

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

DONG GUAN LEAFY WINDOWARE CO. LTD.,
Petitioner,

v.

ANLI SPRING CO., LTD. and
HSIEN-TE HUANG,
Patent Owner.

PGR2020-00001
Patent 10,174,547 B2

Before GEORGE R. HOSKINS, MICHAEL L. WOODS, and
SCOTT C. MOORE, *Administrative Patent Judges*.

HOSKINS, *Administrative Patent Judge*.

DECISION
Granting Institution of Post-Grant Review
35 U.S.C. § 324

I. INTRODUCTION

Dong Guan Leafy Windoware Co. Ltd. (“Petitioner”) has filed a Petition (Paper 1, “Pet.”) pursuant to 35 U.S.C. §§ 321–329 to institute a post-grant review of claims 1–4 of U.S. Patent No. 10,174,547 B2 (“the ’547 patent”). Anli Spring Co., Ltd. and Hsien-Te Huang (collectively, “Patent Owner”) have filed a Preliminary Response (Paper 6, “Prelim. Resp.”). Institution of post-grant review requires the information presented in the Petition to demonstrate, if not rebutted, it is more likely than not that at least one challenged claim is unpatentable. 35 U.S.C. § 324(a). Applying that standard on behalf of the Director (37 C.F.R. § 42.4(a)), we institute a post-grant review to determine whether Petitioner demonstrates by a preponderance of the evidence that claims 1–4 of the ’547 patent are unpatentable on all grounds presented in the Petition.

II. BACKGROUND

A. *Real Parties in Interest and Related Proceedings*

Petitioner identifies Dong Guan Leafy Windoware Co. Ltd. as the sole real party in interest here. Pet. 1. Patent Owner identifies Anli Spring Co., Ltd. and Hsien-Te Huang as the owners of the ’547 patent, and the real parties in interest here. Paper 5, 2. The parties identify *Union Winner Int’l Co. Ltd. v. Hsien-Te Huang, Anli Spring Co., Ltd., and Elegant Windows Inc.*, Case No. 3:19-cv-2060 (N.D. Tex.), as a matter that might affect, or be affected by, a decision in this proceeding. Pet. 1; Paper 5, 2. That District Court litigation has been dismissed voluntarily by joint stipulation of the parties. *See Union Winner*, ECF No. 29 (filed Jan. 27, 2020).

