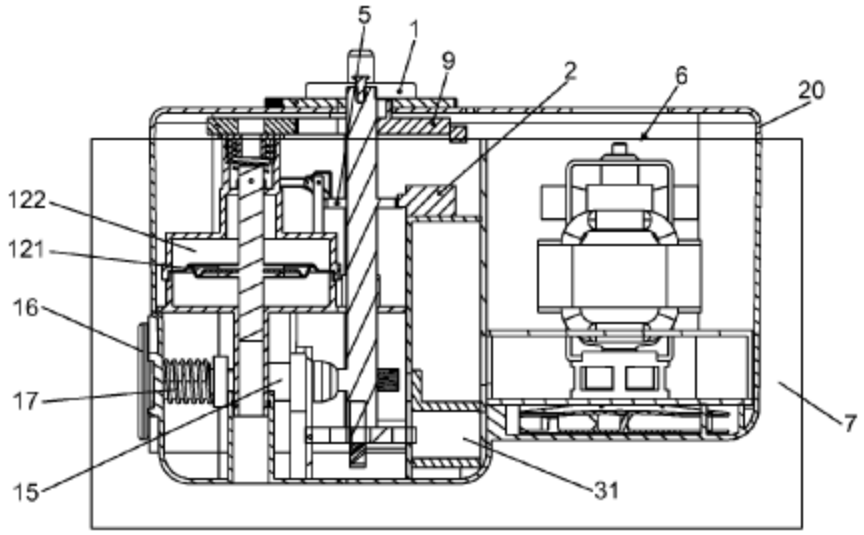


Fig 2a

Figure 2a depicts "a cross sectional view showing the valve controlling assembly in association with the pressure sensing assembly of the" invention of the '979 patent. Ex. 1004, 2:38–40. We first observe that Figure 2a is directed to a valve controlling assembly for controlling valve 16 and nowhere depicts a supplemental air pressure providing device. From Figure 2a, we see that item 121 is a physical structure, unnamed in the Specification. Item 122 points to a cavity that includes item 121.

Patent Owner contends that the recited "pressure controlling assembly" is part of a control loop. PO Resp. 22–23. Patent Owner argues that a person having ordinary skill in the art "would appreciate such a control loop can be modeled by" Figure B,[11] which we reproduce, below.

[11] Patent Owner introduces the concept of a pressure control system in its Patent Owner Response, including showing a basic closed loop system in Figure A. PO Resp. 20–22.

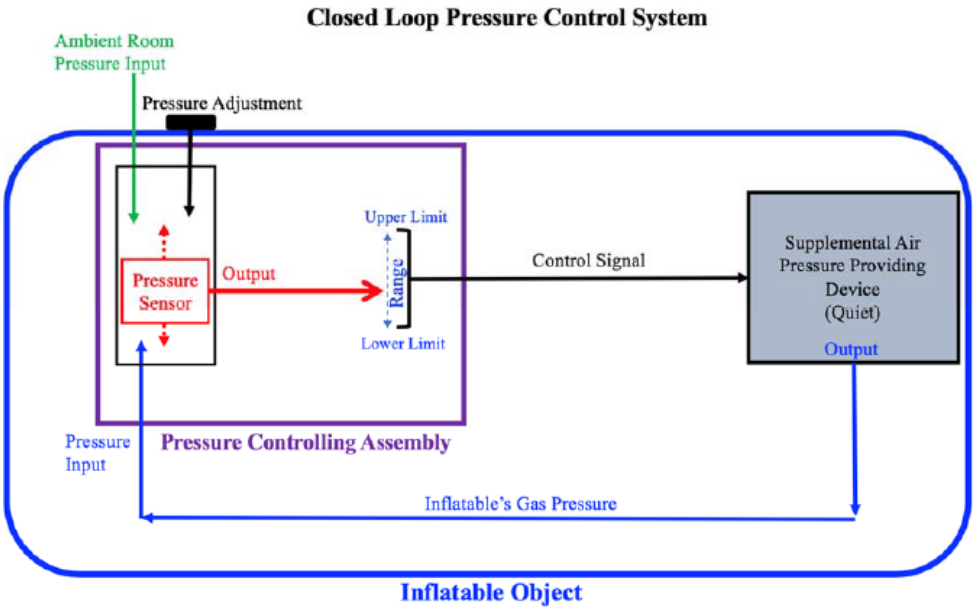
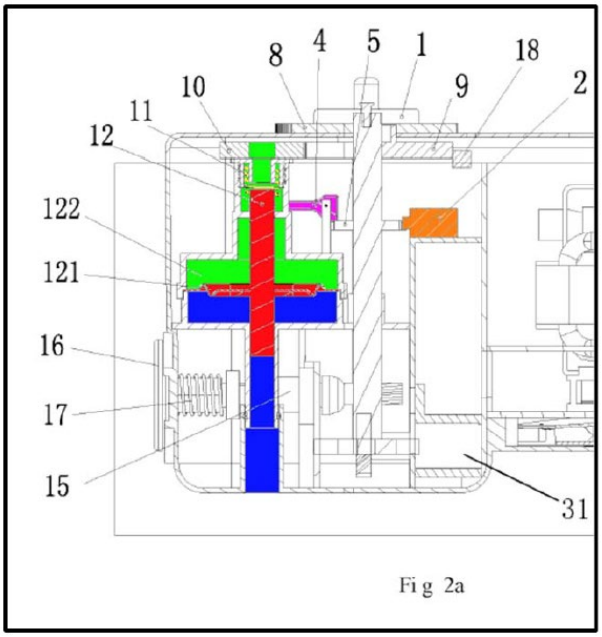


FIG. B – A Model of a Control Loop With Sensor and Range Control

Id. at 23 (referencing Ex. 2020 ¶ 39). Patent Owner juxtaposes Figure B and an annotated version of a portion of Figure 2a from the '847 application. We reproduce this annotated version of Figure 2a, below.



Id. at 24–25 (referencing Ex. 2020 ¶ 40). The annotated version depicts the left side of Figure 2a, with certain components colorized. We discuss these colorized components in greater detail below.

Patent Owner asserts that a person having ordinary skill in the art "would understand the region of [Figure] 2a denoted by [reference numbers] 121/122 as a disclosed pressure controlling assembly." PO Resp. 25. Patent Owner argues that

> flexible diaphragm 121 (red) of [Figure] 2a of the '979 [p]atent acts as a pressure sensor. Its associated rod (also red) will slide up and down based on the pressure of the inflatable (blue) versus the ambient pressure (green) and force applied to it by the adjusting input (e.g., spring 11 of [Figure] 2a). The diaphragm 121 isolates the internal pressure of the inflatable object from the ambient pressure of the room. It moves upward as the pressure of the inflatable object is increased. If the spring (11) is tightened, it will push back on the red bar connected to the diaphragm 121. As pressure in the inflatable body increases it forces the red bar up (as viewed from the drawing). A [person having ordinary skill in the art] would appreciate in the example of [Figure] 2a, movement of the red bar is sensed by switches which can turn on and off the primary pump (e.g., using switch 2 and linkage 4) and the supplemental pressure providing device (e.g., using switch 13 as a limit switch, which can turn the supplemental air pressure providing device on and off).

Id. (referencing Ex. 2020 ¶ 41). Patent Owner further provides an annotated version of Figure 1 of the '847 application, which we reproduce below.

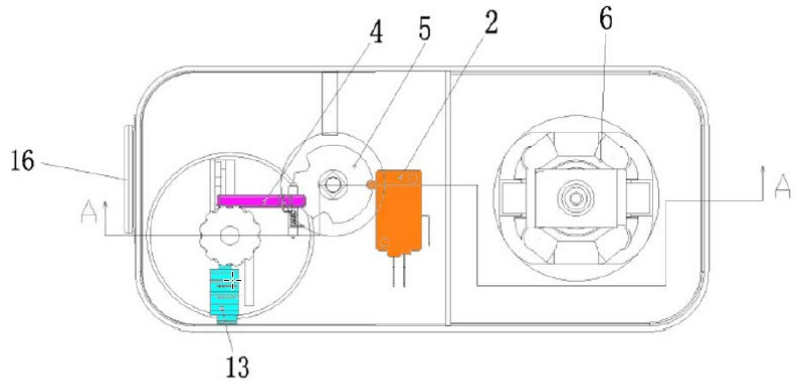


Fig 1

PO Resp. 26 (referencing Ex. 1003, 6, 17; Ex. 2020 ¶ 42). Figure 1 depicts a "top plan view of the valve controlling assembly of the" invention disclosed in the '847 application. Ex. 1003, 6.[12] Patent Owner and its expert contend that item 13 is a switch that "can turn the supplemental air pressure providing device on and off." *See* PO Resp. 25; Ex. 2020 ¶ 41.

Next, Patent Owner argues that "components of [Figure] 2a are strikingly similar" to a natural gas pressure regulator depicted in Exhibit 2008, which Patent Owner characterizes as an exemplary "[a]pparatus for sensing gas pressure and adjusting pressure with a diaphragm." PO Resp. 30; *see also id.* at 31 (reproducing the image from Ex. 2008). Patent Owner argues that a person having ordinary skill in the art would have understood "that element 121 is a flexible diaphragm used for sensing a difference in pressure between the upper chamber portion 122, which is in communication with atmospheric pressure, and the lower chamber portion (not labeled), which is in communication with the pressure of the inflatable object 7." *Id.* at 31; *see also* Ex. 2020 ¶ 49 (providing a

[12] This image differs from Figure 1 of the '979 patent, which does not include reference numeral 4 or its associated lead line. *Compare* Ex. 1004, Fig. 1, *with* Ex. 1003, 17.

verbatim statement from Dr. Stevick). Patent Owner argues that a person having ordinary skill in the art would have appreciated that the structures colorized in the annotated version of Figure 2a that we reproduced above would operate in a similar way as the natural gas pressure regulator. *See* PO Resp. 32–34.

Patent Owner next contends that the text of the '847 application describes the operation of the diaphragm and switches *of the supplemental air pressure providing device*. PO Resp. 34–35 (referencing Ex. 1003, 5, 9). Patent Owner argues that, based on this text, a person having ordinary skill in the art would have understood

> that after air pump 6 has inflated the inflatable object it is switched off and the pressure controlling assembly provides limit switching to automatically turn the supplemental air pressure providing device on when the pressure of the inflatable object is at a lower limit and to turn it off when the pressure is at an upper limit to maintain an air pressure of the inflatable object.

