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Paper 47
Entered: February 7, 2017

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SHENZHEN LIOWN ELECTRONICS CO., LTD.,
Petitioner,

v.

DISNEY ENTERPRISES, INC.,
Patent Owner.

Case IPR2015-01657
Patent 8,534,869 B2

Before TRENTON A. WARD, J. JOHN LEE, and WILLIAM M. FINK, *Administrative Patent Judges.*

FINK, *Administrative Patent Judge.*

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

On July 31, 2015 Shenzhen Liown Electronics Co., Ltd. ("Petitioner") filed a Petition requesting an *inter partes* review of claims 1, 5–8, 19, 26, 27, and 31–36 of U.S. Patent No. 8,534,869 B2 (Ex. 1001, "the '869 patent"). Paper 2 ("Pet."). On November 11, 2015, exclusive licensee and real party-in-interest, Luminara Worldwide, LLC, acting under authority of Disney Enterprises, Inc. (collectively, "Patent Owner"), filed a Preliminary Response. Paper 6 ("Prelim. Resp."); Paper 5, App'x 1 (agreement). On February 9, 2016, we instituted trial as to claims 1, 5–8, 19, 26, 27, and 31–36 of the '869 patent on a subset of the grounds of unpatentability, under 35 U.S.C. § 103(a), that were alleged in the Petition. Paper 7 ("Inst. Dec.").

After institution, Patent Owner filed a Patent Owner Response ("PO Resp."). Paper 20. Petitioner filed a Reply to the Patent Owner Response. Paper 28 ("Pet. Reply"). A consolidated oral hearing for IPR2015-01656, IPR2015-01657, and IPR2015-01658 was held on October 18, 2016. A transcript of the hearing has been entered into the record. Paper 46 ("Tr.").

This Final Written Decision ("Decision") is issued pursuant to 35 U.S.C. § 318(a). For the reasons explained below, we conclude Petitioner has demonstrated, by a preponderance of the evidence, that claims 1, 5–8, 19, 26, 27, and 31–36 of the '869 patent are unpatentable.

A. Related Matters

Petitioner and Patent Owner identify the following pending judicial matters as relating to the '869 patent: *Luminara Worldwide, LLC v. Liown Electronics Co., Ltd.*, Case No. 14-cv-03103 (D. Minn.), filed August 5, 2014; *Luminara Worldwide, LLC v. Liown Electronics Co., Ltd.*, Case No. 15-1671 (Fed. Cir.), filed May 21, 2015; *RAZ Imports, Inc. v. Luminara*

Worldwide, LLC, Case No. 3-15-cv-02223 (N.D. Tex.), filed July 3, 2015; and *Luminara Worldwide, LLC v. RAZ Imports, Inc.*, Case No. 15-cv-03028 (D. Minn.), filed July 10, 2015. Pet. 1–2; Paper 5, 1–2.

In addition to this proceeding, the following *inter partes* reviews are pending in which related patents are challenged:

IPR	Patent	Stage
2015-01656	U.S. Patent No. 8,070,319	Trial
2015-01658	U.S. Patent No. 8,696,166	Trial
2016-01785	U.S. Patent No. 8,721,118	Pre-Institution
2016-01834 2016-01835	U.S. Patent No. 8,727,569	Pre-Institution

B. The '869 Patent

The '869 patent relates to "simulating a flickering flame providing kinetic light movement," such as the simulation of a single candle flame. Ex. 1001, 1:23–26. Figure 1 of the '869 patent is reproduced below:

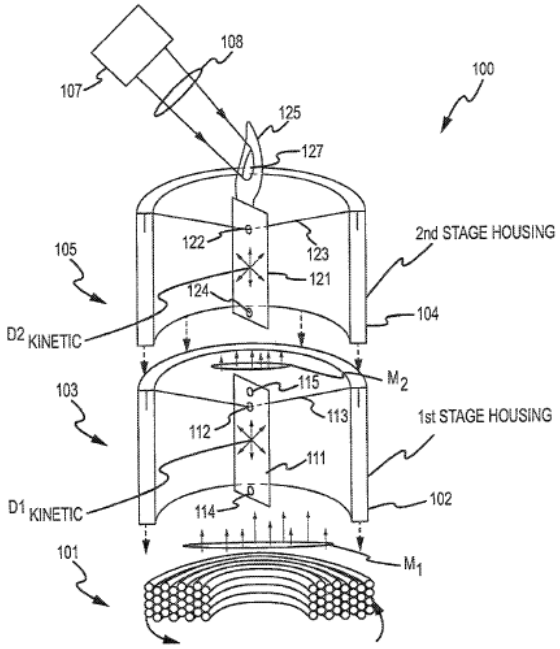

FIG.1

Figure 1 illustrates an embodiment of the kinetic flame device, in accordance with the claimed invention, resembling a conventional wax candle. Ex. 1001, 3:65–67, 5:20–23. As shown in Figure 1, single coil 101 may be distributed about the central axis of the device to act upon upper and lower pendulum members 111 and 121. *Id.* at 5:56–62. Specifically, energized coil 101 produces a time-varying magnetic field, which acts upon magnet 114 on lower or first-stage pendulum 111 to produce kinetic motion $D1_{Kinetic}$. *Id.* at 6:13–16, 6:25–27. First-stage pendulum 111 is "pivotally supported" by support 113, which may be a rod, axle, wire, or the like, and which passes through hole 112 to allow the kinetic motion about the pivot point. *Id.* at 7:19–27. The second stage 105 is similar in construction and operation to the first stage, with second-stage pendulum 121 pivotally mounted on support element 123. *Id.* at 9:7–12. Flame silhouette 125 extends from the top of second-stage pendulum 121 and is formed into a flame-shaped outline. *Id.* at 9:34–39. Flame silhouette 125 moves with kinetic movement $D2_{Kinetic}$ of second-stage pendulum 121 and is illuminated by spotlight 107. *Id.* at 10:42–48. Although Figure 1 represents a two-stage embodiment, single-stage-only embodiments are also described, such as depicted in Figure 7. *Id.* at 15:30–38, Fig. 7.

C. Illustrative Claim

Claims 1, 5, 6, and 34 are independent claims. Claims 7, 8, 19, and 33 depend from claim 1; claims 26 and 27 depend from claim 5; claims 31 and 32 depend from claim 6; and claims 35 and 36 depend from claim 34. Claim 1 is reproduced below.

> 1. An apparatus for simulating a flickering flame effect, comprising:
>
> a housing including an interior space;
>
> a pendulum member pivotally mounted within the interior space, the pendulum member including first and second ends, wherein the pendulum member further includes a flame element extending from a second end opposite the first end, such that at least a portion of the flame element extends outwardly from the housing;
>
> a first light source selectively transmitting light onto the flame element; and
>
> a drive mechanism positioned in the housing and operating to provide kinetic motion to the first end of the pendulum member,
>
> wherein the pendulum member is pivotally mounted within the interior space using a pendulum support member that extends through a hole in the pendulum member and wherein the pendulum support member is at least semi-rigid and bent to form a low spot at a location where the pendulum member rests.

Ex. 1001, 23:42–62.

D. Pending Grounds of Unpatentability

The first pending ground of unpatentability challenges independent claims 1, 5, and 34 and dependent claims 7, 8, 19, 26, 27, 33, 35, and 36 as obvious, under 35 U.S.C. § 103(a), over the teachings of Schnuckle '455[1]

[1] U.S. Patent No. 7,261,455 B2, issued Aug. 28, 2007 (Ex. 1003) ("Schnuckle '455").

and Meeker[2]. The second pending ground of unpatentability challenges independent claim 6 and dependent claims 31 and 32 as obvious, under 35 U.S.C. § 103(a), over the teachings of Schnuckle '455 and Physics Lab.[3]

II. DISCUSSION

A. Level of Ordinary Skill in the Art

Petitioner's declarant, Dr. Delson, testifies:

> a person of ordinary skill in the art at the time of the alleged invention would have had a Bachelor's degree in mechanical engineering and one to three years of mechanical design experience. This description is approximate and additional educational experience in mechanical engineering could make up for less work experience and vice versa.

Ex. 1002 ¶ 41. Patent Owner's declarant, Dr. Brown, testifies that "a person [of ordinary skill in the art] typically would have a mechanical engineering degree (either a bachelor's degree or associate's degree), and would have some familiarity, training, or experience with electric lighting devices." Ex. 2010 § 14.

We find these "definitions" to be substantially similar. For example, both require at least a mechanical engineering degree and experience varying between "some," in Dr. Brown's opinion, and "one to three years," in Dr. Delson's opinion. Given this apparent lack of disagreement, we adopt Dr. Delson's statement of the level of ordinary skill for purposes of this Decision, but we note that our analysis would be the same under either formulation.

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[2] U.S. Patent No. 782,156, issued Feb. 7, 1905 (Ex. 1005) ("Meeker").
[3] Physics 1140 Course Laboratory Instructions, Lab M3: THE PHYSICAL PENDULUM (Ex. 1004) ("Physics Lab").

B. Claim Interpretation

In an *inter partes* review, claim terms in an unexpired patent are given their "broadest reasonable construction in light of the specification of the patent in which it appears." 37 C.F.R. § 42.100(b); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2142–46 (2016). Under the broadest reasonable construction standard, claim terms are generally given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

1. "kinetic motion"

In its Preliminary Response, Patent Owner proposed that the term "kinetic motion," recited in at least independent claims 1, 5, 6, and 34, "requires unconstrained and unpredictable motion of the pendulum member in multiple axes." Prelim. Resp. 13–19. In the Decision to Institute, we rejected this construction, but, in considering the specification, we determined that the term "kinetic motion" should not include "fully periodic or predictable motion." Inst. Dec. 11 (citing Ex. 1001, 4:54–56 ("Prior devices that attempt to simulate flickering flames [that] generally *used modulated or controlled motion* to mimic a flame.") (emphasis added); 4:59–60, 11:9–10). The parties do not raise claim construction or patentability arguments related to this term. *See, e.g.*, PO Resp. 9–13, 17–24. Accordingly, we see no reason to depart from the preliminary construction in this Decision.

2. "selectively transmit light" and "upward angle"

In the Decision to Institute, we construed the term "selectively transmitting light onto the flame element," recited in at least claim 1, as

"controlling the direction of light towards the flame silhouette." Inst. Dec. 11–13. We construed the term "upward angle," recited in at least claims 7, 26, and 31, as not excluding "angles parallel to the longitudinal axis" of the device. *Id.* at 13–14. In their respective Response and Reply, neither party disputes the preliminary construction of these terms. Accordingly, we see no reason to change our construction, which we based on the broadest reasonable interpretation, consistent with the specification.