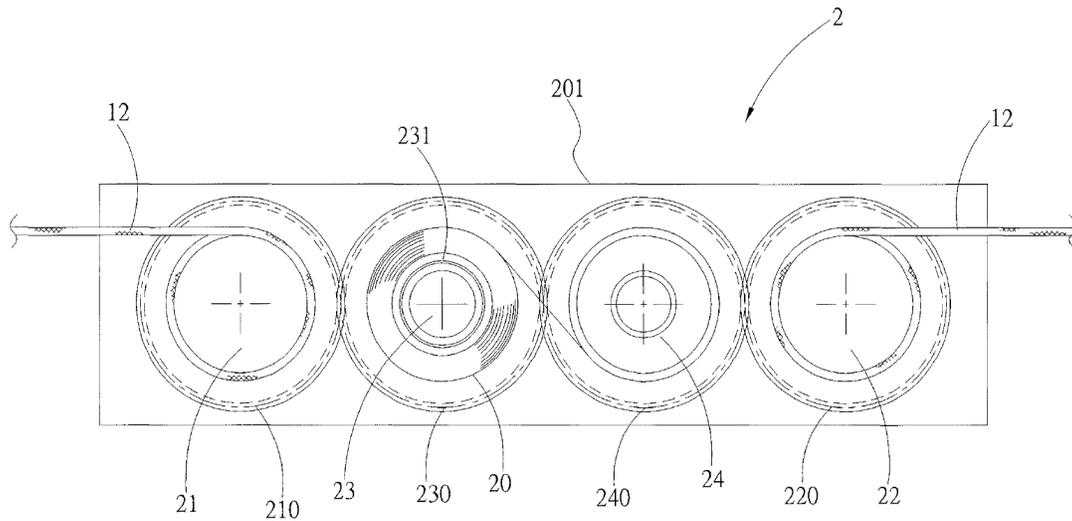


FIG. 3
Prior Art

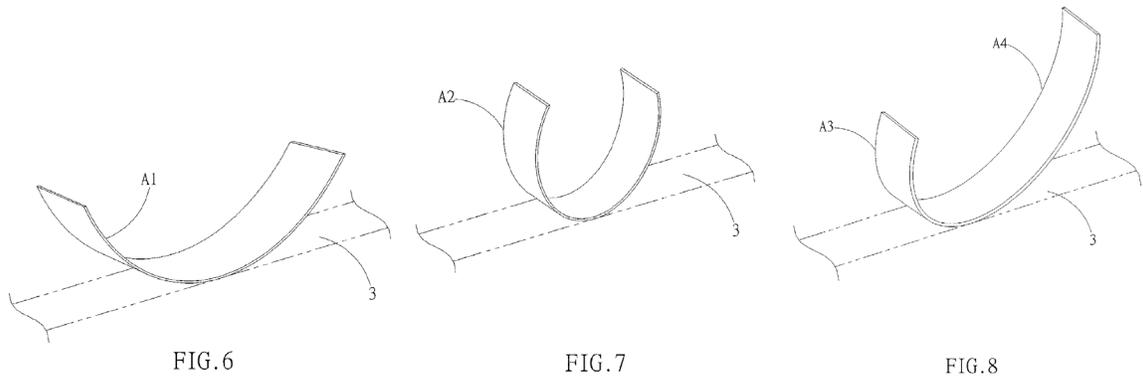
Figure 2 is a three-dimensional structural view, and Figure 3 is a top view, of spring motor 2. *Id.* at 4:31–34. When lower beam 14 is at its uppermost position to support all of the curtain pieces 150, almost the entire length of equal-torque coil spring 20 is wound on axle 23, with a small portion of spring 20 received on coiling axle 24. *Id.* at Figs. 1 & 3, 1:53–63, 2:3–11. When a user grasps lower beam 14 and pulls it downward to close curtain 15, cords 12 unwind from reel drums 21 and 22. *Id.* at 1:37–40. The resulting unwinding rotation of reel drums 21 and 22 causes equal-torque coil spring 20 to unwind from axle 23 and wind on to coiling axle 24, due to the interactions among chainrings 210, 220, 230, and 240. *Id.* at 1:53–2:6, Fig. 3. The user's pulling down of lower beam 14 thereby stores the energy of equal-torque coil spring 20 as it winds on to coiling axle 24, so the tendency of coil spring 20 to wind back on to axle 23 provides a feedback force that: (a) holds lower beam 14 and the curtain pieces 150 supported on lower beam 14 at a height selected by the user, and (b) assists the user to

raise lower beam 14 to open curtain 15. *Id.* at 1:17–37, 2:6–17, 2:32–42, 2:54–60, 3:20–30.

Coil spring 20 of the disclosed prior art curtain set 1 is an “equal-torque” spring, meaning the spiral shape of spring 20 “generates an effective torque curve that is close to being horizontal.” *Id.* at 1:30–32, 1:45–52. According to the ’547 patent, it was also known in the prior art to manufacture springs having “*different* elastic actions at a front end and a back end” to meet “actual system requirements” by providing a “varied torque.” *Id.* at 3:31–44 (emphasis added). This was previously done, for example, by boring holes of unequal sizes and distances along the length of the spring, or by making the spring strip have different thicknesses or widths along the length of the spring. *Id.* The ’547 patent indicates these prior methods can cause “weaknesses in the strip of spring,” and also can be difficult and costly to implement. *Id.* at 3:44–53.

2. *Invention of the ’547 Patent*

The claims of the ’547 patent (Ex. 1001, 7:62–8:64) differ from the above-described admitted prior art in two principal respects. First, the ’547 patent discloses an unequal-torque coil spring 30, which has “various curvatures in different sections of a reed strip longitudinally” to provide an “unequal feedback torque” in a spring motor. *Id.* at 3:57–4:11, 4:64–5:6, 5:65–6:14. Figures 6–8 of the ’547 patent are reproduced below.



These figures respectively illustrate different sections of reed strip 3 which combine to form unequal-torque coil spring 30, with each section having different curvatures A1, A2, A3, and A4. *Id.* at 5:7–18.