Id. at 35 (referencing Ex. 1003, Figs. 1, 2a; Ex. 2020 ¶ 54 (providing, verbatim, the language in the Patent Owner Response)). Patent Owner adds that "[t]his understanding is confirmed by the" CN '302 application. *Id.* at 35–37.

Petitioner replies that the Specification does not disclose any structure for the term "pressure controlling assembly" and cites *MTD Products* for the proposition that an embodiment disclosed in the Specification cannot impart structure to a term that does not recite structure. Reply 4. We agree. *See MTD Prods., Inc.*, 933 F.3d at 1344 ("The Board's analysis implies that so long as a claim term has corresponding structure in the specification, it is not a means-plus-function limitation. This is not consistent with our prior decisions."). We find that the information in the Specification does not

support a finding that the term "pressure controlling assembly" itself connotes sufficient structure. We find that the mere reference to items 121 and 122, without further description, does not convey that the *term* "pressure controlling assembly" itself connotes sufficient structure. The mere fact that the Specification discloses some structure to perform the claimed functions is insufficient to support a finding that the claim term itself connotes sufficient structure.

Patent Owner directs us to two aspects of the prosecution history to support its positions. We address these aspects in turn. First, Patent Owner recounts that the '073 application was issued after the examiner considered several prior art references, including Patent Owner's US 8,801,392 B2 (the "'392 patent," Ex. 2001). PO Resp. 45–48. This evidence and the accompanying arguments do not demonstrate that the term "pressure controlling assembly" has a *commonplace* meaning to a person having ordinary skill in the art or otherwise connotes sufficient structure itself because the term is used in the '392 patent. *See, e.g.*, Ex. 2001, code (57) ("A . . . pressure controlling assembly for sensing pressure difference to selectively activate operation of the valve . . . ."). The '392 patent and the '979 patent have the same inventors and describe similar systems. *See* Ex. 1004, code (72); Ex. 2001, code (75). At best, this evidence demonstrates that the inventors of the '979 patent chose the same functional term as an indicator of one or more components that performs similar functions (activating a supplemental pump compared to activating a valve).

Further, we understand the examiner concluded the claim term "noise silencing means" in the '073 application was a means-plus-function limitation, and did not reach the same conclusions as to the "pressure controlling assembly" at issue here. *See, e.g.*, PO Resp. 8 & n.4 (citing

Ex. 1005, 43–50; Ex. 2010, 49:4–51:16). However, the prosecution history does not reflect that the examiner actually considered whether the claim term at issue here might be a means-plus-function limitation, much less that any decision was made in that regard. *See, e.g.*, Ex. 1005, 43–50. Therefore, the prosecution history of the '979 patent has very little impact here.

Second, Patent Owner directs us to the CN '302 application. PO Resp. 20. Patent Owner, however, argues that this application "confirms that the inventors possessed the invention at least as far back as May 21, 2010." *Id.*; *see also id.* at 35 ("This understanding [of what is disclosed in Figures 1 and 2a] is confirmed by the Chinese priority application."). In the Sur-reply, Patent Owner adds that "[t]he Chinese application uses nearly identical figure numbering, is part of the file history, and a [person having ordinary skill in the art] would have had access to it." Sur-reply 17. Patent Owner adds that "the figures are nearly identical for all applications. . . . [T]he drawings and disclosed structures are the same . . . [and] a [person having ordinary skill in the art] would have accessed the Chinese application and been able to apply that information to the '979 [p]atent disclosure." *Id.* at 18.

This argument, however, does not go to whether a person having ordinary skill in the art would have understood the term "pressure controlling assembly" to have a sufficiently definite meaning as the name for structure. First, as Patent Owner recognizes, the CN '302 application does not use the word "pressure controlling assembly," but, instead, "air pressure control mechanism." PO Resp. 35; Ex. 1027, 18–19. Second, this argument may support a finding that a person having ordinary skill in the art could identify structure to perform the functions to which the "pressure controlling

assembly" is configured. It does not support a finding that the term alone has a sufficiently definite meaning as the name for structure.

b) Extrinsic record – is the term "pressure controlling assembly" used in common parlance or by persons of skill in the pertinent art to designate structure?

We appreciate that, "[i]n each case, a critical question is whether 'the claim term is used in common parlance or by persons of skill in the pertinent art to designate structure,' including either a particular structure or a class of structures." *MTD Prods. Inc.*, 933 F.3d at 1341. Patent Owner argues that the term "pressure controlling assembly" is used in common parlance to designate a particular structure or, at least, a class of structures. *See* PO Resp. 19–20. For the reasons discussed below, we find, based on our weighing the evidence and arguments, that the term "pressure controlling assembly" is not used in common parlance or by persons of skill in the pertinent art to designate structure, including either a particular structure or a class of structures. We now turn to Patent Owner's arguments that rely on extrinsic evidence.

We start with Dr. Stevick's testimony. First, in our role as fact finder, we find Dr. Stevick's testimony, as a whole, lacks credibility. Dr. Stevick's declaration copies, typically verbatim, the arguments in the Patent Owner Response, putting these arguments in numbered paragraph form. *Compare* PO Resp. 19–51, *with* Ex. 2020 ¶¶ 34–81. Indeed, Dr. Stevick's declaration even includes citations to case law that Patent Owner uses to support its arguments in the Patent Owner Response. *See, e.g.*, Ex. 2020 ¶¶ 56, 62, 75, 77 (providing a few examples where Dr. Stevick's expert declaration includes attorney argument supported by case law citations). As such, the declaration merely parrots attorney argument.

Even if we ignore this deficiency in Dr. Stevick's testimony, we still find that the testimony is entitled to little weight. Dr. Stevick testifies that the term "pressure controlling assembly" "is descriptive to a" person having ordinary skill in the art. Ex. 2020 ¶ 35. We find that Dr. Stevick fails to support adequately this opinion and other opinions underlying this conclusion. *See* 37 C.F.R. § 42.65(a) ("Expert testimony that does not disclose the underlying facts or data on which the opinion is based *is entitled to little or no weight*.") (emphasis added); *see also In re Am. Acad. of Sci. Tech Ctr.*, 367 F.3d 1359, 1368 (Fed. Cir. 2004) ("[T]he Board is entitled to weigh the declarations and conclude that the lack of factual corroboration warrants discounting the opinions expressed in the declarations.").

First, Patent Owner and Dr. Stevick provide a definition of "pressure control" from a technical dictionary—"a 'device or system able to maintain, raise, or lower pressure in a vessel or processing system.'" Ex. 2020 ¶ 36 (referencing Ex. 2022, 1); PO Resp. 20. This definition, however, provides no insight into whether the term "pressure controlling assembly" is used in common parlance or by persons of skill in the pertinent art to designate a particular structure or class of structures. Indeed, this definition is provided in functional terms and does not suggest any specific structure or class of structures for performing these functions. Also, as Petitioner points out, the actual definition states "*[a]ny* device or system," which, together with the functional language, suggests the "black-box nature" of the term. Reply 7; *see* Ex. 2022, 1. We further note that the definition is directed to pressure in a vessel or processing system, rather than an inflatable object. *See* Ex. 2022, 1.

Dr. Stevick next testifies that a person having ordinary skill in the art "would interpret the pressure controlling assembly of the '979 [p]atent as a

pressure sensor component which can be set with a threshold and a predetermined range to control a pressurized system . . . [and] has an output that can be supplied to a pump to maintain pressure in the system." Ex. 2020 ¶ 39. Again, Dr. Stevick provides no basis for this opinion and we afford it little weight.

Next, Patent Owner argues, and Dr. Stevick testifies, that Mr. Kuchel, Petitioner's declarant, "admitted in deposition that such [pressure controlling] assemblies were well-known in the field." Ex. 2020 ¶ 59 (reproducing Ex. 2010, 35:13–23); *see* PO Resp. 37–38. Dr. Stevick further testifies that "Mr. Kuchel admits that pressure control assemblies were used in applications that are not 'bedding.'" Ex. 2020 ¶ 60 (referencing Ex. 2010, 25:14–31:16, 35:13–23). Dr. Stevick adds that "Mr. Kuchel specifically admitted when confronted with [three] examples in deposition that a [person having ordinary skill in the art] would know what a pressure control assembly [is] by the name alone as, for example, shown in the various prior art references." *Id.* (referencing Ex. 2010, 39:4–45:13 (addressing Ex. 2007), 17:6–23:5); *see* PO Resp. 38–39 (providing the identical language).

We find that the cited testimony from Mr. Kuchel does not support an opinion that the term "pressure controlling assembly" is used in common parlance or by persons of skill in the pertinent art to designate a particular structure or class of structures. For example, Mr. Kuchel testified in his deposition that "I believe pressure control assembly does connote that it controls pressure and it's an assembly and it was known in the field . . . [to] have ways of sensing pressure." Ex. 2010, 35:18–23. This testimony merely states that it was known that certain assemblies sense pressure, that is, perform a certain *function*. Such a statement does not support a finding

that the term "pressure controlling assembly" was used in *common parlance* or designates a *particular* structure or class of structures.