3. "pivotally mounted"

a. Federal Circuit's Construction of "pivot"

After the Decision to Institute, the Federal Circuit reviewed the related '166 patent[4] to determine whether, in a related district court action, Luminara (i.e., Petitioner) had raised a substantial question of validity sufficient to avoid a preliminary injunction. *See Luminara Worldwide, LLC v. Liown Elecs. Co.*, 814 F.3d 1343 (Fed. Cir. 2016); *see also* PO Resp. 9–13 (discussing the Federal Circuit's *Luminara* decision); Pet. Reply. 2–5 (same). Significantly, the Federal Circuit held that the '166 patent's specification (which is substantially the same as the specification of the '869 patent at issue here) "disclaims non-chaotic pivoting" and "devices driven by rhythmic or metronomic patterns," with "no further requirements on movement." *Luminara*, 814 F.3d at 1353–54 (internal quotations omitted). The Federal Circuit further held that Schnuckle '455 indisputably teaches pivoting in two axes and "seems" to disclose chaotic movement. *Id.* at 1354. As a result, the Federal Circuit determined that Petitioner's anticipation argument based on Schnuckle '455 raised a substantial question of validity

[4] U.S. Patent No. 8,696,166 ("the '166 patent") is at issue in IPR2015-01658.

and reversed the district court's grant of a preliminary injunction against Petitioner. *Id.*

The Federal Circuit applied this disclaimer to the "pivot" term in claim 1 of the '166 patent. *Id.* at 1354 ("Thus, we preliminarily construe claim 1 of the '166 patent to require chaotic pivoting, with no further requirements on movement."). As discussed in more detail below, the parties agree that the disclaimer applies equally to the instituted claims here, because, similar to the "pivot" term in the '166 patent, the '869 patent recites a "pivotally mounted" pendulum member in claims 1, 5, 6, and 34. PO Resp. 9–11 (citing, e.g., *NTP, Inc. v. Research In Motion, Ltd.*, 418 F.3d 1282, 1293 (Fed. Cir. 2005)); *see also* Pet. Reply 3 ("[T]he Federal Circuit's analysis of the intrinsic evidence is equally applicable to the '869 patent."). Given the substantially similar specification of the '166 patent, which issued from a continuation of the application for the '869 patent, we agree with the parties that the same disclaimer applies here. For example, the '869 patent contains the same statements regarding the present invention's "real but chaotic physical movements," addressing the deficiency of the prior art, as relied upon by the Federal Circuit in finding a disclaimer of non-chaotic movement. *Compare Luminara*, 814 F.3d at 1353 (quoting '166 patent, 2:13–16, 2:23–25) *with* Ex. 1001, 2:13–15, 2:22–24.

Although the Federal Circuit's opinion appears to fully address the scope of the disclaimer sufficiently enough for the Federal Circuit to preliminarily determine that Schnuckle '455 discloses the disputed pivotally mounted limitation, Patent Owner raises additional arguments here concerning what the Federal Circuit meant with its "chaotic pivoting" requirement.

b. Patent Owner's Position

Relying on various extrinsic evidence, Patent Owner contends "chaotic" means aperiodic, unpredictable behavior arising in a system extremely sensitive to initial conditions. PO Resp. 11–12 (citing Ex. 3001, 234; Ex. 2014, 0009; Ex. 2010 ¶ 16); Tr. 51:17–22. Based on this meaning of chaotic, Patent Owner further contends:

> Importantly, the flame element moves chaotically *not* because of the nature of driving force that initially perturbs the pendulum. Indeed, all the driving force has to do is "kick" the pendulum into motion. Rather, it is *the claimed pivotal mounting* for the pendulum member, not the kick, that ensures that the motion of the flame element is chaotic. The [Federal Circuit] did not consider this point when it concluded that a substantial question of validity existed with respect to Schnuckle ['455].

PO Resp. 13 (internal citations omitted). In other words, according to Patent Owner, it is the pivotal mounting structure, not the driving force, that makes the pivoting *chaotic* within the meaning of that term. *Id.*

Thus, Patent Owner essentially views *Luminara* as requiring two disclaimers of different scope, one of devices driven by rhythmic or metronomic patterns, and one of non-chaotic pivoting devices. Tr. 54:5–13. The latter imposes additional constraints on the pivotal mounting structure, including extreme sensitivity to initial conditions. Tr. 50:1–6. Relying on Dr. Brown's testimony, Patent Owner contends this definition of chaotic pivoting requires three, independent, non-linear types of motions that must not be controlled or modulated. PO Resp. 13 (citing Ex. 2010 ¶¶ 17–21).

Patent Owner also argues that the claims are entitled to an interpretation that preserves their validity over Schnuckle '455. PO Resp. 13–14. Specifically, Patent Owner contends that because Schnuckle '455

was before the Examiner during prosecution of the ’869 patent (*id.* at 14 (“Schnuckle appears on the face of the ’869 patent”)), it is reasonable to infer that the Examiner considered Schnuckle ’455 and “appreciated the differences” (*id.*) between it and the challenged claims. According to Patent Owner, any ambiguity (i.e. whether Schnuckle ’455’s two-axis mounting structures should read on the claimed pivotal mounting structure) should be resolved with an eye towards preserving the validity of the claims over the prior art of record and exclude Schnuckle ’455’s two-axis mounting. *Id.* (citing *Phillips v. AWH Corp.*, 415 F.3d 1303, 1327 (Fed. Cir. 2005) (en banc)).

c. Analysis

As noted above, based on a mathematical definition of *chaotic*, Patent Owner views *Luminara* as requiring two disclaimers of different scope, one of the driving mechanism (i.e., excluding rhythmic or metronomic) and one of the pivotal mounting (i.e., excluding non-chaotic). We have reviewed the evidence, and we conclude that neither the Federal Circuit’s *Luminara* opinion nor the nearly identical specifications of the ’869 patent and the ’166 patent support this position.

We start with the relevant portion of the Federal Circuit’s opinion, which also reproduces relevant portions of the specification of the ’166 patent:

> By contrast, the specification disclaims non-chaotic pivoting. It explains that solitary flames are “complex kinetic interactions” that “produce a continuously and randomly moving light.” ’166 patent, col. 1 ll. 39–41. It teaches that flame displays in the prior art “are relatively poor imitations of a real flame and have not been widely adopted by the commercial or retail markets.” *Id.* at col. 2 ll. 13–16. The specification further

> explains that "[t]he present description addresses the above and other problems by providing kinetic flame devices that create lighting effects driven by *real but chaotic physical movements.*" *Id.* at col. 2 ll. 23–25 (emphasis added); *see also id.* at col. 4 ll. 52–58 ("The present description involves devices that create lighting effects driven by real, chaotic, and physical movements."), col. 4 l. 62–col. 5 l. 2 ("[T]he present invention stimulates and/or perturbs a complex interaction between gravity, mass, electromagnetic field strength, magnetic fields, air resistance, and light, but the complex interaction is not directly modulated or controlled."). . . .

Luminara, 814 F.3d at 1353–54. As the above excerpt indicates, the Federal Circuit bases the disclaimer of "non-chaotic pivoting" on the '166 patent specification's description of the nature of solitary flames (i.e., "continuously and randomly moving"), the deficiencies of the prior art (i.e., "poor imitations"), and the present invention's requirement for "lighting effects driven by *real but chaotic physical*" movements.

In other words, the Federal Circuit viewed the specification's description of the driving forces (i.e., "real but chaotic" and "not directly modulated or controlled") as significant in finding the disclaimer of non-chaotic pivoting, as summarized in the concluding sentence of the above paragraph:

> By teaching that the "present description" solves the problems associated with the prior art candle devices because it is driven by "real but chaotic movements," the patentee disclaims devices driven by rhythmic or metronomic patterns.

Id. at 1354. Thus, the Federal Circuit started the paragraph by stating that the specification disclaimed non-chaotic pivoting, and then, after reviewing the '166 patent specification evidence, concluded that this meant the patentee disclaims devices driven by rhythmic or metronomic patterns. We

discern no suggestion by the Federal Circuit that it believed the disclaimer of chaotic pivoting to require more than not being driven by rhythmic or metronomic patterns such that Patent Owner's mathematical definition of chaos is required.

Although we disagree with Patent Owner's reading of the Federal Circuit's opinion, we have also considered its mathematical definition of chaotic, i.e., requiring sensitivity to initial conditions, in light of the '869 patent specification.[5] As an initial matter, the '869 patent specification does not support or suggest a sensitivity to initial conditions. Tr. 61:11–12 (Patent Owner: "The Petitioner is right, the specification doesn't talk about that.").

Moreover, as Petitioner points out, the specification uses "chaotic" nearly "interchangeably with both 'unpredictable' and 'random.'" Pet. Reply 6 (citing, e.g., Ex. 1001, 19:15–20 (explaining that magnets may modify the kinetic movement or "its chaotic nature (e.g., make the movement, $D2_{Kinetic}$, more unpredictable.)."); *see* Ex. 1001, 3:18–23, 6:25–27, 7:2–7, 8:49–52, 9:51–53. Patent Owner's declarant apparently agrees that "random" is not chaotic in the mathematical sense. *See* Ex. 1024,

[5] We note that Patent Owner's construction of "chaos" is based on a dictionary definition we cited in our Decision to Institute in related IPR2015-01656. PO Resp. 11; IPR2015-01656, Inst. Dec. 14 n.12 (citing Ex. 3001, 234). However, there, we cited this definition as evidence that the "kinetic motion" and "chaotic motion" terms in the '319 patent, generally do not mean the same thing in response to Patent Owner's preliminary joint proposed construction of both terms. *Id.* at 14. It bears emphasis that we rejected an interpretation of "kinetic motion" in claim 3 and "chaotic motion" in claim 17 as requiring movement in three orthogonal axes, as we similarly reject that requirement for the "pivotally mounted" term here. *Id.* at 12–13.

96:13–22 ("random is not chaotic and chaotic is not random"). These frequent references to "chaos" or "chaotic" used synonymously with terms that do not require chaos in the mathematical sense in the '869 patent specification suggest that a looser, colloquial meaning for "chaos" or "chaotic" was adopted by applicant.

Furthermore, as Petitioner points out (Pet. Reply 7), Patent Owner's declarant stated that a system is either chaotic in the mathematical sense or it is not. Ex. 1024, 31:20–23 ("Chaos is an existence or nonexistence phenomenon, and there are different types of chaotic motion, but I'm not aware of any sliding scale which measures the amount of chaos"). The specification, however, uses the term chaos in conjunction with relative terms such as "more" (Ex. 1001, 3:39–44, 7:22–27), "increasingly" (*id.* at 7:42–45), or "enhance" (*id.* at 11:63–67). When combined with the way the specification interchangeably uses chaotic, unpredictable, and random, these terms of degree further suggest that a person of ordinary skill in the art would have understood the specification to use the term chaos in a colloquial sense to indicate the extent to which the flame element moves naturally or realistically. Indeed, Petitioner provides evidence that a person of ordinary skill in the art, as defined by Patent Owner (i.e., having a bachelor's or associate's degree), would not have been educated on mathematical chaos theory. Pet. Reply 9–10 (citing Ex. 1024, 37:2–17). This view is consistent with the patent's stated objective, i.e., "provid[ing] a convincing simulation that appears real or natural to a viewer." Ex. 1001, 1:43–47.