Second, the '547 patent discloses a specific torque profile provided by the different curvatures of unequal-torque coil spring 30. *Id.* at 5:19–41. Figure 12 of the '547 patent is reproduced below.

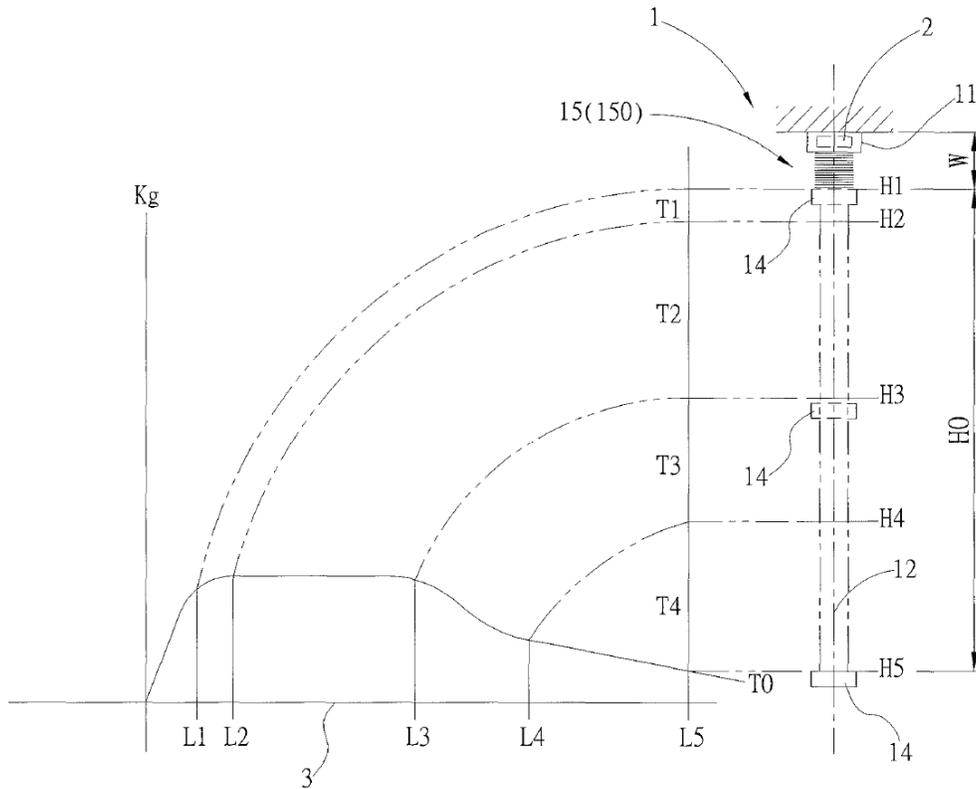


FIG. 12

Figure 12 illustrates a “feedback torque curve” (at the left) which “corresponds to the requirements for the curtain folding process in a curtain set [1]” (at the right). *Id.* at 4:55–57, 6:15–16. Figure 12 correlates various lengths L1–L5 of reed strip 3 forming unequal-torque coil spring 30 to various heights H1–H5 of lower beam 14 below spring motor 2 incorporating spring 30. *Id.* at 5:19–41 (Fig. 9), 6:15–19 (Fig. 12). Strip 3 has an initial curvature A0 between the end that is joined to coiling axle 24 (the origin of Figure 12) and a first length L1, generating a suddenly increasing torque TC. *Id.* at 5:19–23, Fig. 9. Strip 3 has a first curvature A1 between first length L1 and second length L2, generating a first torque T1 “of a slowly increasing arc.” *Id.* at 5:23–26, 6:27–34, 6:44–51, Fig. 9. Strip 3 has a second curvature A2 between second length L2 and third length L3, generating a second torque T2 which “is a constant torque which is of a curve extending from a highest torque output of the first torque T1.” *Id.* at 5:27–31, 6:35–44, Fig. 9. Strip 3 has a third curvature A3 between third length L3 and fourth length L4, generating a third torque T3 which “is a decreasing torque.” *Id.* at 5:31–34, 6:52–54, Fig. 9. Strip 3 has a fourth curvature A4 between fourth length L4 and fifth length L5, generating a fourth torque T4 which is less than the third torque T3. *Id.* at 5:34–38, 6:54–57, Fig. 9.