Similarly, the other testimony from Mr. Kuchel relied on by Dr. Stevick does not support Dr. Stevick's opinion. In testifying about Exhibit 2007, Mr. Kuchel stated that item 104 depicted in Figure 2 of Exhibit 2007 (depicted as a box, with item 104 designated "pressure control assembly") is "apparently an apparatus that controls pressure." Ex. 2010, 45:12–13. This testimony confirms the functional nature of this term. With respect to Mr. Kuchel's testimony concerning devices used to sense pressure in inflatable objects, this testimony merely supports a finding that devices existed that sensed pressure or regulated pressure in inflatable objects, not that the term "pressure controlling assembly" was used in common parlance to identify those devices. Indeed, we find Mr. Kuchel consistently testifies, both in his declaration and in his deposition, that devices were known that would perform the functions of monitoring and controlling pressure. *See, e.g.*, Ex. 1002 ¶¶ 51 ("Although sensing pressure in inflatable objects was generally known in the art before the filing date of the '847 [a]pplication, this was done in a number of different ways, using a number of different devices or methods."), 60 ("[I]t has long been known to measure and adjust air pressure within the inflatable object so as to maintain such air pressure at a predetermined level."), 61–74 (discussing prior art systems); Ex. 2010, 27:10–14 ("Q. If I told you I could go find and buy something called a pressure control assembly, would you have any idea what that does? A. In a generic sense, I guess it controls pressure."); *cf.* Reply 7–10 (arguing how Mr. Kuchel consistently testified that the term "pressure controlling assembly" or "pressure control assembly" was an expression of function, not structure); Ex. 1002 ¶ 84 ("Here, a [person having ordinary skill in the art]

would not have understood 'pressure controlling assembly' to have a sufficiently definite meaning as the name for structure. The claims simply recite that the 'pressure controlling assembly' is configured to perform . . . functions, without reciting any structure for performing those functions."). We afford this testimony from Mr. Kuchel considerable weight, given the consistent nature of the testimony and that the testimony conforms with our understanding of the evidence upon which he testified in his deposition. Important in our evaluation of this evidence is Mr. Kuchel's deposition testimony, which consistently stated that the terms "pressure controlling assembly" or "pressure control assembly" would be understood by the functions it performed.

Petitioner contends that Dr. Stevick testified that the "pressure controlling assembly" of the '979 patent was unique, supporting Petitioner's contention that the term does not convey a sufficiently definite meaning as the name for structure. Reply at 6–7 (citing *Ex parte Rodriguez*, 92 USPQ2d 1395, 1404–05 (BPAI 2009) (precedential)). That is, the position that the term "pressure controlling assembly" was used in common parlance or used to designate a particular structure cannot be reconciled with the position that the "pressure controlling assembly" of the '979 patent was unique.

Petitioner argues that Patent Owner's other extrinsic evidence fails to support Patent Owner's position that the term "pressure controlling assembly" conveys a sufficiently definite meaning as the name for structure and, actually demonstrates the "black-box nature" of the term "pressure control assembly." Reply 7. First, Petitioner argues that none of the extrinsic evidence is directed to a "pressure control*ling* assembly." *Id.* at 5. Second, Petitioner argues that the devices identified in Patent Owner's extrinsic evidence are not in the pertinent art of inflatable products. *Id.* As

Petitioner explains, Exhibit 2005 is directed to "well drilling;" Exhibit 2006 is directed to "automotive vehicles;" Exhibit 2007 is directed to "injection molding;" and Exhibit 2022 is directed to "the non-descript field of engineering." *Id.* at 6. Petitioner concludes that "this evidence does not and cannot inform how the term might be understood by persons of skill in the pertinent art of inflatable products" and, instead, "confirms that the disputed [claim term] has no structural significance." *Id.* We agree with Petitioner that Patent Owner's reliance on this other extrinsic evidence is unavailing.[13] We discuss the specific evidence below.

First, as to Exhibit 2004, the exhibit purportedly provides a search report for "Import Export Data of India" from the website zauba.com. Ex. 2004, 1. The exhibit appears to show 16 import records that contain the words pressure, control, and assembly, with one of those records having the complete phrase "pressure control assembly." *See* Ex. 1004, 2 (showing a record for EMEA Receiver Head Pressure Control Assembly – Spare Part). The record does not include any evidence as to what this part is, how it operates, how it relates to the recited "pressure controlling assembly," or how it demonstrates that the term "pressure controlling assembly" is used in *common parlance* or designates a particular structure or class of structures. All this exhibit shows is that some entity uses the phrase "pressure control assembly" to identify some type of structure. *Cf.* Ex. 2010, 32:17–19 ("Q. But you don't know, looking at the phrase [EMEA Receiver Head Pressure Control Assembly – Spare Part] you can't tell anything about what this

[13] We understand that Patent Owner relies on this evidence primarily in deposing Mr. Kuchel. *See* PO Resp. 2; *see also* Ex. 2020 ¶ 60 (Dr. Stevick testifying as to Mr. Kuchel's admissions with respect to the extrinsic evidence). We address the evidence directly here for completeness.

import is? A [by Patent Owner's Counsel]. Absolutely not."); Tr. 41:10–44:14 (providing Patent Owner's explanation that Exhibit 2004 demonstrates that a "pressure control assembly" is "something that you find out in the world").

Exhibit 2005 is US 3,093,996, titled "Drilling Pressure Control Assembly Tester." This exhibit does suggest that the phrase "drilling pressure control assembly" is used in well drilling operations. *See, e.g.*, Ex. 2005, 1:10–2:38 (discussing the use and testing of drilling pressure control assemblies). As the patent explains, "[d]rilling pressure control assemblies generally include one or more blowout preventers which are connected to the well through a casing head or the like." *Id.* at 1:25–27; *see also* Figs. 1, 2 (showing well drilling pressure control assembly 12 with upper blowout preventer 13, middle blowout preventer 14, and lower blowout preventer 15). Patent Owner does not direct us to any similarities between the drilling pressure control assembly of Exhibit 2005 and the alleged pressure controlling assembly of the '979 patent, so as to support a finding that the term defines a particular structure or class of structures. *Compare* Ex. 2005, 1:25–31 (describing a drilling pressure control assembly), *with* PO Resp. 25–26 (describing the alleged pressure controlling assembly of the '979 patent). Accordingly, the record does not support a position that the use of the phrase "drilling pressure control assembly" *in well drilling operations* demonstrates that the term "pressure controlling assembly" is used in common parlance or designates a particular structure or class of structures when recited in a claim directed to an inflatable object.

Similarly, Exhibit 2006 is a U.S. patent directed to "a rotative joint for a *pneumatic air pressure control assembly* which distributes air pressure . . . to pneumatic elements of a vehicle, . . . in order to calibrate the air pressure

with a predetermined value." Ex. 2006, 1:11–13 (emphasis added); *see id.* at 1:16–20 ("As known in the prior art, and particularly by users of pneumatic air pressure control assemblies, such an assembly has various problems relating to the sealing system of the rotative joint that constitutes part of the air pressure control assembly."). The patent does not disclose how the pneumatic air pressure control assembly, as a whole, is structured, as its focus is on the rotative joint for the pneumatic air pressure control assembly. *See* Ex. 2006, 2:52–3:50 (describing the rotative joint). Significant to our analysis here, we find no similar rotative joint structure described in the drilling pressure control assembly of Exhibit 2005 or the alleged pressure controlling assembly structure of the '979 patent, suggesting different structures for these different applications. *Compare* Ex. 2006, 2:52–3:50, *with* Ex. 2005, 1:25–31; PO Resp. 25–26. As such, Exhibit 2006 does not support a position that the use of the phrase "pneumatic pressure control assembly" as used in trucks and the like demonstrates that the term "pressure controlling assembly" is used in common parlance or designates a particular structure or class of structures when recited in a claim directed to an inflatable object.

Exhibit 2007 is a U.S. patent application directed to a molding system. The system includes "a pressure-control assembly (104)." Ex. 2007 ¶ 4. The pressure-control assembly is "configured to: communicate, in use, a fluid pressure between the fluid-bottle assembly (102) and with the hydraulic-accumulator assembly (200); and controllably adjust, in use, the fluid pressure between the fluid-bottle assembly (102) and the hydraulic-accumulator assembly (200)." *Id.*; *see also id.* ¶¶ 18, 19 (describing how the pressure-control assembly is configured and that it may include a control unit that is configured to perform certain functions), claim 1 (reciting how

the pressure-control assembly is configured). The patent application describes the pressure-control assembly in functional terms only. Such use of a coined functional name for a component in describing and claiming an invention in a patent application is not uncommon. Indeed, this use of the term "pressure-control assembly" aligns with the use of functional descriptors in the '979 patent, supporting Petitioner's position. *Cf.* Ex. 1004 (describing and claiming a "supplemental air pressure providing device," which is a device supplemental to the primary pump that provides air to the inflatable object). This evidence does not support the position that the term "pressure controlling assembly" is used in common parlance or designates a particular structure or class of structures when recited in a claim directed to an inflatable object.

Finally, Exhibit 2013 is purportedly a webpage offering a replacement part compatible with a pump, called a "pressure control assembly." Ex. 2013; Ex. 2023, 2. Patent Owner fails to explain the significance of this exhibit. We note, however, that, like the other extrinsic evidence, this exhibit appears to depict a structure that differs greatly from other structures using the name "pressure control assembly." *Compare* Ex. 2013, 1, *with* Ex. 2006, 2:52–3:50, *and* Ex. 2005, 1:25–31; PO Resp. 25–26. Indeed, the assembly depicted in Exhibit 2013 purports to be a part for a gas piston pump, but the "pressure controlling assembly" of the '979 patent monitors air pressure and sends a signal to a pump. *Compare* Ex. 2013, 1, *with* Ex. 1004, 5:50–63.

Even if the use of the term "pressure controlling assembly" or "pressure control assembly" reflected a designation of structure, the extrinsic record demonstrates, at best, that the term is used as a descriptive term across a broad spectrum of industries, having a broad range of structures.

The record does not include sufficient evidence to demonstrate that the term "pressure controlling assembly" is used in common parlance or used to designate a *particular* structure by a person having ordinary skill in the art of the '979 patent. *See MTD Prods. Inc.*, 933 F.3d at 1341 ("[A] critical question is whether 'the claim term is used . . . by persons of skill *in the pertinent art* to designate structure.'") (emphasis added).