Notwithstanding our disagreement with Patent Owner's mathematics-based interpretation of the disclaimer addressed by the Federal Circuit, we also consider whether Patent Owner's construction of "pivotally mounted"

(i.e., requiring three, independent, non-linear types of motions that must not be controlled or modulated) is appropriate. *See* PO Resp. 12. We conclude it is not. Though preliminary, the Federal Circuit specifically rejected this reading both before and after determining that non-chaotic pivoting is disclaimed. *Luminara*, 814 F.3d at 1352–53 (rejecting the district court's construction that "free to pivot" requires "movement that is more than rotation around two axes"; "Pivoting includes rotation around a single axis."), 1354 (finding that "[t]he [Schnuckle] '455 patent undisputedly teaches pivoting in two axes" and the "final limitation in claim 1 of the '166 patent—chaotic movement—seems to be met . . . in the prior art [Schnuckle] '455 patent.").

We agree with the Federal Circuit's analysis, because it is consistent with the intrinsic evidence. Conversely, Patent Owner's proposed construction contradicts the intrinsic evidence in other respects. For example, claim 17 of the related '319 patent[6] has a limitation directed to both pivoting (i.e. "allowing the pendulum to pivot about the hole on the support wire") and "chaotic motion at the coupling member *in at least two dimensions*." IPR2015-01656, Ex. 1001, 23:28–30 (emphasis added). By requiring chaotic motion in at least two dimensions (as on a single-axis allowing rotation in one plane), the claims suggest chaotic motion nominally includes motion in even one dimension, as in up or down or side to side. On the other hand, interpreting the specification disclaimer of "chaotic pivoting" for purposes of claim 1 of the '319 patent to require three, independent non-

[6] As set forth in the final decision in IPR2015-01656, we agree with both parties that the disclaimer of non-chaotic pivoting also applies to the '319 patent as well as the '869 patent in this proceeding.

linear types of motion, as Patent Owner argues, would lead to the incompatible result that claim 17 of the '319 patent, which requires movement in only two dimensions, would cover devices that are disclaimed by the specification. Because the disclaimer is based on the specification, which is substantially similar between both patents, the analysis of the '319 patent's claims applies here as well.

Finally, we have also considered Patent Owner's argument that any ambiguity in the claim language should be resolved in a manner that would preserve the patent's validity, especially where, as here, the prior art was expressly considered during examination. PO Resp. 13–15. We find this argument unavailing as well. First, Patent Owner relies on *Phillips* for this proposition. *Id.* (citing 415 F.3d at 1327). However, as Patent Owner acknowledges (PO Resp. 11), we apply the broadest reasonable interpretation consistent with the specification, not the *Phillips* standard. *See Cuozzo*, 136 S. Ct. at 2134, 2144–46. Patent Owner has not directed us to any case in which a claim term's *broadest reasonable interpretation* turned on preserving its validity. Regardless, even under *Phillips*, this canon of construction only applies in situations where the proposed claim interpretation is "practicable" and "based on sound claim construction principles," even where the prior art at issue is part of the prosecution history. *Generation II Orthotics, Inc. v. Medical Techs., Inc.*, 263 F.3d 1356, 1365 (Fed. Cir. 2001). As we determined above, Patent Owner's proposed construction of the disclaimer is unsupported by, and even contrary to, the specification of the '869 patent.

We determine that the Federal Circuit's statement of the disclaimer of "non-chaotic pivoting" and devices "driven by rhythmic and metronomic

patterns," *Luminara*, 814 F.3d at 1353–54, is sufficiently specific to determine the scope of the term "pivotally mounted" in claim 1.[7] Accordingly, we apply the Federal Circuit's construction that the plain and ordinary meaning of "pivotally mounted" applies, except that non-chaotic pivoting and devices driven by rhythmic and metronomic patterns are disclaimed.

C. Obviousness of Claims 1, 5, 7, 8, 19, 26, 27, and 33–36 over Schnuckle '455 and Meeker

Petitioner argues that claims 1, 5, 7, 8, 19, 26, 27, and 33–36 of the '869 patent are unpatentable, under 35 U.S.C. § 103(a), as obvious over Schnuckle '455 and Meeker. *See* Pet. 15–19. We have reviewed the Petition, Patent Owner's Response, Petitioner's Reply, as well as the relevant evidence discussed in those papers and other record papers. As described in further detail below, we determine that the record supports Petitioner's contentions for claims 1, 5, 7, 8, 19, 26, 27, and 33–36, as obvious over Schnuckle '455 and Meeker, and we adopt Petitioner's analysis discussed below as our own. For reasons that follow, we determine that Petitioner has shown by a preponderance of the evidence that claims 1, 5, 7, 8, 19, 26, 27, and 33–36 of the '869 patent would have been obvious over Schnuckle '455 and Meeker.

[7] We have also considered Patent Owner's Motion for Observations (Paper 36), which are substantially directed at obtaining admissions from Petitioner's declarant in support of its proposed construction of chaotic pivoting (or that Schnuckle '455 does not disclose chaotic pivoting based on this construction). *See id.* at 6–13. Although we have considered Patent Owner's observations, we do not find them persuasive for the reasons explained herein.

1. Schnuckle ’455 (Ex. 1003)

Schnuckle ’455, which shares a common inventor with the ’869 patent (Prelim. Resp. 2), describes an imitation candle comprising a simulated candle housing and a simulated flame mounted on a pendulum within the housing. Ex. 1003, Abstract, Figs. 2, 7, 12.

Figures 7 and 12 of Schnuckle ’455 are reproduced below:

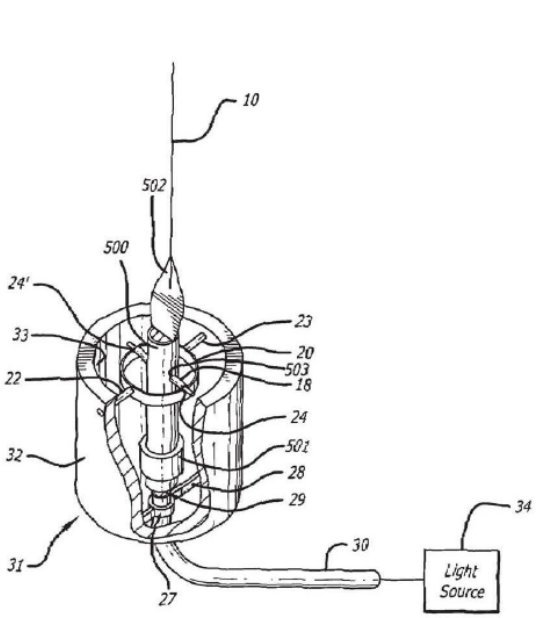


FIG. 12

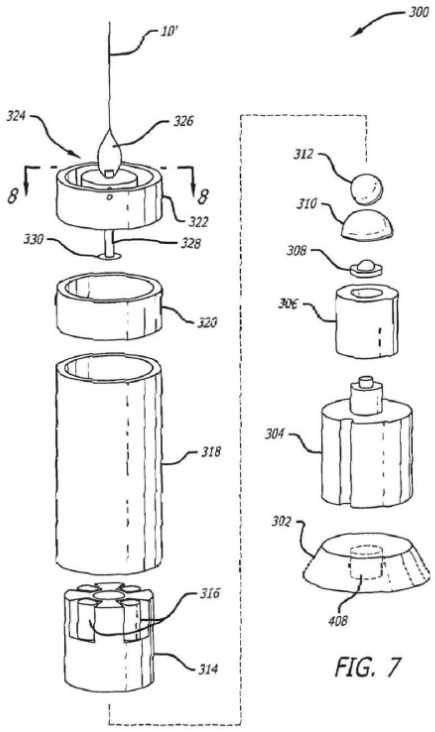


FIG. 7

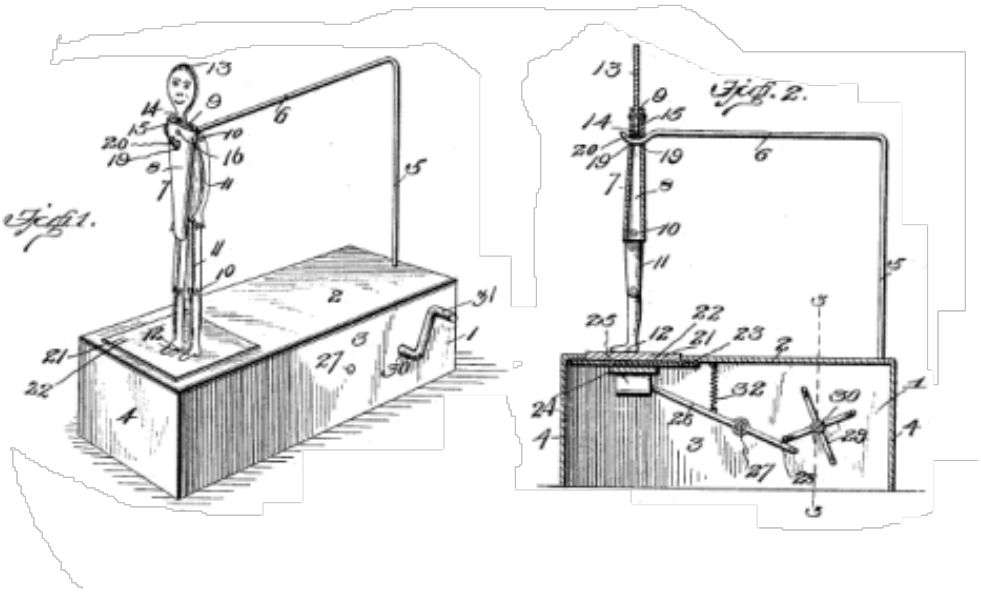
Figures 7 and 12 above illustrate an artificial candle in accordance with the invention of Schnuckle ’455. Ex. 1003, 2:49–50, 2:56–57. As shown in Figure 12, teardrop shaped element 502 resembling a flame is secured to the upper end of channel 500. *Id.* at 6:47–49. Rod 18 passes through hole 503 in channel 500. *Id.* at 6:49–50. Rod 18 is disposed in grooves 24 and 24’ of ring shaped member 20 of the gimbal mechanism. *Id.* at 3:55–65, 6:49–52, Figs. 2, 12. Ring shaped member 20 is connected to housing 32 by a pair of pins, 22 and 23, “each pin 22, 23 being fixedly secured to the outer

periphery of member 20 and rotatably secured to the inner wall of housing 32." *Id.* at 3:56–60. "The pins 22 and 23 thus permit the member 20 of the gimbal mechanism to rotate about the longitudinal axes of pins 22 and 23." *Id.* at 3:60–62.