C. The Challenged Claims of the '547 Patent

The '547 patent contains four claims, each of which is challenged in the Petition. Claim 1 illustratively recites, with line breaks and indenting added to improve readability:

1. An unequal-torque coil spring, wherein feedback torque is provided in response to requirements of unequal forces at a loading end, comprises
 - a long strip of reed strip;
 - the reed strip has different sections longitudinally disposed from a front end to a rear end thereof, and the sections have different curvatures formed by getting coiled and bent inwards to generate different torque;
 - an exposed end serving as a joining end,wherein the reed strip has torque distributed as follows:
 - an increasing torque is implemented between the joining end and a first length,
 - a first torque that follows the increasing torque and slowly increases is implemented between the first length and a second length,
 - a second torque that follows the first torque and is equal to a maximum value of the first torque is implemented between the second length and a third length,
 - a third torque that follows the second torque and gradually decreases is implemented between the third length and a fourth length, and
 - a fourth torque that follows a minimum value of the third torque and gradually decreases is implemented between the fourth length and a fifth length.

Ex. 1001, 7:63–8:17 (line breaks and indenting added). Claim 2 depends from claim 1, and adds “wherein the unequal-torque coil spring generates usable feedback torque values with a ratio between 4:1.” *Id.* at 8:18–20.

Claim 3 is independent, and recites “[a] spring motor being applied in a curtain set,” wherein the motor comprises several elements. *Id.* at 8:21–62. One of the elements is an unequal-torque coil spring, having the same properties recited in claim 1. *Id.* at 8:40–58. Claim 4 depends from

claim 3, and adds “wherein the unequal-torque coil spring generates usable feedback torque values with a ratio between 4:1.” *Id.* at 8:63–65.

D. Proposed Grounds of Unpatentability

Petitioner challenges claims 1–4 of the ’547 patent, based on the following nine grounds. Pet. 2–3.

Claim(s) Challenged	35 U.S.C. §	Reference(s) / Basis
1, 3	102(a)(2)	Lin ’943 ¹
1, 3	103	Lin ’943, Yamashita ²
1, 3	103	Admitted Prior Art ³ , Lin ’943
1	103	Maeda ⁴
3	103	Lin ’109 ⁵ , Maeda
1	103	Wang Drawing ⁶
3	103	Ruggles ⁷ , Wang Drawing
2, 4	112(b)	Indefiniteness
1	102(a)(1)	On Sale Bar (Wang Springs)

¹ Ex. 1003, US 2011/0277943 A1, published Nov. 17, 2011.

² Exs. 1007 (English translation) & 1008 (original), JP S53-113955, published Oct. 4, 1978.

³ Petitioner cites the ’547 patent’s Figures 1–5, and written description at column 1, line 16 through column 3, line 44, as admitted prior art. Pet. 41–43.

⁴ Exs. 1004 (English translation) & 1005 (original), JP S53-115442, published Oct. 7, 1978.

⁵ Ex. 1006, US 2008/0185109 A1, published Aug. 7, 2008.

⁶ Exs. 1010 (English translation) & 1011 (original), engineering drawing of a spiral spring by Wei Wang dated Sept. 17, 2015.

⁷ Ex. 1009, US 6,289,965 B1, issued Sept. 18, 2001.

III. LEVEL OF ORDINARY SKILL IN THE ART

Petitioner contends a person having ordinary skill in the art pertaining to the '547 patent would possess a bachelor's degree in engineering, with coursework or equivalent experience in mechanical engineering, basic mechanics, engineering mechanics, materials science, and engineering. Pet. 11; Ex. 1015 ¶ 9.

Patent Owner asserts "Petitioner's proposal is inadequate because it ignores that the field of the ['547 patent] specifically relates to *torsional spring design* and spring motors relying on torsional springs." Prelim. Resp. 17 (emphasis added) (citing Ex. 1001, 1:7–14); Ex. 2001 ¶¶ 43–46. According to Patent Owner, a person having ordinary skill in the art pertaining to the '547 patent would have "at least a bachelor's degree in mechanical engineering, materials engineering, or similar discipline *with course work relating to torsion spring analysis.*" Prelim. Resp. 17–18 (emphasis added); Ex. 2001 ¶ 47.