In summary, upon our review of the complete record, we find that Patent Owner fails to explain adequately how the extrinsic record, individually or in totality, supports a finding that the term "pressure controlling assembly" was used in *common parlance* to designate a *particular* structure or class of structures. We find, in weighing the totality of the extrinsic evidence, that the term "pressure controlling assembly" is not used in common parlance as a term for a specific structure. We also find, that the term does not designate a particular structure or a class of structures. We find, at best, that the term "pressure controlling assembly" is employed across a wide array of technologies to designate a component or collection of components to control pressure in a system, with those components varying greatly in structure. *See MTD Prods.*, 933 F.3d at 1344 (determining that "mechanical control assembly" invokes § 112 ¶ 6 and noting that the patent challenger in an *inter partes* review "did not dispute [the patent owner's] reliance on various prior patents and publications that used 'mechanical control assembly' to describe a wide variety of structures with varying functions").

c) Relevant case law

We now turn to relevant case law. In addition to *Williamson*, which we discussed briefly above and which lays out the framework for our analysis here, *MTD Products* is instructive to our inquiry here. Petitioner

argues that *MTD Products* "strongly supports the § 112(f) status of the Challenged Claims."[14] Reply 2. Petitioner argues that the term at issue in *MTD Products* ("mechanical control assembly"), like the term "pressure controlling assembly," uses the nonce word "assembly" and both claim 1 of the '979 patent and the claim at issue in *MTD Products* use "configured to" language in defining the assembly in multiple clauses of the subject claim. *Id.* Petitioner adds that the subject claim in *MTD Products* includes a recitation of structural elements ("a mechanical control assembly coupled to the left and right drive units"), similar to the additional structures in claim 1 that Patent Owner identifies. *Id.* (emphasis omitted). Petitioner argues that the claim at issue in *MTD Products* has an even stronger link to these additional structural elements than claim 1 of the '979, as the claim in *MTD Products* states that the mechanical control assembly is "coupled to" the structures, and claim 1 of the '979 patent has no language coupling the recited "pressure controlling assembly" to the other structures in claim 1. *Id.* at 2–3. Petitioner concludes that the term "'pressure controlling assembly' [of claim 1] is *entirely* functional, rather than just *primarily* functional like the *MTD [Products]* claim." *Id.* at 3. Petitioner adds that Patent Owner "admits that 'pressure controlling assembly' is nothing more than any 'device for use in a pressure control system.'" *Id.* (referencing PO Resp. 20).

Next, Petitioner replies that the Specification does not disclose any structure for the term "pressure controlling assembly" and cites *MTD Products* for the proposition that an embodiment disclosed in the

[14] Petitioner notes that the decision in *MTD Products* reversed a Board decision upon which Patent Owner relies in the Patent Owner Response. Reply 1.

specification cannot impart structure to a term that does not recite structure. Reply 3.

Patent Owner attempts to distinguish the Federal Circuit's decision in *MTD Products* from the facts here.[15] Patent Owner argues that (1) the term recited in the claim at issue in *MTD Products* was not found in the specification of the patent at issue in the case; (2) the patent owner introduced expert testimony that the term "mechanical control assembly" had no well-understood meaning and petitioner did not contradict that evidence; and (3) the Board erred in relying on the phrase "ZTR control assembly" to support its conclusion that the term "mechanical control assembly" has a definitive meaning. Sur-reply 2–3. Patent Owner then explains that (1) the term "pressure controlling assembly" is in the Specification; (2) Patent Owner has argued that the term has a structural meaning; and (3) neither the parties nor the Board substitutes a different term from the Specification to mean "pressure controlling assembly." *Id.* at 3.

Although we agree that the facts identified by Patent Owner above differ between *MTD Products* and the instant case, we find that these differing facts do not compel a different conclusion with respect to the term "pressure controlling assembly." Like "pressure controlling assembly," the

[15] In the Patent Owner Response, Patent Owner relies on the Board decision underlying *MTD Products*, arguing that "[t]he approach in [the underlying Board decision] can be applied to the 'pressure controlling assembly' and its 'configured' recitations which set it apart from the prior art in prosecution and which should be read as structural limitations so that they too are not rendered superfluous." PO Resp. 42–43 (discussing *Toro Co. v. MTD Prods., Inc.*, IPR2016-00194, Paper 41 (PTAB May 10, 2017)). Given that the Federal Circuit reversed the Board's decision, we do not address these arguments further.

term at issue in *MTD Products* uses the word "assembly," modified by a similar functional phrase "mechanical control." *MTD Prods. Inc.*, 933 F.3d at 1343; Reply 1. Also, similar to the remainder of the limitations at issue here, the remainder of the limitations at issue in *MTD Products* recites primarily functional language that the mechanical control assembly was configured to perform. *MTD Prods. Inc.*, 933 F.3d at 1343; Reply 2. Also, similar to the instant case, the Federal Circuit found in *MTD Products* that the specification did not demonstrate that the patentee had acted as its own lexicographer to define the nonce term. *MTD Prods. Inc.*, 933 F.3d at 1344.

Other Federal Circuit decisions also inform our analysis here. In *MIT*, the court determined that "colorant selection mechanism" did not connote sufficient structure to one of ordinary skill in the art and that § 112 ¶ 6 applied. *See MIT*, 462 F.3d at 1354. Specifically, the court viewed "mechanism" as not, by itself, connoting sufficient structure and determined that "colorant selection" was not defined in the specification or otherwise understood to a person of ordinary skill in the art to identify sufficient structure. *Id.* at 1353–54; *see also Williamson*, 792 F.3d at 1349–51 (holding that § 112 ¶ 6 applied to "distributed learning control module" because "'[m]odule' is a well-known nonce word that can operate as a substitute for 'means' in the context of § 112, para. 6" and "[t]he prefix 'distributed learning control' does not impart structure into the term 'module'"); *Mas-Hamilton Grp.*, 156 F.3d at 1214 (holding that the recited "lever moving element" invoked § 112 ¶ 6 because that limitation "is described in terms of its function not its mechanical structure"). Our Decision instituting trial discussed these three cases (Dec. on Inst. 19–21) and Patent Owner did not address them in its Patent Owner Response.

Patent Owner argues that, because "pressure controls and pressure control assemblies were well known in the art at the time of patenting . . . the term 'pressure controlling assembly' is a structure and not a means-plus-function term." PO Resp. 39. To support its position, Patent Owner relies on a case from the Federal Circuit and one from the Eastern District of Texas. *Id.* at 39–40 (citing *Lighting World Inc. v. Birchwood Lighting, Inc.*, 382 F.3d 1354 (Fed. Cir. 2004), and *Weatherford Tech. Holdings, LLC v. Tesco Corp.*, No. 2:17-CV-456, 2018 WL 3239714 (E.D. Tex. July 3, 2018) (construing "mounting assembly")).

Patent Owner's reliance on *Lighting World Inc.* is unavailing. First, as Patent Owner recognizes, *Lighting World* was decided before (and overruled by) *Williamson* and the court applied a strong presumption that a term that did not recite the word "means" did not invoke § 112 ¶ 6. *See* PO Resp. 40; *Lighting World Inc.*, 382 F.3d at 1358 ("Our cases make clear, however, that the presumption flowing from the absence of the term 'means' *is a strong one that is not readily overcome*.") (emphasis added), *overruled by Williamson*, 792 F.3d at 1349 ("expressly overul[ing] the characterization of th[e] presumption [based on the absence of 'means'] as 'strong'"); *see also* Dec. on Inst. 20–21 (contrasting *Lighting World* with *MIT* and *Mas-Hamilton Grp.* and determining that the claim language in the instant case is more similar to the claims in *MIT* and *Mas-Hamilton Grp.*). Second, the court determined that "connector assembly" recited sufficient structure (such that § 112 ¶ 6 did not apply), but the court based the analysis on evidence that the modifying term "connector"—rather than "assembly"—was understood to denote structure. *Lighting World Inc.*, 382 F.3d at 1359–63. Here, the modifying term, "pressure controlling," is a functional term, not a structural term such as "connector."

Patent Owner's reliance on *Weatherford Technology Holdings* is equally unavailing. PO Resp. 39. In *Weatherford Technology Holdings*, the court construed the term "mounting assembly" as not invoking § 112 ¶ 6. *Weatherford Tech. Holdings, LLC*, 2018 WL 3239714, at *6. In that case, one of the independent claims did not identify any function for the recited "mounting assembly" at issue. *Id.* at *5; *see id.* at *2 (reciting "wherein the control line holding assembly is operatively mounted proximate a floor of a rig with a mounting assembly"); Reply 3. In the instant case, the term "pressure controlling assembly" is defined in independent claim 1 in functional terms. *See* Reply 3–4.

In summary, the governing case law strongly supports a determination that the term "pressure controlling assembly" invokes § 112(f).

d) Conclusion

For the reasons above, we determine that the term "pressure controlling assembly" is a means-plus-function term that invokes the requirements of § 112(f).

3. Claim construction of "pressure controlling assembly"—claimed functions and corresponding structure

Having determined that § 112(f) applies, we turn to the construction of "pressure controlling assembly." To construe a limitation subject to § 112(f), we first identify the claimed function or functions and then identify what structure, if any, disclosed in the specification corresponds to the claimed function or functions. *Williamson*, 792 F.3d at 1351–52.

As to the first step, Petitioner states that "the claimed functions are . . .[,] in short, monitoring air pressure, automatically activating the supplemental air pressure providing device, detecting that the air pressure inside the inflatable object has decreased below a predetermined threshold

after inflation, and controlling the supplemental air pressure providing device to provide supplemental air pressure." Pet. 48–49 (citing Ex. 1004, claim 1; Ex. 1002 ¶ 86).

Patent Owner argues that the functions identified by Petitioner as the functions corresponding to the purported means are not separate functions but are "portions of the pressure control 'so as to maintain the air pressure of the inflatable object within a predetermined range.'" PO Resp. 40–41.[16] Patent Owner explains that Figure 2a of the '979 patent (and '847 application) depicts diaphragm 121 that, in conjunction with chamber 122, monitors the air pressure in the inflatable object and compares the pressure to atmospheric pressure plus an offset provided by spring 11. *Id.* at 41. Patent Owner continues that "[t]his assembly also automatically activates the supplemental air pressure providing device when it detects the pressure inside the inflatable object is less than a predetermined threshold (adjusted using, for example, a spring) and controls the supplemental air pressure providing device to maintain the air pressure within a predetermined range." *Id.* at 41–42. Patent Owner concludes that "[t]herefore, the pressure controlling assembly is configured to provide all of the claimed aspects." *Id.* at 42.