Air from a fan is blown or injected against the components from the bottom of the candle housing to cause the components to move on the gimbal mechanism. *Id.* at 3:41–45. The Figure 7 embodiment is similar but for the use of electromagnets 316 instead of air to drive the lower end of the pendulum to simulate the movement of the flame blowing in the wind. *Id.* at 5:13–32, 6:53–62.

2. Meeker (Ex. 1005)

Meeker describes a toy that includes jointed Figure 7 made of sheet metal and supporting arm 6 from which the Figure is suspended. Ex. 1005, 1:27–29, 42–46, 51–60. Figures 1 and 2 are reproduced below:



Figures 1 and 2 represent the dancing toy invention of Meeker. As shown in Figure 2, the toy figure rests in the downwardly curved portion 20 of supporting arm 6, which protrudes through hole 19 in the body. Ex. 1005,

1:67–75. This allows the body to swing transversely and longitudinally while remaining in place. *Id.* Turning crank 31 imparts motion upon "vibratory platform 21," transmitting motion to the toy figure. *Id.* at 1:81–2:13.

3. Claims 1, 5, and 34

Claim 1 recites an apparatus for simulating a flickering flame effect. Ex. 1001, 23:43. Petitioner contends Schnuckle '455's apparatus for generating a flickering flame effect discloses the preamble of claim 1. Pet. 15 (citing, e.g., Ex. 1003, Abstract, 4:41–52); *see also* Ex. 1001, Fig. 12 (reproduced above). Petitioner relies on cylindrical housing 322 of Figure 7 as disclosing the recited "housing including an interior space" of claim 1. Pet. 15 (citing, e.g., Ex. 1003, 5:13–38).

Before turning to the disputed limitations, we address claim 1's recited "drive mechanism positioned in the housing and operating to provide kinetic motion to the first end of the pendulum member." In the Figure 7 embodiment, Schnuckle '455 discloses electromagnets 316 positioned on base 314 "for generating an electromagnetic field." Ex. 1003, 5:23–25. Petitioner also relies on Figure 11 (Pet. 18), which explicitly incorporates like-numbered components from both Figures 2 and 7 into one embodiment, including electromagnets 316 for generating an electromagnetic field. *Id.* at 6:27–41; Fig. 11. Electromagnets 316 are driven by a control board including memory, pulsing circuits, and a power source. *Id.* at 5:13–31, 5:52–67. Petitioner also contends that a person of ordinary skill would have appreciated that the magnetic drive mechanism of Figures 7 and 11 could be incorporated into the single air channel embodiment of Figure 12, by suggesting, for example, that magnetic base 330 could be attached to a

hollow channel, such as channel 500 in Figure 12. Pet. 18 (citing Ex. 1003, 5:37–41). According to Petitioner, such a modification to Figure 12 would allow for added flexibility by allowing pendulum motion generated by electronic circuits. Pet. 18; *see* Ex. 1002 ¶¶ 61–64; Inst. Dec. 20–21.

The drive mechanism must provide "kinetic motion." As discussed above, we determine the broadest reasonable interpretation of kinetic motion, consistent with the specification, to be aperiodic or irregular motion. Schnuckle '455's magnetically driven flame element teaches both kinetic motion and claim 8's narrower requirement that the drive mechanism must displace the pendulum in a random pattern. *See* Pet. 26. Specifically, Petitioner relies on Schnuckle '455's description of the magnetically driven flame element "mov[ing] 'randomly, simulating blowing in the wind,'" which we agree discloses random motion, and, therefore, aperiodic or irregular motion. *Id.* (citing Ex. 1003, 6:46–62); *see* Ex. 1002 ¶ 95. In its Response, Patent Owner does not dispute this analysis, which we adopt as our own.

Claim 1 also requires "a first light source selectively transmitting light onto the flame element." Petitioner contends this limitation is disclosed by light source 34 of Figures 2 and 12, and LED 308 of Figures 7 and 11. Pet. 17 (citing, e.g., Ex. 1003, 3:49–54, 5:13–32). As noted above, we construe "selectively transmitting light" as "controlling the direction of light towards the flame silhouette." The Figure 7 and 11 embodiments teach or suggest this requirement by explaining that LED 308, condenser lens 310, and ball lens 312 position on mount 306 "allow optimal *focusing* of the LED light output." Ex. 1003, 5:17–23 (emphasis added). Patent Owner does not dispute the substance of this analysis, which was discussed in our Decision

to Institute (Inst. Dec. 22), but contends the Board's preliminary finding was improper because the Board supplied the reasoning and the Petitioner lacks support required by 35 U.S.C. § 312(a)(3).[8] PO Resp. 32. We disagree.

As an initial matter, although Petitioner was not yet aware of Patent Owner's proposed claim construction for "selectively transmitting," Petitioner identified with particularity the grounds, and evidence that supports the grounds, by relying on the figures and portions of Schnuckle '455 that it contends disclose the first light source for selectively transmitting light including LED 308 (Ex. 1003, 5:13–32). Consequently, Petitioner provided sufficient support under 35 U.S.C. § 312(a)(3).

Patent Owner had the opportunity to rebut this preliminary finding with arguments and evidence in its Response, but failed to do so. Nonetheless, we have reconsidered the foregoing evidence and we adopt our preliminary finding for purposes of this Decision.

a. "pivotally mounted"

Finally, claim 1 recites:

> a pendulum member pivotally mounted within the interior space, the pendulum member including first and second ends, wherein the pendulum member further includes a flame element extending from a second end opposite the first end, such that at least a portion of the flame element extends outwardly from the housing . . . wherein the pendulum member is pivotally mounted within the interior space using a pendulum support member that extends through a hole in the pendulum member and wherein the pendulum support member is at least semi-rigid and bent to form a low spot at a location where the pendulum member rests.

[8] Patent Owner also cited 37 C.F.R. § 42.23(b). However, we fail to see the relevance of this rule, which addresses the scope of replies.

Petitioner contends the embodiment in Figure 2, 7, 11, and 12 of Schnuckle '455 depict pendulum members with a first and second end, with flame element 12, 326, or 502 that extends outwardly from the second, top end of the housing. Pet. 16 (citing Ex. 1003, 3:34–45, 4:36–39, 5:33–48, 6:27–52). Petitioner contends the pendulum members are pivotally mounted within the interior space using a pendulum support member that extends through a hole (e.g., Figure 12 (hole 503)) in the pendulum member. *Id.* at 16, 18–19.

Petitioner contends Meeker in combination with Schnuckle '455 teaches or suggests a support member that is semi-rigid and bent to form a low spot at a location where the pendulum member rests. Pet. 19–21. According to Petitioner, Meeker discloses a "supporting arm that includes a downwardly curved portion with a low point where the body of the dancing figure rests." *Id.* at 19 (citing Ex. 1005, 1:67–75, Figs. 1, 2). Petitioner contends a person of ordinary skill in the art would have "include[d] a support wire with a low spot, as disclosed by Meeker, to replace rod 18 of Schnuckle 455," which "would pass through hole 503 in channel 500 shown in Fig. 12." *Id.* at 22. Petitioner contends a person of ordinary skill in the art would have been motivated to combine Schnuckle '455 and Meeker to obtain predictable advantages and benefits. For example, "the combination would be advantageous because Meeker's support structure would be simpler and less costly to manufacture than the gimbal structure of Fig. 12 of Schnuckle 455," and would have eliminated the risk that rod 18 slip off the

grooves 24 in ring shaped member 20 of the two-axis gimbal.[9] *Id.* at 21 (citing Ex. 1002 ¶¶ 34–37, 66–71).

In its Response, Patent Owner disputes these contentions as to the "pivotally mounting" term, arguing that Schnuckle '455 does not pivot chaotically as required by the Federal Circuit's claim construction. PO Resp. 17–21 (citing Ex. 2010 ¶ 53–56). Because Patent Owner's arguments depend on Patent Owner's interpretation of "chaotic pivoting," we are not persuaded.

Although we disagree with Patent Owner's arguments, we nonetheless consider whether Schnuckle '455 and Meeker sufficiently teach or suggest the pivotally mounted limitation given the disclaimer of non-chaotic pivoting and devices driven by rhythmic and metronomic patters. As noted above, the Federal Circuit specifically determined, at least as a preliminary matter, that Schnuckle '455 seemed to meet this claim requirement with its discussion of a two-axis gimbal articulated by "chaotic forces" that can articulate the flame element to "randomly simulat[e] blowing in the wind. '455 patent, col. 6, ll. 53–62." *Luminara*, 814 F.3d at 1354.

We agree with the Federal Circuit's preliminary determination. Although Patent Owner observes that "'chaotic' describes the 'external or internal force'—i.e., the force entering the system, not the resulting motion"

[9] Although Patent Owner contends the proposed combination is to replace rod 18 of the gimbal with Meeker's spring arm (PO Resp. 21), Petitioner's proposed combination replaces the entire gimbal with Meeker's spring wire. *See* Pet. 21; Ex. 1002 ¶ 70; Pet. Reply 12; Ex. 2011, 145:10–146:22 ("I would indeed remove the complete gimbal mechanism."); Inst. Dec. 23–24 (addressing the replacement of the two-axis gimbal with the single-axis movement of Meeker); *id.* at 25 (stating the support wire is connected to the housing).

(PO Resp. 20), Patent Owner does not account for how this driving force is coupled to resulting motion "simulating blowing in the wind" (Ex. 1003, 6:62) and "provid[ing] a realistic flickering flame effect" (*id.* at 1:54–58). As such, we agree this excerpt of Schnuckle '455 satisfies the chaotic pivoting requirement and is not driven by a "rhythmic or metronomic" driving force. Pet. Reply 4 n.2. Petitioner also cites the discussion of "programmable movement patterns" as additional evidence of this fact. *Id.* (citing Ex. 1003, 5:52–67 ("The desired movement pattern of the flame shaped surface 326 may be encoded and stored in the memory module 408 of the control board 302 in the form of digital data or control signals.")). We agree that the column 5 description in Schnuckle '455 of programmable movement patterns, when viewed against column 6's description relied upon by the Federal Circuit (Ex. 1003, 6:53–62), suggests the programmed pattern is not rhythmic or metronomic but natural and chaotic.[10]

Although Patent Owner's arguments regarding the chaotic pivoting requirement are directed to the two-axis gimbal structure in Schnuckle '455, not Meeker's wire arm (*see* PO Resp. 18–21), we nonetheless have considered Meeker as replacing the two-axis gimbal and determine that it does not alter our determination. See Pet. 20. First, the combination would still include Schnuckle '455's electromagnetic drive mechanism, which, as

[10] We also do not agree with Patent Owner's argument that a two-axis gimbal "modulates or controls movement" or restricts movement to "two controlled and predictable paths." *See* PO Resp. 19–20. As Patent Owner's declarant, Dr. Brown, testified, "[t]he gimbal with its two axes of motion constrains that motion be basically defining the surface of a sphere. But what dictates the trajectory of that tip over time is the control module on the circuit board." Ex. 1024, 145:19–146:6. As such, the gimbal does not restrict the flame element from moving chaotically.

discussed above, is disclosed as articulating the pendulum with natural and chaotic forces. Thus, the combination satisfies the disclaimer of devices driven by "rhythmic and metronomic patterns."