Thus, at this preliminary stage of the proceeding, the parties agree as to the level of ordinary skill, except that Patent Owner would require education or experience in torsion spring design. We find, however, that we would reach the same decision under either of the parties' definitions. As such, we do not adopt either party's proposed definition. After institution, if we determine a need to define precisely the level of skill, we will do so at that time.

IV. POST-GRANT REVIEW TIMELINESS AND ELIGIBILITY

A. Timeliness of the Petition

A petition for post-grant review of a patent “may only be filed not later than the date that is 9 months after the date of the grant of the patent.” 35 U.S.C. § 321(c). The ’547 patent was granted on January 8, 2019. Ex. 1001, code (45). The Petition’s filing on October 8, 2019, therefore, was timely. *See* Paper 4.

B. Post-Grant Review Eligibility of the ’547 Patent

The post-grant review provisions of 35 U.S.C. §§ 321–329 apply to patents subject to the first-inventor-to-file provisions of the Leahy-Smith America Invents Act⁸ (“the AIA”). *See* AIA § 6(f)(2)(A) (“The amendments made by subsection (d) [enacting 35 U.S.C. §§ 321–329] . . . shall apply only to patents described in section 3(n)(1).”). The first-inventor-to-file provisions of the AIA apply to any patent issuing from an application that contains or contained at any time a claim to a claimed invention that has an effective filing date on or after March 16, 2013. *See id.* § 3(n)(1). As pertinent to the ’547 patent, the term “effective filing date” for a claimed invention means:

(A) if subparagraph (B) does not apply, the actual filing date of the [’547] patent . . . ; or

(B) the filing date of the earliest application for which the [’547] patent . . . is entitled, as to [the claimed] invention, to a right of priority under section 119

35 U.S.C. § 100(i)(1).

⁸ Pub. L. No. 112-29, 125 Stat. 284 (2011).

The actual filing date of the '547 patent was February 22, 2017. Ex. 1001, code (22). The '547 patent asserts priority under 35 U.S.C. § 119 to Taiwanese Patent Application No. 105204038 U, filed on March 22, 2016. Ex. 1001, code (30). Thus, the earliest potential effective filing date for the '547 patent is March 22, 2016, after the March 16, 2013, effective date of the AIA's first-inventor-to-file provisions. The '547 patent therefore is eligible for post-grant review.

V. PETITIONER'S GROUNDS OF UNPATENTABILITY

A. Introduction

For the reasons provided below, we determine the present preliminary record establishes it is more likely than not that claims 2 and 4 of the '547 patent are unpatentable as indefinite, as set forth in Petitioner's eighth proposed ground of unpatentability. We also determine the present preliminary record establishes it is more likely than not that claims 1 and 3 of the '547 patent are unpatentable as having been obvious over Lin '943 and Yamashita, as set forth in Petitioner's second proposed ground of unpatentability.

The Supreme Court has held that a final written decision in an *inter partes* review (IPR) must decide the patentability of all claims challenged in an IPR petition. *SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348 (2018). The IPR statutory provision at issue in the *SAS* decision (35 U.S.C. § 318(a)) is substantially identical to the corresponding post-grant review (PGR) statutory provision that governs the present proceeding (*id.* § 328(a)). Thus, the *SAS* decision applies to the present proceeding, as recognized by the USPTO Guidance implementing the *SAS* decision. *See Guidance on the*

Impact of SAS on AIA Trial Proceedings (Apr. 26, 2018), <https://www.uspto.gov/patents-application-process/patent-trial-and-appeal-board/trials/guidance-impact-sas-aia-trial> (“*SAS* Guidance”) (“As required by [*SAS*], the PTAB will institute as to all claims or none,” and “[a]t this time, if the PTAB institutes a trial, the PTAB will institute on all challenges raised in the petition.”); PTAB Consolidated Trial Practice Guide (Nov. 2019) (“Consolidated Guide”), 5–6 (*available at* <https://www.uspto.gov/TrialPracticeGuideConsolidated>).