We generally agree with Petitioner's summary of the four functions required of the "pressure controlling assembly." For completeness, we provide the precise functions as recited in claim 1: (1) monitoring air pressure in the inflatable object after the inflatable body has been inflated by the pump; (2) detecting that the air pressure inside the inflatable object

[16] Petitioner replies that Patent Owner's "interpretation is at odds with the plain language of claim 1." Reply 10 n.3.

decreases below a predetermined threshold after inflation by the pump; (3) automatically activating the supplemental air pressure providing device when the pressure controlling assembly detects that the air pressure inside the inflatable object decreases below the predetermined threshold after inflation by the pump; and (4) controlling the supplemental air pressure providing device to provide supplemental air pressure to the inflatable object so as to maintain the air pressure of the inflatable object within a predetermined range. *See* Ex. 1004, 5:46–64. Regardless of whether we characterize these four functions as separate functions or as four sub-functions of an overarching pressure controlling function, the "pressure controlling assembly" must perform all four of the functions.

Turning to the second step, Petitioner contends that, when a means-plus-function term recites multiple functions, the corresponding structure must perform *all of the claimed functions*. Pet. 49 (citing *Williamson*, 792 F.3d at 1351–52). Petitioner adds that "the [S]pecification of the '979 [p]atent does not disclose corresponding structure to perform *any* of the claimed functions." *Id.* (emphasis added). Petitioner identifies passages from (1) column 1, line 64 to column 2, line 6; (2) column 2, lines 7 to 11; (3) column 2, lines 12 to 15; and (2) column 4, lines 48 to 51 as "[t]he only references to 'pressure controlling assembly' in the specification." *Id.* at 49–50. According to Petitioner, in these passages, "the [S]pecification does not disclose any structure for performing the claimed functions, but rather refers to 'pressure controlling assembly' only in relation to its functions." *Id*. at 50 (citing Ex. 1002 ¶¶ 87–88). The identified passage at column 4, lines 48 to 51 provides:

> After the supplemental air pressure providing device is in a standby mode, a pressure controlling assembly 121/122 as described starts monitoring air pressure in the inflatable object.

Ex. 1004, 4:48–51.

As noted by Petitioner, the only figure in the '979 patent that includes reference numerals 121 and 122 is Figure 2a. *See* Pet. 50. A version of Figure 2a, with annotations added by Petitioner, is reproduced below.

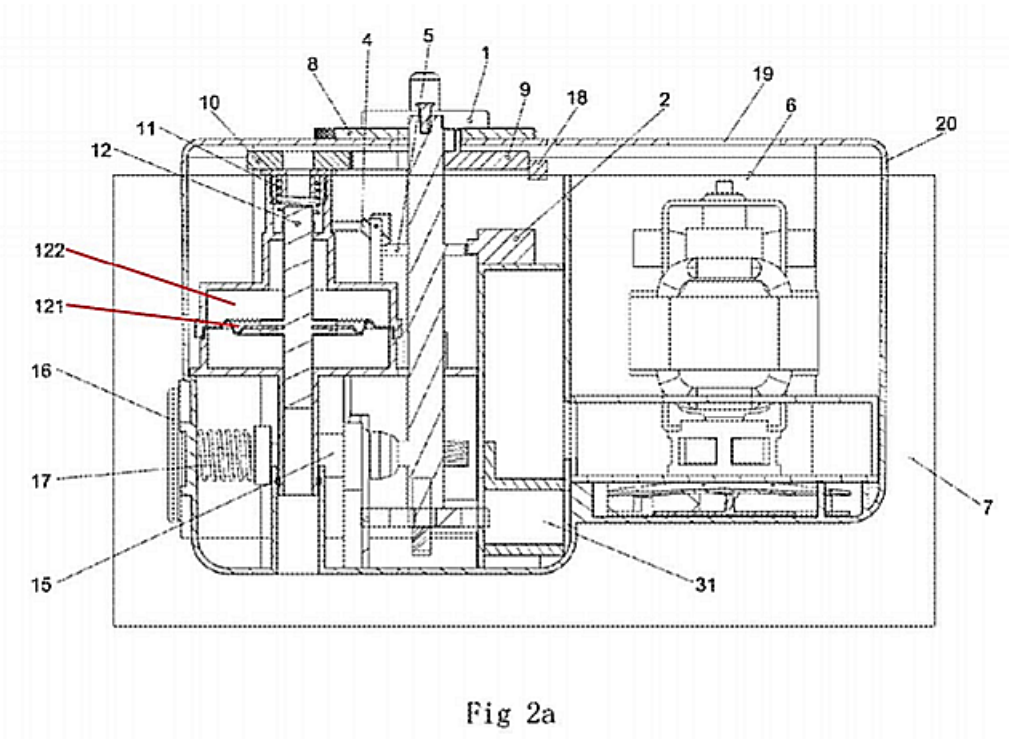


Fig 2a

Pet. 51. Figure 2a depicts a "cross sectional view showing [a] valve controlling assembly in association with [a] pressure sensing assembly." Ex. 1004, 2:38–40. In this annotated version of Figure 2a, Petitioner adds two red lines over the lead lines for elements 121 and 122. Pet. 51.

Petitioner argues that the '979 patent does not include sufficient description as to what elements 121 and 122 are. *See* Pet. 50 ("While the [passage at column 4, lines 48 to 51] refers to '121/122' in the figures, there is absolutely no description or identification in the specification as to what,

if anything, these structures are. The only [f]igure that lists these numbers is Figure 2a, but . . . the [f]igure does not identify what, if anything, these numerals are pointing to.").

Petitioner concludes that, "[b]ecause the [S]pecification does not disclose corresponding structure to all of the claimed functions, the claim term ['pressure controlling assembly'] is indefinite." Pet. 51.

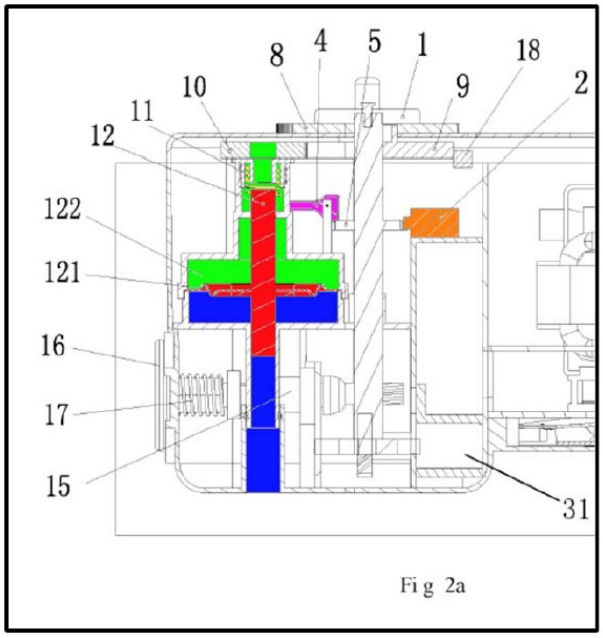
Patent Owner contends that, "even if the Board interprets the 'pressure controlling assembly' as a means-plus-function term, the '979 [p]atent identifies structure in its text and figures." PO Resp. 65. Patent Owner explains that the Specification discloses "a 'linkage assembly interactively sandwiched between the valve controlling assembly and the pressure controlling assembly to sense the operation of the pressure controlling assembly and consequently operate the movement of the valve controlling assembly.'" *Id.* (quoting Ex. 1004, 1:64–2:6).

We determine that the disclosure of the '979 patent cited by Patent Owner fails to identify adequate structure for performing the four functions recited in claim 1 associated with the "pressure controlling assembly." Indeed, this disclosure identifies structure other than the "pressure controlling assembly." The disclosure states that the "linkage assembly" structure is located "*between* the valve controlling assembly and the pressure controlling assembly," that is, the linkage assembly and valve controlling assembly are structures independent from the pressure controlling assembly. *See* Ex. 1004, 2:1–6 (emphasis added). Even if the linkage assembly and valve controlling assembly were considered part of the pressure controlling assembly, the Specification does not explain adequately that these components (1) monitor air pressure inside the inflatable object; (2) detect that the air pressure has decreased below a predetermined threshold after

inflation; (3) automatically activate the supplemental air pressure providing device; and (4) control the supplemental air pressure providing device to provide supplemental air pressure, as required by claim 1.

Patent Owner adds that, during prosecution, the examiner compared the recited "pressure controlling assembly" to structures in the prior art, providing "intrinsic evidence that pressure control structures did exist about the time of these patents and were accessible to anyone studying the file history of either" the '979 patent or the '771 patent. PO Resp. 66. The fact that the prior art may disclose structures that performs the functions of the pressure controlling assembly as recited in claim 1 does not support a contention that the disclosure of the '979 patent describes these structures. The Federal Circuit has "held that 'structure *disclosed in the specification* is "corresponding" structure *only* if the specification or prosecution history clearly links or associates that structure to the function recited in the claim. This duty to link or associate structure to function is the *quid pro quo* for the convenience of employing § 112[(f)].'" *Saffran v. Johnson & Johnson*, 712 F.3d 549, 562 (Fed. Cir. 2013) (quoting *B. Braun Med., Inc. v. Abbott Labs.*, 124 F.3d 1419, 1424 (Fed. Cir. 1997) (first emphasis added)). Structure identified during prosecution that is disclosed outside the specification does not satisfy the patent drafter's obligation under § 112(f).

Patent Owner also contends, albeit not directly in relation to corresponding structure for a means-plus-function element, what it contends is the disclosed structure of the recited "pressure controlling assembly." PO Resp. 22–27. To support its contention, Patent Owner provides an annotated version of a portion of Figure 2a from the '847 application. We, again, reproduce this annotated version of Figure 2a, below, for convenience.



Id. at 24–25 (referencing Ex. 2020 ¶ 40).[17] The annotated version depicts the left side of Figure 2a, with certain components colorized. We discuss these colorized components in greater detail below.

Patent Owner asserts that a person having ordinary skill in the art "would understand the region of [Figure] 2a [of the '979 patent] *denoted by [reference numbers] 121/122* as a disclosed pressure controlling assembly." PO Resp. 25 (emphasis added). Patent Owner argues that

> flexible diaphragm 121 (red) of [Figure] 2a of the '979 [p]atent acts as a pressure sensor. Its associated rod (also red) will slide up and down based on the pressure of the inflatable (blue) versus the ambient pressure (green) and force applied to it by the adjusting input (e.g., spring 11 of [Figure] 2a). The diaphragm 121 isolates the internal pressure of the inflatable object from the ambient pressure of the room. It moves upward as the pressure of the inflatable object is increased. If the spring (11) is tightened, it will push back on the red bar connected to the

[17] Figure 2a from the '847 application differs from the corresponding figure in the '979 patent, which, for example, does not identify the vertical component that Patent Owner colors in red as item 12. *Compare* Ex. 1003, 17, *with* Ex. 1004, Fig. 2a

> diaphragm 121. As pressure in the inflatable body increases it forces the red bar up (as viewed from the drawing). A [person having ordinary skill in the art] would appreciate in the example of [Figure] 2a, movement of the red bar is sensed by switches which can turn on and off the primary pump (e.g., using switch 2 and linkage 4) and the supplemental pressure providing device (e.g., using switch 13 as a limit switch, which can turn the supplemental air pressure providing device on and off).