Second, although the two-axis gimbal provides flame element rotation in two axes, we rejected a multi-axis movement requirement for chaotic pivoting. As discussed above in our analysis of the disclaimer of non-chaotic pivoting, motion can be chaotic with one axis of rotation. *See also Luminara*, 814 F.3d at 1353 ("Pivoting includes rotation around a single axis."). Dr. Delson also testified that a single-axis of rotation is sufficient to exhibit chaotic motion in a plane. Ex. 1019 ¶¶ 16–17, 27 ("Fig[ure] 7 has key components necessary for chaotic motion; dimensionality greater than 2 and nonlinear coupling."). We credit this testimony. For example, although the Schnuckle '455 Figure 7 embodiment includes a single axis gimbal (*see* Ex. 1003, Fig. 7 & 8, 2:1–3 (rotation about at least one axis)), all embodiments are described as providing a *realistic flame effect*. *See* Ex. 1003, 1:54–58. Similarly, Meeker not only provides rotation in one axis, but also some longitudinal movement, which provides a high degree of "grotesqueness" of movement. Ex. 1005, 1:15–20, 1:69–70; Ex. 1002 ¶¶ 66–71. Therefore, we determine that Schnuckle '455's natural and chaotic driving force combined with Meeker's rotation and longitudinal movement teaches or suggests chaotic pivoting.

For the foregoing reasons, we find the Schnuckle '455 and Meeker combination teaches all of the limitations of claim 1.

b. Claims 5 and 34

Independent claims 5 and 34 recite substantially similar limitations to claim 1. Petitioner has provided a proposed mapping of its combination of

Schnuckle ’455 and Meeker to these claims. *See* Pet. 23–25. Claim 5 also recites “wherein the pendulum support member comprises a rigid V-shaped wire.” Ex. 1001, 24:26–27. Citing Dr. Delson, Petitioner contends Meeker’s wire resembles a V or U-shaped wire, as much as such a shape is practically obtainable by bending a wire. Pet. 23 (citing Ex. 1002 ¶¶ 81–83). Petitioner also contends Meeker’s “spring-like wire” is rigid, and, therefore, remains stationary as required by claim 34. *Id.* at 23–24 (citing Ex.1004, 1:42–51, 2:11–20); *see also* Ex. 1002 ¶ 86. In its Response, Patent Owner does not dispute these contentions regarding claims 5 and 34. We agree with Petitioner’s analysis and adopt it as our own.

c. Motivation to Combine

Patent Owner also disputes Petitioner’s rationale for combining Schnuckle ’455 and Meeker as proposed. *See* PO Resp. 21–24. As an initial matter, we need not address Patent Owner’s arguments as to why a person of ordinary skill in the art would have replaced rod 18 of Schnuckle ’455’s two-axis gimbal, because, as noted above, this is not the modification Petitioner proposes. As to Petitioner’s proposed modification—replacing the entire gimbal in Figure 12 with Meeker’s wire support—Patent Owner contends “Schnuckle’s princip[le] of operation as relied upon by Petitioners would be destroyed.” *Id.* at 22. We have reviewed Dr. Brown’s testimony cited by Patent Owner, but, except for one sentence in paragraph 92, this, too, is based on the belief that only rod 18 is replaced in Schnuckle ’455. *See* Ex. 2010 ¶¶ 92–93, 129. The one sentence of Dr. Brown’s testimony is conclusory as it simply restates that the principle of operation would be destroyed, without elaboration. *See* Ex. 2010 ¶ 92.

Although unsupported, we have considered whether replacing the entire gimbal would destroy the principle of operation, and we find that it would not. As discussed above, replacing the two-axis gimbal in Figure 12 with Meeker's support wire would eliminate one of the two axes of rotation. Thus, the replacement would involve trade-offs, but, in this case, the trade-offs would be similar to those already contemplated by Schnuckle '455. *See also In re Urbanski*, 809 F.3d 1237, 1243 (Fed. Cir. 2016) (agreeing that a person of ordinary skill in the art would have been motivated to pursue the desirable qualities taught by one reference at the expense of foregoing the benefit taught by another reference). For example, at a high level, all embodiments of Schnuckle '455, even the single-axis embodiment of Figure 7, are designed to provide a realistic flame effect. *See* Ex. 1003, 2:1–3 ("[R]otation of the at least one channel about at least one axis of the mount creates an artificial flickering flame on the flame shaped surface."). Given these teachings, and Patent Owner's failure to explain why Meeker's structure would have undermined or destroyed the principle of operation of Schnuckle '455, we do not find that the proposed combination would have destroyed Schnuckle '455's principle of operation. *See In re Mouttet*, 686 F.3d 1322, 1332 (Fed. Cir. 2012).

As to the rationale for combining, Schnuckle '455 and Meeker, based on reducing the number of components and reducing the possibility of the wire support slipping off the ring, Patent Owner's arguments are again based on keeping parts of the gimbal structure, which is not the proposal. *See* PO Resp. 24 ("If Schnuckle's gimbal is kept even partially intact, modification of the gimbal would be even more costly and require the same number of parts. (Ex. 2010, Brown Decl. ¶¶ 99, 129.)"). Dr. Brown makes similar

statements in his Declaration. *See* Ex. 2010 ¶¶ 99, 129. Petitioner's cost and reliability rationales, based on replacing the *entire* gimbal, remain unrebutted.

We find Petitioner's reasons for combining Schnuckle '455 and Meeker to be based on rational underpinnings. *See KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 418 (2007).

> When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense.

Id. at 421. Here, we find that Petitioner has provided two reasons for why a person of ordinary skill in the art would have been motivated to identify a simpler pivotal mounting structure, such as that used in Meeker, to replace the gimbal mechanism in Schnuckle '455 based at least on cost and reliability. In view of the foregoing, we determine Petitioner has presented and sufficiently established an "articulated reasoning with some rational underpinning to support the legal conclusion of obviousness" with respect to combination of Schnuckle '455 and Meeker, and we adopt its analysis as our own. *Id.* at 418 (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

4. Claims 7, 18, 19, 26, 27, 33, 35, and 36

a. Claims 7, 19, and 26

Claim 7, which depends from claim 1, recites "wherein the light source is positioned within the housing to transmit the light onto the flame element at an upward angle." Ex. 1001, 24:51–53. Claim 26, which depends from claim 5, recites a similar limitation. *Id.* at 26:31–33. As discussed above, Petitioner contends Figures 2 and 12 of Schnuckle show a

light source, 34, that transmits light via conduit 30 and light carrying cables 14, 16 or channel 500. Pet. 26 (citing, e.g., Ex. 1001, 3:49–54, 4:40–51, Fig. 2, 12). Petitioner also relies on the Figure 7 and 11 embodiments including LED 308 for transmitting light at an upward angle towards flame-shaped surface 326. *Id.* (citing 5:13–32, 6:1–11, 6:27–33). In its Preliminary Response, Patent Owner disputed this in view of its proposed construction that "upward angle" excludes angles parallel to the vertical or longitudinal axis. Prelim. Resp. 39. We rejected this construction, but we noted that even if we had adopted it, Petitioner demonstrated that Schnuckle '455 teaches a non-vertical upward angle (i.e., an oblique angle). *See* Inst. Dec. 26 (citing Pet. 27–28; Ex. 1001, 7:20, Figs. 15, 16).

In its Response, Patent Owner no longer argues for this claim construction, but instead argues the Board improperly found that Petitioner properly accounted for Patent Owner's construction—even if we had adopted it. PO Resp. 31–32. This argument is not persuasive.

As an initial matter, because Patent Owner no longer argues that "upward angle" requires an explicit construction excluding angles parallel to the longitudinal axis, our preliminary findings and Petitioner's argument that Figures 7 and 11 teach the limitation of claim 7 (and claim 26) are unrebutted. *In re Nuvasive*, 842 F.3d 1376, 1380–81 (Fed. Cir. 2016) (holding that arguments made in preliminary response are waived if not addressed during the trial phase). Consequently, Patent Owner's objection to the Board's *alternative* reasoning is moot.

Claim 19 requires that the "first light source is at least partially disposed within an outer wall of the housing and is configured to upwardly project the light." Petitioner contends LED lights 613, 614 are positioned in

holes 611, 612 of the housing in Figures 13–16 to project light at an upward angle. Pet. 27 (citing Ex. 1003, 7:10–13, 7:18–21 ("These LEDs are angled upwardly . . .")). Petitioner, relying on Dr. Delson, further contends a person of ordinary skill in the art would have appreciated that the teachings of this embodiment could have been used in the proposed combination to obtain additional light sources to allow for different colors and intensities, illumination angles, etc. *Id.* 27–28 (citing Ex. 1002 ¶¶ 96–97; Ex. 1003, 6:24–41 (explaining that other embodiments could be used to make structural and functional changes)). In its Response, Patent Owner does not dispute this rationale for making this modification, which we adopt. We find this rationale to be supported by rational underpinnings. *See KSR*, 550 U.S. at 418 (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

b. Claims 8 and 27

Claim 8 requires that the pendulum member of claim 1 "is displaced in a random pattern." Claim 27 recites a similar limitation. Petitioner directs us to Schnuckle '455's magnetically driven flame element that "moves '*randomly* simulating blowing in the wind'" based on the magnetic field generated according to the data pattern, as teaching or suggesting this limitation. Pet. 26 (quoting Ex. 1003, 6:46–62 (emphasis added)); Ex. 1002 ¶ 95. Patent Owner does not dispute these contentions. We agree with Petitioner's analysis and adopt it as our own.

c. Claim 33

Claim 33, which depends from claim 1, recites "wherein the pendulum support member is a rigid member that does not move with the pendulum member when the pendulum member pivots during operation of the drive mechanism." Petitioner contends the combination of these

elements, using Meeker's "support wire, with [both its] ends connected to the housing, would provide a support that remains stationary as channel 500 swings within the interior of the candle device of Fig. 12." *Id.* at 25. Petitioner contends rod 18 is stationary because Schnuckle '455 "describes 'rotational movement . . . about rod 18,' which indicates that rod 18 is stationary ([Ex. 1003], 5:1–3)." Pet. 28 (citing Ex. 1002 ¶ 98). Petitioner further contends it would have been a design choice to select a wire of sufficient rigidity to support the pendulum member while allowing it to pivot as needed. *Id.* at 28–29 (citing Ex. 1002 ¶¶ 98–101).