Pursuant to *SAS* and the *SAS* Guidance, based on our determination that it is more likely than not that claims 2 and 4 are unpatentable as indefinite, and that claims 1 and 3 are unpatentable as having been obvious over Lin ’943 and Yamashita, we institute a trial as to all claims and all challenges raised in the Petition. Nonetheless, we additionally address limited aspects of Petitioner’s other grounds of unpatentability based on the present preliminary record, to help guide the parties’ efforts during trial. *See* Consolidated Guide, 5–6.

B. Claim Construction

We interpret the claims of the ’547 patent “using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b).” 37 C.F.R. § 42.200(b) (2019). This “includ[es] construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” *Id.*

1. “the sections have different curvatures formed by getting coiled and bent inwards to generate different torque”

Petitioner contends the phrase in claims 1 and 3 reciting that “the sections [of the reed strip] have different curvatures formed by getting coiled and bent inwards to generate different torque” “provides *no structural limitations* to the reed strip or sections and is instead simply directed to how . . . the reed strip is to be used to generate a desired torque.” Pet. 3–4 (emphasis added) (citing *In re Chudik*, 851 F.3d 1365 (Fed. Cir. 2017); *In re Anderson*, 662 Fed. Appx. 958 (Fed. Cir. 2016)). Also: “[T]his phrase is simply a statement of intended use,” and “should be afforded no patentable weight.” *Id.*

Petitioner further contends, in the alternative, the claim phrase “should be considered as part of a product-by-process limitation” defining how the curvatures are “formed.” *Id.* at 4 (citing *Amgen Inc. v. F. Hoffmann-La Roche Ltd.*, 580 F.3d 1340, 1369–70 (Fed. Cir. 2009)). Thus, in Petitioner’s view, the “limitation provides no patentable weight to the claims **unless** the process of bending and coiling imparts a structural difference to the reed strip and/or the sections that make up the reed strip.” *Id.* (emphasis by Petitioner) (citing *Greenliant Sys., Inc. v. Xicor LLC*, 692 F.3d 1261, 1265 (Fed. Cir. 2012)). Petitioner concludes the “limitation provides a structural difference if the phrase ‘the sections have different curvatures formed by getting coiled and bent inwards to generate different torque’ results in modification of the electronic spatial structures of different sections.” *Id.* at 4–5 (citing Ex. 1001, 5:11–18).

Patent Owner disputes both of Petitioner’s alternative claim constructions, and asserts the claim phrase at issue “provides a structural

limitation of the scope of claims 1 and 3 that is entitled to patentable weight.” Prelim. Resp. 11–12; Ex. 2001 ¶¶ 34–42. Patent Owner contends the plain and ordinary meaning of the phrase “the sections have different curvatures” requires the reed strip segments to have different curvature radii, which is a structural requirement. Prelim. Resp. 11–12, 13; Ex. 2001 ¶¶ 35–38. Patent Owner contends the plain and ordinary meaning of “the recitation ‘getting coiled and bent inwards’ describes that the reed strip forms a coil with an inward bend to form a coil spring,” which also is a structural requirement. Prelim. Resp. 11, 12; Ex. 2001 ¶ 39. Patent Owner asserts that, in reciting that these structural features “generate different torque” by virtue of the different curvatures, the claims “demonstrate[] that the structural features create a mechanical property (e.g., ‘different torque’) in the reed strip.” Prelim. Resp. 12–13; Ex. 2001 ¶ 40.

Concerning Petitioner’s alternative product-by-process claim construction, Patent Owner asserts “words of limitation that can connote with equal force a structural characteristic of the product or a process of manufacture are commonly and by default interpreted in their structural sense, unless the patentee has demonstrated otherwise.” Prelim. Resp. 13–14 (emphasis omitted) (citations omitted). Further according to Patent Owner, “limitations have repeatedly been held to ‘convey structure even when they also describe a process of manufacture’, especially when the specification demonstrates a structural meaning to the disputed language.” *Id.* at 14 (citations omitted); Ex. 2001 ¶¶ 41–42.