Id. (referencing Ex. 2020 ¶ 41). Patent Owner further provides an annotated version of Figure 1 of the '847 application, which we reproduce below.

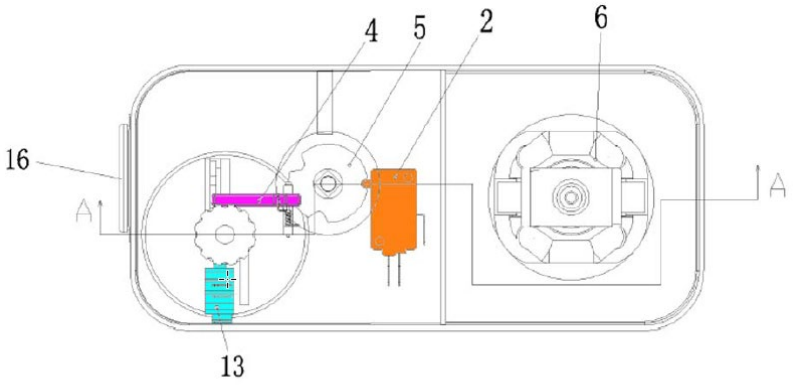


Fig 1

PO Resp. 26 (referencing Ex. 1003, 6, 17; Ex. 2020 ¶ 42). Figure 1 depicts a "top plan view of the valve controlling assembly of the" invention disclosed in the '847 application. Ex. 1003, 6.[18] Patent Owner and its expert contend that item 13 is a switch that "can turn the supplemental air pressure providing device on and off." *See* PO Resp. 25; Ex. 2020 ¶ 41.

We find that the Specification fails to disclose corresponding structure for all the recited functions of the "pressure controlling assembly." "Where there are multiple claimed functions, as we have here, the patentee must disclose adequate corresponding structure to perform all of the claimed

[18] This image differs from Figure 1 of the '979 patent, which does not include reference numeral 4 or its associated lead line. *Compare* Ex. 1004, Fig. 1, *with* Ex. 1003, 17.

functions." *Williamson*, 792 F.3d at 1352–53. We focus our analysis on one of the recited functions, as it is dispositive to our finding.

Claim 1 requires, in part, the pressure controlling assembly functions to "automatically activate the supplemental air pressure providing device." Ex. 1004, 5:54–56. Patent Owner takes the position that item 121 and item 122 combine to form the pressure controlling assembly. PO Resp. 25 ("A POSA would understand the region of [Figure] 2a denoted by 121/122 as a disclosed pressure controlling assembly."). Patent Owner then includes rod 12 as part of item 121. *See* PO Resp. 24 (showing rod 12 and item 121 in red); *id.* at 25 (indicating a "rod (also red)" associated with item 121).

Patent Owner characterizes item 121 as a "flexible diaphragm" and argues that "flexible diaphragm 121 (red) of [Figure] 2a of the '979 [p]atent acts as a pressure sensor. Its associated rod (also red) will slide up and down based on the pressure of the inflatable (blue) versus the ambient pressure (green) and force applied to it by the adjusting input (e.g., spring 11 of [Figure] 2a)." PO Resp. 25 (referencing Ex. 2020 ¶ 41). Significant to our analysis, Patent Owner argues, relying on Dr. Stevick's verbatim testimony, that the movement of the rod is sensed by limit switch 13, which turns the supplemental air pressure providing device on and off. *See* PO Resp. 25 (referencing Ex. 2020 ¶ 41).

We find that Patent Owner's description does not support a finding that the '979 patent provides corresponding structure for at least the function of "automatically activat[ing] the supplemental air pressure providing device." First, Patent Owner relies on evidence from the '847 application to support its arguments. *See* PO Resp. 24 (showing an annotated version of Figure 2a from the '847 application, which differs from the figure in the '979 patent, for example, by not identifying item 12 by number), 26

(showing Figure 1 from the '847 application). We recognize that Patent Owner was not addressing the precise issue of corresponding structure, but we note that Patent Owner does not explain why the differences between the '847 application and '979 patent can be ignored.

Even if we ignore the differences, the *only* support for Patent Owner's position is Dr. Stevick's testimony of how a person having ordinary skill in the art would interpret the Figures 1 and 2a. We afford this testimony little or no weight, as Dr. Stevick provides no basis for the testimony and the testimony is not supported by the figures.

As an initial point, as we have already discussed, we find Dr. Stevick's testimony, as a whole, lacks credibility. His declaration essentially parrots the attorney argument in the Patent Owner Response. Even ignoring this deficiency, we would not afford his testimony weight, as he provides no basis for the testimony. He makes the conclusory statement that a person having ordinary skill in the art "would appreciate in the example of [Figure] 2a, movement of the red bar is sensed by switches which can turn on and off the primary pump (e.g., using switch 2 and linkage 4) and the supplemental pressure providing device (e.g., using switch 13 as a limit switch, which can turn the supplemental air pressure providing device on and off)." Ex. 2020 ¶ 41. But neither the '979 patent nor the '847 application states that item 13 is a switch. Indeed, Figure 1 of the '979 patent does not even have a lead line to what Figure 1 of the '847 application indicates is item 13. Dr. Stevick provides no testimony in his declaration to support his opinion that item 13 represents a limit switch. Compounding this deficiency, nothing in Figures 1 and 2a links item 13 to the "red bar" (which we assume means item 12, which is not identified in either the '979 patent or the '847 application). We cannot discern, nor has

Patent Owner directed us to, anything in the figures that links item 12 and item 13. Similarly, we cannot discern, nor has Patent Owner directed us to, anything in the figures that links item 13 to the supplemental air pressure providing device. Dr. Stevick's wholly unsupported opinion testimony is insufficient to demonstrate that the '979 patent discloses corresponding structure for the function of activating the supplemental air pressure providing device. *See* 37 C.F.R. § 42.65(a) ("Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight."); *see also* Reply 11 (discussing the flaws in Dr. Stevick's testimony with respect to item 13). Indeed, at best, Dr. Stevick's testimony conveys a way that a person having ordinary skill in the art might accomplish the recited function. We find, however, that the testimony fails to provide persuasive evidence that the '847 application and '979 patent actually disclose that way. *See, e.g.*, *Blackboard, Inc. v. Desire2Learn, Inc.*, 574 F.3d 1371, 1385 (Fed. Cir. 2009) ("The question before us is whether the specification contains a sufficiently precise description of the 'corresponding structure' to satisfy section 112, paragraph 6, not whether a person of skill in the art could devise some means to carry out the recited function.").

We also find Dr. Stevick's deposition testimony unhelpful. First, Dr. Stevick testifies that item 13 is a switch because "[w]hy else would you put it there?" Ex. 1031, 64:11–23. Dr. Stevick adds that item 13 is "described by the picture as it has to be a switch, because you have to be able to control and determine the position of the rod 12." *Id.* at 65:3–7. Dr. Stevick further testifies that "switch 13 is an electrical switch, so you know that will be connected to turn on and off the supplemental pump shown in Figures 5 to 13." *Id.* at 73:14–17. We find this testimony is built

on conjecture, not supporting evidence. Dr. Stevick seems to assume that rod 12 must interact with a switch, so item 13 must be that switch and item 13 must be connected to the supplemental air pressure providing device to turn it on and off because it is a switch.

Weighing all of the evidence in light of the parties' arguments, we find that the '979 patent fails to disclose any corresponding structure for performing at least the function "automatically activat[ing] the supplemental air pressure providing device" as required by claim 1.

4. Conclusion as to eligibility for post-grant review based on "pressure controlling assembly" lacking written description support

Having attempted to construe the term "pressure controlling assembly," we now turn to whether the '847 application provides written description support for all of the claims of the '979 patent, that is, whether the '847 application "describ[ed] *the invention*, with all its claimed limitations," *Lockwood*, 107 F.3d at 1572, to show "possession of the claimed subject matter as of the filing date," *Ariad Pharm.*, 598 F.3d at 1351. We find that it does not. *See Vas-Cath Inc.*, 935 F.2d at 1563 ("Our cases also provide that compliance with the 'written description' requirement of § 112 is a question of fact.").

As discussed above, we find that the '979 patent does not provide corresponding structure for the means-plus-function term "pressure controlling assembly." Our finding considered the drawings from the '847 application and associated testimony about the figures. The figures, arguably, contained additional information relative to our inquiry, yet we still find the disclosure deficient. Additionally, the '847 application's detailed description does not associate items 121/122 with the pressure

controlling assembly. *Compare* Ex. 1003, 9, *with* Ex. 1004, 4:48–56 (providing the text as quoted above, but with Ex. 1004 associating items 121/122 with the pressure controlling assembly). The patentee amended the original disclosure of the '847 application to associate items 121/122 with the pressure controlling assembly. *See* Ex. 1003, 101. This fact strengthens a finding that the '847 application does not provide written description support for the "pressure controlling assembly."

The inquiry as to whether a written description discloses sufficient structure for a means-plus-function term and whether the written description satisfies the written description requirement of § 112(a) are very closely related, yet separate inquiries. *Accord In re Dossel*, 115 F.3d 942, 946 (Fed. Cir. 1997) ("Paragraph 6 of § 112, which permits a claim in means-plus-function form and specifies 'such claim shall be construed to cover the corresponding structure, material, or acts described in the specification,' does not itself implicate the requirements of § 112 ¶ 1."); *but see* MPEP § 2163.03 (indicating that a disclosure that fails to disclose corresponding structure for a means-plus-function term would not satisfy the written description requirements of § 112(a)).