Patent Owner disputes these contentions, again, presuming that the modification is to leave the gimbal of Schnuckle '455's Figure 12 in place while replacing only rod 18. PO Resp. 27–31. As discussed above, this is not the proposed modification. As quoted above from the Petition, Meeker's "support wire, *with its both ends connected to the housing*, would provide a support." Pet. 25 (emphasis added). Because both ends are connected to the housing, there is no ambiguity—in addition to rod 18, the other structures of the gimbal are replaced by Meeker's wire.[11]

Aside from arguments based on its misplaced assumption that Meeker's support wire is not connected to the housing, Patent Owner contends Meeker's support wire is a "spring-wire" connected to the platform in Meeker to allow vibratory movement of the figure. PO Resp. 29–30 (citing Ex. 1005, 1:46–56). Patent Owner contends that a spring is a component associated with motion, and, therefore, movement in Meeker's

[11] It bears emphasis that Petitioner's expert unequivocally testified prior to Patent Owner's Response that this was the proposed modification. Ex. 2011, 145:10–146:22 ("I would indeed remove the complete gimbal mechanism.")

system would cause the spring-wire to move. *Id.* (citing Ex. 2010 ¶¶ 98, 136). In the proposed combination, any movement by the pendulum member (i.e., channel 500) would cause the wire in Meeker's wire support to move (i.e., non-stationary). *Id.* at 30. Patent Owner contends, therefore, that a person of ordinary skill in the art would not have replaced a spring-wire, designed to impart motion, into a stationary support, such as the gimbal. We disagree.

Patent Owner's argument mistakenly assumes that the entire length of Meeker's spring-wire is bodily incorporated into Schnuckle '455. *See In re Keller*, 642 F.2d 413, 425 (CCPA 1981) ("The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference."). Instead, we understand Petitioner to be relying on the section of the wire support, identified as 20 in Figures 1 and 2 of Meeker (reproduced above), which is much shorter. *See* Pet. 25 (citing Ex. 1005, 1:67–75, Figs. 1, 2). We are persuaded that such a section of wire, connected to the housing as Petitioner proposes (*id.*), would teach or suggest the wire remains stationary when mounted in the housing of the artificial candle of Schnuckle '455. In other words, the question is not whether the entire length of Meeker's support wire 5 and 6 would vibrate in spring-like manner to impart movement from the platform to the figure, but rather whether the curved end of wire (i.e., Figure 2 (20)), which *supports the figure* and is coupled to the housing in the proposed combination, would be non-stationary. We find that it would be, as explained below.

Patent Owner's evidence to the contrary is Dr. Brown's Declaration (i.e., Ex. 2010 ¶¶ 98, 136). Paragraph 98 is a discussion about Helmer[12]—a reference similar to Meeker in which a toy is supported by a spring wire—in which Dr. Brown contends the spring (because of "its nature") would move. Paragraph 136 extends this reasoning to Meeker. However, even Helmer makes clear that the "spring-wire [is] *sufficiently stout to sustain the figure* without interfering in the least with its free movements." IPR2015-01658, Ex. 1005, 1:47–50 (emphasis added). Thus, we credit Dr. Delson's rebuttal testimony that "the springiness and vibrations in Meeker or Helmer's wire, if any, are largely due to the long length and cantilevered configuration of the support. *A similar support wire of Meeker/Helmer in a shorter segment that are attached at both ends to candle housing would be substantially stiffer and can function as a rigid support of a swinging pendulum.*" Ex. 1019 ¶ 61 (emphasis added). We find Dr. Delson's testimony to be more credible on this issue than that of Dr. Brown. Accordingly, for the foregoing reasons, we agree that a person of ordinary skill in the art would have understood that Meeker's wire support, as used in the combination, would be sufficiently rigid to remain stationary while supporting the moving pendulum member.

d. Claims 35 and 36

Claim 35 and claim 36 recite limitations similar to limitations of claim 1 (i.e., "low spot") and 5 (i.e., "V-shaped" support), respectively. Petitioner cites evidence similar to that relied on for those limitations as teaching or suggesting these claims. *See* Pet. 29–31. Patent Owner does not

[12] U.S. Patent No. 817,772, issued Apr. 17, 1906 (IPR2015-01658, Ex. 1005) ("Helmer").

dispute Petitioner's contentions for these claims. We agree with Petitioner's analysis and adopt it as our own.

Before reaching our legal conclusion as to whether 1, 5, 7, 8, 19, 26, 27, and 33–36 are unpatentable, we address Patent Owner's arguments based on objective indicia of non-obviousness.

5. Objective Indicia of Non-Obviousness

Factual inquiries for an obviousness determination include secondary considerations based on evaluation and crediting of objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). The totality of the evidence submitted, including objective evidence of nonobviousness, may lead to a conclusion that the challenged claims would not have been obvious to one of ordinary skill in the art. *In re Piasecki*, 745 F.2d 1468, 1471–72 (Fed. Cir. 1984).

Secondary considerations may include any of the following: long-felt but unsolved needs, failure of others, unexpected results, commercial success, copying, licensing, and praise. *See Graham*, 383 U.S. at 17; *Leapfrog Enters., Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1162 (Fed. Cir. 2007). However, to be given substantial weight, there must be a nexus between the merits of the claimed invention and the evidence of secondary considerations. *In re GPAC Inc.*, 57 F.3d 1573, 1580 (Fed. Cir. 1995). "Nexus" is a legally and factually sufficient connection between the objective evidence and the claimed invention, such that the objective evidence should be considered in determining nonobviousness. *Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, 851 F.2d 1387, 1392 (Fed. Cir. 1988).

In its Response, Patent Owner presents evidence and arguments as to long-felt need, commercial success, industry praise, licensing, and copying. PO Resp. 33–38.

a. Long-Felt Need

Patent Owner contends "[t]he public has long sought artificial candles that can simulate a natural flickering flame." PO Resp. 34. As an example, Patent Owner cites Wiklund (Ex. 2013), which, according to the related '166 patent (Ex. 2005, 1:66–2:19) could not convincingly reproduce a real or natural flame. *Id.* The '869 patent addressed this need by providing devices that realistically reproduced the chaotic movement of natural flame. PO Resp. 34 (citing Ex. 2010 ¶¶ 144–145). Patent Owner contends this need has nexus to the innovative aspects of the challenged claims, i.e. "the improved 'pleasing and realistic simulation of solitary flames' achieved by the pivotal mounting structures and the corresponding chaotic movement they produce." *Id.* (citing Ex. 2005, 1:63–64).

To be relevant, the proffered evidence must show a long-felt need *recognized by those of ordinary skill in the art. In re Gershon*, 372 F.2d 535, 538 (CCPA 1967). Reliance solely on the specification of the challenged patent is only probative of the inventors' recognition of a problem and, if anything, demonstrates that the problem is not a serious one. *Id.* In this case, because the only proffered evidence of the alleged long-felt need are the inventors' statements in the '166 patent, the evidence of long-felt need is weak at best.

We also consider Patent Owner's contention that a nexus exists between the claimed invention and the alleged long-felt need. PO Resp. 33–34. According to Petitioner, Patent Owner only argues a nexus to realistic

flame effect, which was known the in the prior art before the '869 patent. Pet. Reply 20.

"A nexus may not exist where, for example, the merits of the claimed invention were 'readily available in the prior art.'" *ClassCo, Inc. v. Apple, Inc.*, 838 F.3d 1214, 1220 (Fed. Cir. 2016) (quoting *Richdel Inc. v. Sunspool Corp.*, 714 F.2d 1573, 1580 (Fed. Cir. 1983)) (holding that the Board properly gave no weight to evidence relating to features disclosed in the proposed combination). However, while a nexus may be lacking if it "exclusively relates to a feature that was 'known in the prior art,' the obviousness inquiry centers on whether 'the claimed invention as a whole' would have been obvious." *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1329–32 (Fed. Cir. 2016) (quoting *Rambus, Inc. v. Rea*, 731 F.3d 1248, 1257 (Fed. Cir. 2013)).

In *WBIP*—an appeal from a denial of JMOL of obviousness—the Federal Circuit found that the patentee was entitled to a presumption of nexus, based on its showing that its products were embodiments of the claimed invention. *Id.* at 1330–31. The challenger argued that a nexus did not exist because objective indicia evidence (i.e., reducing carbon monoxide emissions) was "not tied to the elements in the claims that were missing from [the prior art,] Phipps," namely a catalyst. *Id.* The court disagreed. Noting that there was testimony that Phipps alone could not "reduce carbon monoxide emissions *without the addition of a catalyst*," it stated that the inquiry must focus on the invention as a whole. *Id.* at 1331–32. Because the invention as a whole was sufficiently linked to the *combination* of known elements with the allegedly new element (i.e., the catalyst), the court

concluded the jury's presumed factual findings relating to nexus were supported by substantial evidence. *Id.* at 1332.

Here, according to Patent Owner, the alleged long-felt need is addressed by chaotic pivoting of the flame element to "reproduce a real or natural flame." PO Resp. 33–34. According to Patent Owner, this "evidence of long-felt need has nexus to the innovative aspects of the challenged claims—namely the improved 'pleasing and realistic simulation of solitary flames.'" *Id.* at 34. However, as discussed above, Schnuckle '455 discloses that the "natural and chaotic" forces cause the flame element to move "randomly simulating blowing in the wind." Ex. 1003, 6:53–62. Schnuckle '455 also states that the system "includes an apparatus and a method for synthesizing an artificial flame that provides a *realistic flickering flame effect* that is safe and easy to manufacture." *Id.* at 1:55–58 (emphasis added).

Consequently, in contrast to *WBIP*, we determine that the record supports the conclusion that the allegedly inventive features relied upon by Patent Owner of the claimed invention as a whole are disclosed *as a whole* by Schnuckle '455. Patent Owner makes no effort, for example, to differentiate between the realistic flame effect of the current invention and identical disclosures in Schnuckle '455. Accordingly, we find that insufficient nexus has been established between the alleged long-felt need and the claimed invention. For this additional reason, we give little weight to Patent Owner's long-felt need argument.

b. Commercial Success

Patent Owner contends it has enjoyed significant commercial success, directly attributable to its "flameless candles that are covered by the

challenged independent claims of each of the '166, '319, and '869 patents." PO Resp. 34–36. Patent Owner relies on Dr. Brown (Ex. 2010 ¶¶ 144–145) and a claim chart he provided (Ex. 2017) to demonstrate that the independent claims read on the commercial embodiment. *Id.* at 35. Patent Owner relies on Dr. Gorowsky (Ex. 2036 ¶¶ 3–6) for evidence that the product sales figures are attributable to the commercial embodiment. *Id.*

We have reviewed this evidence and testimony, and we find it does not demonstrate commercial success. At the outset, a necessary component of the commercial success inquiry is determining market share associated with the alleged product, relative to competing products. *In re Applied Materials, Inc.*, 692 F.3d 1289, 1300 (Fed. Cir. 2012). In this case, Patent Owner provides only raw sales (*see* Ex. 2020) of products allegedly embodying the independent claims as evidence of commercial success. *See* Ex. 2036 ¶¶ 3–6. Without market share, or a sense of the total market, we have no point of reference with which to evaluate the significance of the proffered sales amounts. *Applied Materials*, 692 F.3d at 1300 ("[T]he number of units sold without evidence of the market share is only weak evidence of commercial success.").