Upon review of the foregoing, and based on the present preliminary record, we discern three different requirements in the claim phrase at issue. The first requirement is that the reed strip “sections *have* different

curvatures.” Ex. 1001, 7:65–8:2 (emphasis added). We agree with Patent Owner’s position, on the present preliminary record, that this is a structural requirement, reflecting that the reed strip is structured to have different curvatures in different sections of the reed strip. This understanding is supported by the ’547 patent Specification, which illustrates different reed strip sections having different curvatures in Figures 6–8. *Id.* at 5:7–11. It is also supported by Dr. Zhang’s testimony that this limitation “simply describe[s] the spring constant in each section of the reed spring,” which is a mechanical property of the spring, and by Dr. Vallee’s testimony. Ex. 1015 ¶¶ 19–21, 38; Ex. 2001 ¶¶ 35–38.

Spring curvature is not a mere intended use of the reed strip, as Petitioner would have it. The cases cited by Petitioner do not support Petitioner’s assertion. *See Chudik*, 851 F.3d at 1368 & 1373 (construing a claim reciting “a protruding surface . . . *arranged to engage* the surface of a cavity” to require that the protruding surface “must at least [be] capable of” engaging the cavity surface) (emphasis by Court); *Anderson*, 662 Fed. Appx. at 960 & 963 (construing a claim reciting “the speed being displayed on the display *for use by a motorist in determining a route of travel*” to be a statement of intended use that does not add a structural limitation to the claimed display) (emphasis by Court).

The second claim requirement is that the different curvatures are “*formed by* [the sections] getting coiled and bent inwards.” Ex. 1001, 8:1–3 (emphasis added). We agree with Petitioner’s position, on the present preliminary record, that this requirement is a product-by-process claim limitation. Pet. 4. It identifies how the different curvatures are *formed* in the different sections, not what the different curvatures are. Patent Owner’s

contrary position overlooks the “formed by” claim term. *See, e.g.*, Prelim. Resp. 11, 12 (contending the claims merely recite “getting coiled and bent inwards”); Ex. 2001 ¶ 39 (same). We also disagree with Patent Owner’s argument that the phrase “formed by getting coiled and bent inwards” connotes, with equal force, both a structural characteristic and a process of manufacture. *See* Prelim. Resp. 13–14. We determine this phrase is clearly directed to a process of manufacturing a spring, not a structural characteristic of the resulting spring. *See, e.g.*, Ex. 1001, 3:44–53 (disclosing that prior art manufacturing processes are difficult and time-consuming), 4:64–67 (“The present invention . . . uses a simple method for disposing different curvatures in multiple front and rear sections of a reed strip”), 5:11–13 (“Each of the unequal curvatures is made by bending the strip toward an identical inner circle.”), 5:42–46, 7:20–25, 7:43–48.

Generally, “[a] product-by-process claim can be anticipated by a prior art product that does not adhere to the claim’s process limitation.” *Amgen*, 580 F.3d at 1369–70. As an exception to that general rule, a product-by-process limitation may be relied upon to distinguish the prior art if the claimed “process *imparts structural differences* to the product,” versus prior art products. *See Greenliant*, 692 F.3d at 1265 & 1268 (emphasis added) (“As we recognized in *Amgen*, if the process by which a product is made imparts ‘structural and functional differences’ distinguishing the claimed product from the prior art, then those differences ‘are relevant as evidence of no anticipation’” (citing *Amgen*, 580 F.3d at 1370, and other cases)); *Amgen*, 580 F.3d at 1366–67 (“a new product may be patented by reciting source or process limitations *so long as the product is new and unobvious*,” so the Court must determine “whether the production of EPO by recombinant

technology [as claimed] *resulted in a new product*, so that claim 1 was not anticipated by the [prior art] urinary EPO”) (emphases added, citations omitted)).

Here, the ’547 patent indicates forming a strip curvature “by bending the strip toward an identical inner circle” modifies the “electronic spatial structure” of the strip to generate the curvature. Ex. 1001, 5:7–18. However, the evidence presently of record does not reflect whether this bending process generates an electronic spatial structure that is different from the electronic spatial structure of other strips. *See, e.g., id.* at 5:7–50. Thus, based on the present record, we conclude the general claim construction rule for product-by-process limitations applies, and the process of manufacture recited in the claims cannot be used to distinguish the claims from the prior art. *See Greenliant*, 692 F.3d at 1267–69; *Amgen*, 580 F.3d at 1365–67, 1369–70; MPEP § 2113.