Petitioner argues that "the [S]pecification does not contain any disclosure at all regarding what the 'pressure controlling assembly' is, or what performs these functions, much less a disclosure that conveys to those skilled in the art that the inventor had possession of the claimed subject matter." Pet. 21 (referencing Ex. 1002 ¶ 49). Petitioner contends that the written description of the '979 patent does not provide disclosure of the "pressure controlling assembly," other than the functions it performs. *Id.* at 21–22. Petitioner adds that the reference to items 121/122 represents a

"vague, unexplained reference[]" that does not provide adequate written description support. *Id.* at 22–23. Petitioner concludes that

> [n]othing in the [S]pecification indicates to a [person having ordinary skill in the art] that the inventor of the '979 [p]atent actually invented the claimed "pressure controlling assembly" at the time of filing the '847 [a]pplication. . . [and, therefore] the Challenged Claims lack written description support in the [S]pecification (and thus in the disclosure of the '847 [a]pplication).

Id. at 24.

Patent Owner responds that "[t]he text *and the figures* of the '874 [a]pplication provide written description of the 'pressure controlling assembly' claimed in the '979 [p]atent." PO Resp. 27. Patent Owner argues that items 121 and 122 "are strikingly similar in appearance to prior art devices used for pressure regulation." *Id.* at 30; *see id.* at 31(reproducing an image from Ex. 2008). Patent Owner argues that a person having ordinary skill in the art would have appreciated that certain structures of Figure 2a operates the same as the gas regulator. *Id.* at 31; *see also id.* at 32 (showing colorized version of the image of Exhibit 2008, with colors corresponding to the colorized portions of Figure 2a). Patent Owner adds that Mr. Kuchel identified the diaphragm of an image in Exhibit 2008.

Patent Owner next argues that a person having ordinary skill in the art would have understood from certain disclosures in the'847 application that

> the pressure controlling assembly provides limit switching to automatically turn the supplemental air pressure providing device on when the pressure of the inflatable object is at a lower limit and to turn it off when the pressure is at an upper limit to maintain an air pressure of the inflatable object.

PO Resp. 34–35 (referencing Ex. 1003, 5, 9, Figs. 1, 2a; Ex. 2020 ¶¶ 53, 54). Patent Owner concludes that the figures in the '847 application "show a

detailed version of a pressure controlling assembly for a working design" and, therefore, "the '874 [a]pplication as-filed 'reasonably conveys to the artisan that the inventor had possession at the time of the later claimed subject matter.'" *Id.* at 36. Patent Owner adds that the CN '302 application confirms this contention. *Id.* at 36–37.

Petitioner replies that Patent Owner relies on unsupported expert testimony to support its contention that the '847 application provides written description support. Reply 14. Petitioner argues that, because the '847 application fails to provide corresponding structure to perform all four of the functions of the means-plus-function element "pressure controlling assembly," the application *necessarily* fails to satisfy the written description requirement. *Id.* at 15 (referencing MPEP §§ 2163, 2163.03); *see also* MPEP § 2163.03 ("Such a limitation also lacks an adequate written description as required by 35 U.S.C. 112(a) or pre-AIA 35 U.S.C. 112, first paragraph, because an indefinite, unbounded functional limitation would cover all ways of performing a function and indicate that the inventor has not provided sufficient disclosure to show possession of the invention.").

For similar reasons that we found that the '979 patent did not disclose corresponding structure for the means-plus-function limitation "pressure controlling assembly," we find that the '847 application fails to provide written description support for the "pressure controlling assembly." Specifically, we find that the '847 application fails to demonstrate that the inventors were in possession of a "pressure controlling assembly" that "automatically activate[s] the supplemental air pressure providing device" as required by claim 1.

We do not agree with Patent Owner that the cited sections of the '847 application disclose to a person having ordinary skill in the art that

limit switches are used by the "pressure controlling assembly" to automatically operate the supplemental air pressure providing device. The '847 application itself is silent as to any limit switch operating the supplemental air pressure providing device. *See, e.g.*, PO Resp. 34–35 (presenting two sections of the '847 application that allegedly support Patent Owner's position, where the text of the application never mentions limit switches). We also do not credit Dr. Stevick's testimony in this regard. Again, Dr. Stevick's declaration essentially mimics the Patent Owner Response, down to the bolding of language from the '847 application. *Compare* Ex. 2020 ¶¶ 53–54, *with* PO Resp. 34–35. Also, Dr. Stevick's declaration states that a person having ordinary skill in the art would have understood that a "pressure controlling assembly provides limit switching to automatically turn the supplemental air pressure providing device on when the pressure of the inflatable object is at a lower limit and to turn it off when the pressure is at an upper limit to maintain an air pressure of the inflatable object." Ex. 2020 ¶ 54. The sole basis for this statement is a reference to Exhibit 1003, Figures 1 and 2a, without any further explanation. Such a conclusory opinion that is not adequately supported is entitled to little weight. *See* 37 C.F.R. § 42.65(a).

We also find Patent Owner's *post hoc* reliance on the CN '302 application as confirmation of its position inapposite. As an initial point, there is no dispute that the CN '302 application cannot be directly relied upon for written description support of the "pressure controlling assembly," with respect to any disclosure in that application that does not appear in the '847 application.[19] Patent Owner's use of the information in the application

[19] *See supra* note 8.

as "confirmation" appears to be an end run around the fact that information from the CN '302 application was not included in the '847 application. It appears to us, based on our review of the complete record, that Patent Owner and its expert use the disclosure in the CN '302 application to develop its position of what the figures of the '847 application disclose, then they attempt to use the CN '302 application to confirm that very position. *See, e.g.*, Ex. 1027 (providing the only documentary support in the record that item 13 is a switch); *compare* Ex. 2020 ¶ 41 (referring to a "bar" connected to item 121, although referring to item 12 as a "rod" in other places), *with* Ex. 1027, 18 (indicating that the air pressure control mechanism includes movable *bar 12* connected to air valve plate 121, the only documentary evidence that refers to item 12 as a "bar").

Accordingly, we find that a person having ordinary skill in the art would not have understood that the patentee was in possession of an invention where item 121 and element 122 (and other depicted, but not described, items in the figures of the '847 application) form an assembly that can perform all of the recited functions of the pressure controlling assembly. As we detailed above, we find that the '847 application fails to disclose how a pressure controlling assembly automatically activates the supplemental air pressure providing device, as required by claim 1.

The '979 patent is eligible for post-grant review, because at least claim 1 of the '979 patent has an effective filing date of August 29, 2014 (when the '073 application was filed), which is after March 16, 2013.

C. Other eligibility assertions by Petitioner

Petitioner also argues that: (1) the patentee added claims to the '073 application that were rejected by the examiner as containing new matter, and that action converted the application to a first-inventor-to-file

application; and (2) the claim term "primary air pressure" lacks written description support in the '847 application, triggering post-grant review eligibility. Pet. 14–19, 24–26; Reply 23–24. Because we determine that the '979 patent is eligible for post-grant review for other reasons provided above, we need not address these additional assertions.

III. ANALYSIS OF UNPATENTABILITY GROUNDS

A. Legal Standards

In post-grant reviews, a petitioner bears the burden of proving unpatentability of the challenged claims, and the burden of persuasion never shifts to the patent owner. *See Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (applying standard for *inter partes* reviews). To prevail in this proceeding, Petitioner must support its challenge by a preponderance of the evidence. 35 U.S.C. § 326(e); 37 C.F.R. § 42.1(d). Accordingly, we base all of our findings and conclusions on a preponderance of the evidence standard.

B. Additional Claim Construction Analysis

In our Decision instituting trial, we preliminarily construed the term "primary air pressure" "to mean air pressure added to the inflatable object with an air pump other than supplemental air pressure added by the supplemental air pressure device." Dec. on Inst. 29; *see also id.* at 27–30 (providing the claim construction analysis). The parties do not address this construction in further briefing. Based on the complete trial record, we see no reason to change this construction here.

Petitioner provides a claim construction analysis for one other term—"absorbent," which appears in dependent claims 2 and 5. Pet. 44. We determine that we need not expressly construe this term to resolve the

parties' dispute. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (citing *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc*., 200 F.3d 795, 803 (Fed. Cir. 1999)). As will be evident from our analysis below, we need not separately address the patentability of claims 2 and 5, which recite "absorbent."

C. Alleged Grounds of Unpatentability

Petitioner alleges seven grounds of unpatentability for the Challenged Claims. Pet. 43. We address these below.

1. Ground 1: Claims 1–5 Are Allegedly Indefinite Under 35 U.S.C. § 112(b)/112(f)

Petitioner alleges that the term "pressure controlling assembly" of independent claim 1 is a means-plus-function term and is indefinite under 35 U.S.C. § 112(f) because the Specification fails to disclose corresponding structure for performing the recited functions associated with the means. Pet. 45–52.

As we discussed above in connection with our analysis of the construction of the term "pressure controlling assembly," we find the term is a means-plus-function term. We also find, as detailed above, that the Specification of the '979 patent does not disclose corresponding structure to perform all of the recited functions in claim 1, and specifically, the function requiring the pressure controlling assembly to automatically activate the supplemental air pressure providing device. Because we find that the Specification fails to disclose corresponding structure for at least one of the recited functions of the "pressure controlling assembly," we find claim 1

unpatentable as indefinite under 35 U.S.C. § 112(f)/112(b).[20] *See Williamson*, 792 F.3d at 1351–52 ("Where there are multiple claimed functions, as we have here, the patentee must disclose adequate corresponding structure to perform all of the claimed functions . . . . If the patentee fails to disclose adequate corresponding structure, the claim is indefinite."). Because claims 2–5 depend, directly or indirectly, from independent claim 1, we find that these claims are unpatentable as indefinite as well.

2. Ground 2: Claims 1–5 Are Allegedly Indefinite Under 35 U.S.C. § 112(b)

Petitioner puts forward two additional arguments as to why claims 1–5 are indefinite under 35 U.S.C. § 112(b). One argument is, should we determine that "pressure controlling assembly" is not a means-plus-function term, the term is still indefinite under 35 U.S.C. § 112(b). Pet. 53–54. As we determined that "pressure controlling assembly" is a means-plus-function term, we need not consider this alternative argument.