Moreover, similar to the deficiency identified above, Patent Owner again relies on features found in the prior art to demonstrate nexus to commercial success. Specifically, Patent Owner's evidence establishes, at most, that its commercial embodiments cover the required chaotic pivoting and realistic flame effect, which we determined to be disclosed by Schnuckle '455. *See* Ex. 2017; Ex. 2010 ¶¶ 144–145 ("As shown in Exhibit 2017, I have mapped out how each feature of each *independent* claim corresponds to an aspect of the commercial embodiment." (emphasis

added)). As with long-felt need, Patent Owner fails to differentiate between the realistic flame effect of the current invention and comparable disclosures in Schnuckle '455. As such, this evidence is insufficient, as it can only establish success based on "features that were [available] in the prior art." *ClassCo*, 838 F.3d at 1220; *see also Ormco Corp. v. Align Tech., Inc.*, 463 F.3d 1299, 1312 (Fed. Cir. 2006) (holding that evidence that commercial success was due to unclaimed or non-novel features of a device "clearly rebuts the presumption that [the product's] success was due to the claimed and novel features").

We have considered Patent Owner's argument that customers favor and perhaps pay as much as twice the price of conventional "*flash-bulb*" flameless candles (*see* PO Resp. 35–36), but we do not find it persuasive because it, too, is linked either to the "realistic flame effect" or the chaotic pivoting disclosed in the prior art. Accordingly, for these additional reasons, we give little weight to Patent Owner's commercial success argument.

c. Praise

We have reviewed Patent Owner's arguments regarding industry praise and, for reasons similar to those discussed above, determine that these, too, are entitled little weight. Patent Owner relies on a video praising Patent Owner's product at the "Consumer Electronics Show in January 2010" (Ex. 2024[13]) and an article praising the products allegedly copying the

[13] Patent Owner also cites Ex. 2018, which is its own contention interrogatory responses from related litigation. *See* PO Resp. 33 (identifying Ex. 2018 as "*arguments* in the parallel district court proceeding" (emphasis added)). Patent Owner's own arguments are not evidence; citing to them as such is an improper attempt to incorporate additional briefing by reference. *See* 37 C.F.R. § 42.6(a)(3). To the extent evidence is cited in Ex. 2018, but

patented technology (Ex. 2025). PO Resp. 36. Regardless, the evidence allegedly relates to "superior realistic flickering flame effect enabled by simulating chaotic motion." *Id.*; *see also* Ex. 2025 ("The wick actually moves, not just the light flickering. That['s] what gives it a real look, authenticity."). In other words, similar to the deficiencies identified above with respect to long-felt need, the evidence at most provides a nexus only to the prior art chaotic pivoting disclosed in Schnuckle '455, and insufficient nexus to the claimed invention.

d. Licensing

Patent Owner contends it has successfully licensed the '869 patent to Candella and its successor, Luminara. PO Resp. 36 (citing Ex. 2026). According to Patent Owner, Luminara's moving flame flameless candles embodying innovative aspects of the claimed technology have been sold through distributors and nationally-recognized retailers. *Id.* at 36–37 (citing Ex. 2028). Patent Owner also contends Petitioner agreed to pay Candella an 18% royalty under an agreement for use of the patented technology and thereafter, in 2012, sought a license directly from Disney. *Id.* at 37 (citing Ex. 2027; Ex. 2029).

We have reviewed this evidence and testimony, and we find it provides little relevant evidence of non-obviousness. At the outset, we discount Luminara's distribution agreements (Ex. 2028) evidence, because these do not purport to be "[l]icenses taken under the patent in suit," and, therefore, do not demonstrate a nexus to the claimed invention. *See GPAC*, 57 F.3d at 1580. We also give little weight to the unsuccessful attempt by

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not filed and cited in the papers of these proceedings, it has not been considered.

Petitioner to obtain a license from Patent Owner during litigation. *See* Ex. 2029. Licenses intended to resolve litigation disputes are not strong evidence of non-obviousness because "it is often cheaper to take licenses than to defend infringement suits." *In re Cree, Inc.*, 818 F.3d 694, 703 (Fed. Cir. 2016) (internal quotes omitted). Here, in addition to not identifying the specific patent at issue or its applications, the unexecuted license between the parties purports to "resolve [the parties'] disputes." *See* Ex. 2029, 26. As such, we give it little weight.

Of greater relevance, Patent Owner has presented what appears to be a series of executed license agreements between Luminara and Disney dating back to May 1, 2008 (Ex. 2026), of which the October 31, 2012 amendment purports to relate to the related '319 patent at issue in IPR2015-01656. *See id.* at 19, 26 (listing the '319 patent). Patent Owner does not direct us to how this agreement relates specifically to the challenged claims here, as opposed to other patents identified in the agreements or the prior art chaotic pivoting and realistic flame effect. Indeed, we observe that the earliest version of the license has an effective date of May 1, 2008, which is prior to the earliest priority date of the '869 patent. *See id.* at 1. This earlier agreement lists only the prior art Schnuckle '455 patent under "Licensed Patents." *See id.* at 2. Taken as a whole, therefore, this license is more broadly indicative of Luminara's desire to obtain Disney's "Artificial Flame Technology" (*id.* at 1) going back to Schnuckle '455, than any inventive features of the challenged claims here. As such, there is insufficient nexus to the claims at issue here for this evidence to be given more than little weight. *See Cree*, 818 F.3d at 694 (finding broad licenses covering multiple patents as not having sufficient nexus).

e. Copying

With regard to copying, Patent Owner's contentions in full are as follows:

> [Petitioner] Liown made specific efforts to reverse-engineer and replicate [Patent Owner] Luminara's products, specifically the innovative feature of chaotic pivoting at the location of the flame element. (Ex. 2030; Ex. 2029.) Liown did so after a failed attempt to access the technology through a manufacturing agreement with Luminara's predecessor, Candella. (Ex. 2029.) Copies of Luminara's patented flameless candles include the innovative features that enable chaotic pivoting of the flame element. (*See, e.g.*, Ex. 2030 at 5–9; Ex. 2029 at 4, 24–25, 32–40, 49–51.) The companies that copied Luminara's patented flameless candles did so with exactitude, with an apparent intent to copy and coopt the consumer demand associated with Luminara's products based on the ability to provide a more realistic flickering flame effect. (*Id.*)

PO Resp. 37–38 (citations to Ex. 2018 omitted).[14]

In considering these contentions, we make several observations. First, the cited pages 5–9 of Exhibit 2030 appear to be part of a declaration submitted by Patent Owner in a district court infringement suit contending that "Liown's flameless candle" practices claim 1 of the '166 patent. *See id.* Petitioner does not address this Exhibit or deny that the cited portions depict its product. *See* Pet. Reply 24–25. Second, Petitioner also does not deny Patent Owner's contention that Exhibit 2029 includes an attempted manufacturing agreement between Candella (i.e. Patent Owner's predecessor) and Petitioner. *See id*.

[14] As noted above, the arguments Patent Owner's Interrogatory Responses are not considered. *See* 37 C.F.R. § 42.6(a)(3).

Third, we observe that Exhibit 2029 is a 51-page compilation of draft agreements, emails, CAD drawings, foreign and U.S. patents, a letter, product photographs, and an advertisement. Of this compilation, Patent Owner directs us to pages 4, 24–25, 32–40, and 49–51. These cites include CAD drawings, two untranslated pages of a Chinese patent, a U.S. patent, and the photographs of finished products. Other than the contentions reproduced above, Patent Owner provides no further explanation as to how these disparate documents are connected with each other, much less interpreted as evidence of copying. Accordingly, other than the CAD drawings, which Petitioner specifically addresses in its Reply, and the attempted agreement, Patent Owner has failed to demonstrate sufficiently that the other documents in the Exhibit 2029 compilation are evidence of copying.

Based on these observations, we assume *arguendo* that the depicted single-pendulum product in Exhibit 2030's claim chart is Petitioner's product.[15] As an initial matter, Petitioner does not deny that it had access to Patent Owner's CAD drawings during the relevant time frame. *See Wyers v. Master Lock Co.*, 616 F.3d 1231, 1246 (Fed. Cir. 2010) (noting that copying requires access and substantial similarity to the patented product). Although not pointed out to us by Patent Owner, we do note that there are similarities between the unannotated drawings and Petitioner's product, including similar angled lighting components and a wire-based pivotal mounting.

[15] We do not consider the mapping of Petitioner's product to claim 1 of the related '166 patent as evidence of copying. *See Iron Grip Barbell Co., Inc. v. USA Sports, Inc.*, 392 F.3d 1317, 1325 (Fed. Cir. 2004) (holding that alleged infringement is not evidence of copying).

Compare Ex. 2029, 4 *with* Ex. 2030, 3. On the other hand, we cannot clearly discern from the photographs whether Petitioner's pendulum is closely similar to Patent Owner's drawing or whether Patent Owner is using a two-stage pendulum with two wire supports as opposed to Petitioner's single-stage pendulum. *Compare* Ex. 2029, 4–5 *with* Ex. 2030, 3.

Based on the foregoing, we determine the evidence supports some degree of copying. However, without further analysis by Patent Owner and the uncertainties identified above, we do not find the evidence to be particularly substantial.

6. Legal Conclusion

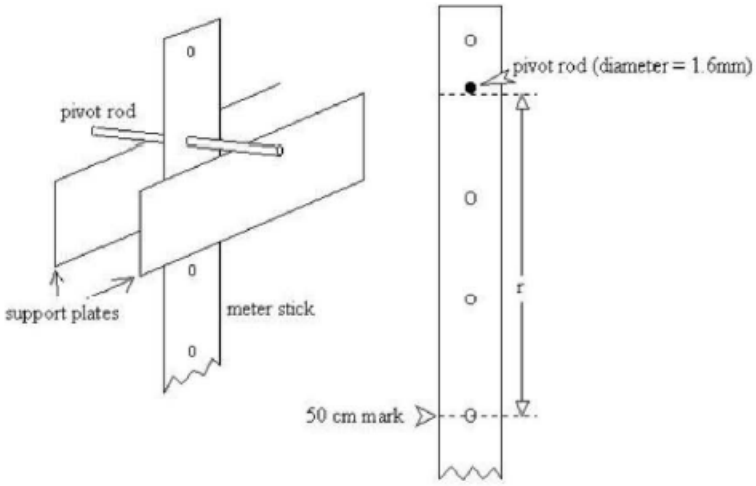
We have considered Patent Owner's evidence of non-obviousness against Petitioner's showing above that the subject matter of claims 1, 5, 7, 8, 19, 26, 27, and 33–36 would have been obvious in view of Schnuckle '455 and Meeker. We found the evidence supports giving the proposed objective indicia of non-obviousness little weight overall. Although the copying evidence is somewhat stronger, we note "that a showing of copying is only equivocal evidence of non-obviousness in the absence of more compelling objective indicia of other secondary considerations," *Ecolochem, Inc. v. Southern California Edison Co.*, 227 F.3d 1361, 1380 (Fed. Cir. 2000), which we did not find here. Considering the evidence as a whole, including Petitioner's rationale for modifying Schnuckle '455 with Meeker to obtain the limitations of claims 1, 5, 7, 8, 19, 26, 27, and 33–36, we are persuaded that Petitioner has established by a preponderance of the evidence that claims 1, 5, 7, 8, 19, 26, 27, and 33–36are unpatentable as obvious over Schnuckle '455 and Meeker.