Petitioner also argues that the term "the inflating module used in conjunction with a pump that provides primary air pressure" is indefinite because it recites both an apparatus and method and because the meaning is unclear. Pet. 54.

As to the last point, Petitioner argues that the term "primary air pressure" is unclear under the standard from *In re Packard*, 751 F.3d 1307 (Fed. Cir. 2014). Pet. 59. As we stated above, in connection with our claim

[20] Petitioner names this ground as indefiniteness under *§ 112(f)*. The definiteness requirement for claims is provided in § 112(b). *See, e.g.*, *Williamson*, 792 F.3d at 1354 (finding claims indefinite under § 112, para. 2 (the pre-AIA version of § 112(b)) for failing to disclose corresponding structure).

construction analysis, we construed the term "primary air pressure" in our Decision instituting trial to "mean air pressure added to the inflatable object with an air pump other than supplemental air pressure added by the supplemental air pressure device." Dec. on Inst. 29. We maintain that construction, as neither party argued after institution for a different construction. *See, e.g.*, Reply (not replying to our construction of "primary air pressure" or our analysis of Ground 2 with respect to the term "primary air pressure"). Accordingly, we determine that the term "primary air pressure" is not indefinite under § 112(b).

As to the other position, Petitioner argues that the term "the inflating module used in conjunction with a pump that provides primary air pressure" "recites both an apparatus and method of using that apparatus." Pet. 56 (citing *IPXL Holdings, L.L.C. v. Amazon.com, Inc.*, 430 F.3d 1377, 1384 (Fed. Cir. 2005)). To support its position, Petitioner contends that, during prosecution of the application that matured into the '979 patent, the patentee argued that "claim 1 recites an embodiment of the application in which an inflating module ***is used*** in conjunction with a pump that provides primary air pressure." *Id.* at 58 (quoting Ex. 1005, 293). Petitioner also contends that the patentee argued, in distinguishing over a prior art reference, that the reference "did not teach or suggest that its alleged supplemental air pressure providing device 'is used in conjunction with another pump that provides primary air pressure.'" *Id.* (emphasis omitted). Petitioner argues that "the patentability of claim 1 depends on the claimed inflating module actually being used in conjunction with the recited 'pump that provides primary air pressure.'" *Id.*

Patent Owner contends that the term at issue does not recite a method step and that the distinguishing statements during prosecution was that the

prior art reference did not disclose two distinct pumps. PO Resp. 68–69. Patent Owner distinguishes the facts here from those of *IPXL*, where the claim recited a step where a human user was required to enter input to change the operation of the system. *Id.* at 70.

In our Decision instituting trial, we determined that Patent Owner had the better position. Dec. on Inst. 40–41. Petitioner does not reply to either our determination or Patent Owner's arguments in its Patent Owner Response addressing Petitioner's contentions with respect to Petitioner's reliance on *IPXL*. We determine, upon review of the complete record, that the claim language at issue does not require a method step of a user using a pump to provide primary air pressure. Instead, the language provides a relationship between one structural element (the pump) and another structural element (the inflatable object). Accordingly, the term "the inflating module used in conjunction with a pump that provides primary air pressure" does not render claim 1 indefinite.

3. Ground 3: Claims 1–5 Allegedly Lack Written Description Support Under 35 U.S.C. § 112(a)

Petitioner contends that the terms "pressure controlling assembly" and "primary air pressure" lack written description support. Pet. 60. We address these contentions in turn.

a) "Pressure controlling assembly"

Our analysis above in connection with whether the '979 patent is eligible for post-grant review analyzed the evidence and arguments presented by both parties related to the issue of written description support for the claim term "pressure controlling assembly." As we detail above, we find that the term "pressure controlling assembly" is a means-plus-function term and the '979 patent does not disclose corresponding structure for

performing all of the recited functions. Also, as we detail above, the term "pressure controlling assembly" lacks written description support in the '847 application, which is essentially the same in all relevant respects to the Specification of the '979 patent.

On the complete record, for the reasons we detail in our analysis of post-grant review eligibility for the '979 patent above, we find that the term "pressure controlling assembly" lacks written description support in the '979 patent. The '979 patent does not disclose corresponding structure for performing all the recited functions of the means-plus-function term, rendering the term indefinite. Such an indefinite term, written in functional language, covers all possible structures that could perform the functional language and, as such, fails to demonstrate that the inventors were in possession of the invention as of the effective filing date of the '979 patent. Accordingly, claim 1 is unpatentable under 35 U.S.C. § 112(a) for failing to satisfy the written description requirement. Because claims 2–5 depend, directly or indirectly, from independent claim 1, we find that these claims are unpatentable for failing to satisfy the written description requirement as well.

b) "Primary air pressure"

Petitioner also contends that the '979 patent lacks written description support for "primary air pressure." *See* Pet. 60 (referencing the analysis in the Petition with respect to the term and post-grant review eligibility for the '979 patent); *id.* at 24–26 (providing the analysis). Petitioner argues that "the [S]pecification does not use the words 'primary air pressure,' nor explain the meaning or scope of the term." *Id.* at 25. Petitioner continues that "[t]he [S]pecification does not explain what constitutes 'primary air

pressure,' or under what circumstances a pump may provide 'primary air pressure.'" *Id.*

Patent Owner responds that the '979 patent describes the benefits of using two separate pumps. PO Resp. 60–61. Patent Owner argues that claim 1 "recites 'a pump that provides primary air pressure' to distinguish air pressure to inflate the object from additional air pressure when the air pressure of the inflatable object is decreasing. The terminology 'primary air pressure' is thereby supported by the ['979 patent] and is distinguishable from 'supplemental air pressure.'" *Id.* at 61. Patent Owner adds that the prosecution history of the '073 application, which matured into the '979 patent, supports a finding that "primary air pressure" is adequately supported. *Id.* at 61–63.

In our Decision instituting trial, we agreed with Patent Owner's position. Dec. on Inst. 36–37. Petitioner did not provide any additional arguments or evidence to counter this position after institution of trial. After reviewing the complete record, we find that the term "primary air pressure" has written description support in the '979 patent Specification, as discussed below.

The '979 patent describes air pump 6, which "can be activated to provide air flow into or out of the inflatable object." Ex. 1004, 4:24–26. The Specification provides that activating air pump 6 "can also activate the operation of the automatic supplemental air pressure providing device." *Id.* at 4:46–48. The Specification adds that, if the air pressure is below a predetermined range, the supplemental air pressure providing device "provide[s] air pressure to the inflatable object." *Id.* at 4:51–55. This disclosure distinguishes two air pumps, one pump used to inflate and deflate the inflatable object and a *supplemental* pump to maintain the air pressure in

the inflatable object. Because this second pump is termed a "supplemental" pump, that language reasonably conveys that air pump 6 is a primary pump, which would provide primary air pressure (rather than supplemental air pressure).

4. Grounds 4–7: Prior art-Based Grounds

For Grounds 4–7, Petitioner presents contentions on how the Challenged Claims are anticipated or rendered obvious by the prior art. Pet. 60–94. Patent Owner argues that Petitioner cannot demonstrate that the prior art anticipates or renders obvious the Challenged Claims because Petitioner does not identify the structure corresponding to the alleged means-plus-function element "pressure controlling assembly" and, instead, contends no structure is provided in the Specification. PO Resp. 71–72. In reply, Petitioner states that "[i]f the Board finds the claims indefinite under either Grounds 1 or 2, the Board need not consider alternative Grounds 4-7." Reply 24 n.11.

As discussed above, on the complete record, we find that the '979 patent does not disclose structure corresponding to a means-plus-function element—namely, the "pressure controlling assembly." We cannot evaluate Petitioner's positions with respect to the prior art grounds given this deficiency, as we cannot compare the corresponding structure with the disclosures in the prior art. We determine, on the entire record, that the Petition does not demonstrate that the Challenged Claims are unpatentable under Grounds 4–7.

IV. PETITIONER'S MOTION TO EXCLUDE EVIDENCE

Petitioner moves to exclude Exhibits 2004, 2008, and 2013. Paper 34, Paper 37. Patent Owner opposes the motion. Paper 35. We find the

information in Exhibits 2004, 2008, and 2013 to be unpersuasive of Patent Owner's positions, even giving them full evidentiary consideration as we have done above. Thus, we deny Petitioner's motion as moot, because even if we were to grant the motion and exclude one or more of the challenged Exhibits, it would not change the result we reach in the present Decision.

V. CONCLUSION[21]

For the reasons discussed above, we find the Challenged Claims are unpatentable for failing to satisfy the written description requirement of 35 U.S.C. § 112(a). We also determine that the Challenged Claims are unpatentable under 35 U.S.C. § 112(f)/112(b) as indefinite. In summary:

Claims	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not shown Unpatentable
1–5	112(f)/112(b)	112(f) Indefiniteness	1–5	
1–5	112(b)	Indefiniteness		1–5
1–5	112(a)	Written description	1–5	
1	102(a)	Price		1
2–4	103	Price, Lathrop		2–4
3, 4	103	Price, Shan-Chieh		3, 4
5	103	Price, Wilkinson		5
Overall Outcome			1–5	

[21] Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding. *See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).

VI. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, claims 1–5 *are unpatentable* under 35 U.S.C. § 112(f)/112(b) as indefinite for failing to disclose structure corresponding to a means-plus-function term;

FURTHER ORDERED that claims 1–5 *are not shown unpatentable* under 35 U.S.C. § 112(b) as indefinite for any other reason;

FURTHER ORDERED that claims 1–5 *are unpatentable* under 35 U.S.C. § 112(a) for failing to satisfy the written description requirement;

FURTHER ORDERED that claim 1 *is not shown to be unpatentable* under 35 U.S.C. § 102(a) as anticipated by Price;

FURTHER ORDERED that claims 2–4 *are not shown to be unpatentable* under 35 U.S.C. § 103 over Price and Lathrop;

FURTHER ORDERED that claims 3 and 4 *are not shown to be unpatentable* under 35 U.S.C. § 103 over Price and Shan-Chieh;

FURTHER ORDERED that claim 5 *is not shown to be unpatentable* under 35 U.S.C. § 103 over Price and Wilkinson;

FURTHER ORDERED that Petitioner's motion to exclude evidence is *denied as moot*; and

FURTHER ORDERED that because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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