D. Obviousness of Claims 6, 31, and 32 over Schnuckle '455 and Physics Lab

Petitioner argues that claims 6, 31, and 32 of the '869 patent are unpatentable, under 35 U.S.C. § 103(a), as obvious over Schnuckle '455 and Physics Lab. *See* Pet. 31–34. We have reviewed the Petition, Patent Owner's Response, Petitioner's Reply, as well as the relevant evidence discussed in those papers and other record papers. As described in further detail below, we determine that the record supports Petitioner's contentions for claims 6, 31, and 32, challenged as obvious over Schnuckle '455 and Physics Lab, and we adopt Petitioner's analysis discussed below as our own.

1. Physics Lab (Ex. 1004)

Physics Lab describes a laboratory experiment using a physical pendulum, which is "a rigid object which swings freely about some pivot point." Ex. 1004, 1:1–3. A figure from page 2 of Physics Lab is reproduced below:



The above figure depicts the experimental pendulum setup described in Physics Lab. Physics Lab includes instructions for measuring the pendulum's period, T, for different locations of the pivot point, which, as

shown above, is located at different holes between the mid-point (50 cm) and top of the meter stick. Ex. 1004, 2:11–3:9. The period is measured for 10 different locations between r = 15 cm to the top of the meter stick. *Id.* at 3:5–9.

2. Claim 6

Petitioner provides a similar mapping of Schnuckle '455 to the preamble and first five limitations of independent claim 6, as it did for claim 1. *See* Pet 15–19. Patent Owner does not separately challenge Petitioner's showing except to argue that Physics Lab does not overcome the fundamental deficit in Schnuckle described above. PO Resp. 24 ("Independent claim 6 is substantively the same as independent claims 1, 5, and 34 except that it does not include the additional requirement of a 'low spot' in the pendulum support member."). Accordingly, as we determined that Schnuckle '455 teaches or suggests these limitations (except for the "low spot" addressed by Meeker), for the reasons discussed above, we adopt Petitioner's analysis in relevant part for claim 6.

In addition, to these limitations, claim 6 also recites "wherein the hole is positioned on the pendulum member such that kinetic motion of the first end of the pendulum member is at least 2 times greater than kinetic motion of the second end of the pendulum member in response to the time varying electromagnetic field." Petitioner contends Schnuckle '455 describes hole 503 in channel 500 (i.e., the recited "pendulum member"). Citing Dr. Delson's testimony, Petitioner contends "Physics Lab illustrates that selection of the pivot hole location on a pendulum would have been obvious to try by a [person of ordinary skill in the art] because such a selection merely requires choosing from a finite number of identified, predictable

solutions." Pet. 33–34 (citing Ex. 1002 ¶¶ 104–110). Petitioner contends, therefore, that the combination of Schnuckle '455 and Physics Lab teaches or suggests positioning the hole such that the kinetic motion is at least two times greater at the first end (i.e., bottom end) of the pendulum member than the motion of the second end. *Id.*

In disputing Petitioner's contentions, Patent Owner argues "Petitioners incorrectly assume that channel 500 pivots about hole 503. (Ex. 2010, Brown Decl. ¶¶ 80–83, 93–94, 131.) Hole 503 is not a point of rotation and rod 18 rotates with channel 500 because it is fixed to channel 500." PO Resp. 25. Thus, Patent Owner argues, rotation would not occur at hole 503. *Id.* Moreover, Patent Owner argues, "Physics Lab does not address how a pendulum mounted on a rod that rotates within two grooves, as in Schnuckle, might be modified to meet the requirements of claim 6." *Id.*

We do not find either of these arguments to be relevant to where a person of ordinary skill in the art would place the "hole" in the pendulum member to obtain the claimed kinetic motion at the end. Regardless of whether channel 500 rotates with rod 18 or relative to rod 18, it is beyond dispute that channel 500 rotates relative to the axis of rod 18 at the point of the hole. *See* Ex. 1019 ¶ 66 ("[R]egardless of whether rod 18 rotates or it doesn't, the rotation of rod 18 does not change the fact that location of pivot hole on pendulum's body determines the range of motion of the top end of the pendulum relative to the motion at the bottom of the pendulum."). Claim 6 simply specifies that the pivot hole is chosen such that the kinetic movement of the bottom end of the pendulum is at least twice the movement at the top end of the pendulum.

In this regard, such a pendulum would have to be mounted at least half way up the pendulum body to avoid tipping over, as the above figure from Physics Lab demonstrates. As Dr. Delson testifies, twice the motion or greater in the lower end of the pendulum would occur in the upper 1/3 of the pendulum body. Ex. 1002 ¶¶ 112–113. Accordingly, *two-thirds* of the possible hole locations on channel 500 would satisfy the claimed hole position. Physics Lab describes hole locations within this range (i.e., in the top 2/3) as part of an experiment for measuring a pendulum's period. *See* Ex. 1004, 2; Ex. 1002 ¶ 111. We agree, therefore, that the combination of Schnuckle '455 and Physics Lab teaches or suggests claim 6's hole position requirement.

Patent Owner also disputes Petitioner's rationale for combining Schnuckle '455 and Physics Lab as proposed. *See* PO Resp. 26. Specifically, Patent Owner argues that even if it would have been obvious to try putting the hole in a location that satisfies claim 6, a person of ordinary skill in the art would not have looked to Physics Lab for guidance. *Id.* This argument misses the point.

In an obvious to try analysis, the inquiry is whether there are a finite number of identified, predictable solutions, and a reasonable expectation of success. *See KSR*, 550 U.S. at 421. Here, as Dr. Delson testified, Physics Lab is relied upon to demonstrate that even a first year physics student would have understood the basic relationship between the pivot point of a pendulum and the relative motion between its top and bottom ends, and, that among the possible pivot points, two-thirds of them would satisfy the requirements of claim 6. *See* Ex. 1002 ¶¶ 110–113. "If a person of ordinary skill [in the art] can implement a predictable variation, [and would see the

benefit of doing so,] § 103 likely bars its patentability." *KSR*, 550 U.S. at 417. We agree that a person of ordinary skill in the art would have had this understanding, and would have found it obvious to try hole locations to obtain the predictable result of different levels of kinetic motion associated with the top end of the pendulum.

3. Claims 31 and 32

Claims 31 recites limitations substantially the same as those of claims 7 and 26. Claim 32 recites limitations substantially the same as those of claims 8 and 27. Petitioner, therefore, relies on its analysis for claims 7 and 26 for claim 31 and its analysis for claims 8 and 27 for claim 32. *See* Pet. 34–35. Patent Owner does not separately dispute Petitioner's contentions for these claims. We agree with Petitioner's analysis and adopt it as our own.

4. Legal Conclusion

We have considered Patent Owner's evidence of non-obviousness, discussed above,[16] against Petitioner's showing above that the subject matter of claims 6, 31, and 32 would have been obvious in view of Schnuckle '455 and Physics Lab. Considering the evidence as a whole, including Petitioner's rationale for modifying Schnuckle '455 with Physics Lab to obtain the limitations of claims 6, 31, and 36, we are persuaded that Petitioner has established by a preponderance of the evidence that claims 6, 31, and 36 are unpatentable as obvious over Schnuckle '455 and Physics Lab.

[16] Including Patent Owner's contentions regarding objective indicia of non-obviousness, which apply to all of the grounds of unpatentability based on non-obviousness. *See* PO Resp. 33–38.

E. Patent Owner's Motion to Exclude

Patent Owner "moves to exclude Exhibits 1019, 1025–1047, 1050, and 1051 submitted with Petitioner's Reply." Paper 37, 2. Patent Owner also states that:

> It is not enough for the Board to find that this motion is moot if the Board does not rely on the inadmissible items of evidence in reaching its Final Written Decision. If the items of evidence are allowed to remain in the record, Liown could continue to rely on them on appeal to the Federal Circuit, where Luminara could unfairly be forced to face them again.

Id. at 3.

We have *not* relied on Exhibits 1025–1047, 1050, or 1051 in this Decision. We also have not relied on paragraph 52, 53, and 59 of Exhibit 1019—the only paragraphs of that exhibit Patent Owner contends should be excluded. We have considered Patent Owner's suggestion that we rule on its objections regardless of that fact.

For exhibits not relied on, the Board's well-established practice is to dismiss motions to exclude such evidence as moot. *See, e.g.*, *Apple, Inc. v. VirnetX, Inc.*, Case IPR2015-00812, slip op. at 40–41 (PTAB Aug. 30, 2016) (Paper 43); *Array BioPharma, Inc. v. Takeda Pharm. Co. Ltd.*, Case IPR2015-00754, slip op. at 36, 46 (PTAB Aug. 12, 2016) (Paper 61); *Daicel Corp. v. Celanese Int'l Corp.*, Case IPR2015-00171, slip op. at 62 (PTAB June 23, 2016) (Paper 86); *Bank of Am., N.A., v. Intellectual Ventures I, LLC*, Case CBM2014-00029, slip op. at 30 (PTAB May 19, 2015) (Paper 38); *Yamaha Corp. of Am. v. Black Hills Media, LLC*, Case IPR2013-00597, slip op. at 29–30 (PTAB Mar. 18, 2015) (Paper 46); *Nichia Corp. v. Emcore*

Corp., Case IPR2012-00005, slip op. at 57–58 (PTAB Feb. 11, 2014) (Paper 68).

In this case, Patent Owner has moved to exclude nearly 30 exhibits on numerous grounds. An advisory opinion on their admissibility when we have not considered them would be improper. Moreover, Patent Owner has not cited any authority for its suggestion that it is "not enough" for the Board to act in accordance with its established procedure. Accordingly, we decline Patent Owner's suggestion, and *dismiss* its motion to exclude as *moot*.

III. CONCLUSION

For the foregoing reasons, Petitioner has demonstrated by a preponderance of the evidence that claims 1, 5, 7, 8, 19, 26, 27, and 33–36 are unpatentable as directed to obvious subject matter over Schnuckle '455 and Meeker, and that claims 6, 31, and 32 are unpatentable as directed to obvious subject matter over Schnuckle '455 and Physics Lab.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1, 5–8, 19, 26, 27, and 31–36 of the '869 patent have been shown to be unpatentable;

FURTHER ORDERED that Patent Owner's Motion to Exclude is denied; 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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