The third claim requirement is that “the sections have different curvatures . . . *to generate different torque*.” Ex. 1001, 8:1–3 (emphasis added). We determine this is a functional limitation, requiring that the claimed “coil spring” (*id.* at 7:63 (claim 1), 8:40 (claim 3)) must at least be capable of generating different amounts of torque by virtue of having different curvatures in different sections of the spring. This construction is consistent with the ’547 patent Specification, which discloses that the different coil spring curvatures “give[] rise to unequal elastic forces (torque) output from different sections of the strip.” *Id.* at 5:7–18; *see also id.* at 5:19–50, Fig. 9 (describing how different curvatures along the length of a coil spring generate different torques). As one example of how a coil spring having different curvatures along its length is thereby capable of generating

different torques, the '547 patent indicates unequal-torque coil spring 30 may be wrapped on two axles 23 and 24, and unwound from axle 23 on to axle 24 against the various curvatures of spring 30, so spring 30 has a tendency to wrap itself back on to axle 23 thereby generating a torque corresponding to the curvature of the section of spring 30 spanning between the two axles 23 and 24. *Id.* at Figs. 9 & 11, 5:19–7:13.

For the foregoing reasons, based on the present preliminary record, we interpret claims 1 and 3 to require a reed strip having different sections, wherein each section has a different curvature from the other sections, such that the different sections are capable of generating different torques. We further determine, based on the present preliminary record, that the process of manufacture recited in the claims, “formed by [the sections] getting coiled and bent inwards,” cannot be used to distinguish the claims from the prior art.

2. *Remaining Claim Terms*

We determine no further explicit constructions of any claim terms are needed to resolve the issues presented by the arguments and evidence presently of record. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Ltd.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (per curiam) (claim terms need to be construed “only to the extent necessary to resolve the controversy”) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

C. *Indefiniteness (Claims 2 and 4)*

Petitioner asserts claims 2 and 4 of the '547 patent are unpatentable under 35 U.S.C. § 112(b) for indefiniteness. Pet. 3, 86–88. Petitioner cites

the Zhang Declaration in support. Ex. 1015 ¶¶ 356–360. Patent Owner opposes. Prelim. Resp. 54–62. Patent Owner cites the Vallee Declaration in support. Ex. 2001 ¶¶ 97–102.

Claim 2 depends from claim 1, and recites “the unequal-torque coil spring generates usable feedback torque values *with a ratio between 4:1.*” Ex. 1001, 8:18–20 (emphasis added). Claim 4 depends from claim 3, and recites the same limitation as claim 2. *Id.* at 8:63–65. The ’547 patent Specification correspondingly discloses one “objective of the present invention is to allow the unequal-torque coil spring to generate usable feedback torque values with a ratio between 4:1.” *Id.* at 4:12–14. The Specification also describes how a coil spring may be manufactured with five different curvatures A0–A4 along the length of the spring to generate five different torques TC and T1–T4 (*id.* at 5:7–58), then indicates: “A ratio between the above-described torque forces can be set between 4:1” (*id.* at 5:59–60).

Petitioner asserts the term “a ratio between 4:1” in claims 2 and 4 is indefinite, because the ’547 patent Specification and prosecution history “fail[] to inform those skilled in the art about ‘the scope of the invention with reasonable certainty.’” Pet. 86 (quoting *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 910 (2014)). In support, Petitioner contends this claim term is not a term of art in the field of the ’547 patent, and is not defined in the ’547 patent Specification. *Id.* at 86–87 (citing Ex. 1015 ¶ 357; Ex. 1001, 5:59–60). Petitioner also contends the ’547 patent “is entirely silent regarding which of the five torques [recited in claims 1 and 3] are to be arranged in ‘a ratio between 4:1’ as a usable feedback torque.” *Id.* at 86–87 (citing Ex. 1015 ¶¶ 357–359; Ex. 1001, 5:19–50). Petitioner

concludes “it is inappropriate to simply ascribe *some* meaning to [the ’547] patent’s claims in the absence of supporting disclosure.” *Id.* at 87–88 (citing *Nautilus*, 572 U.S. at 911).

Patent Owner responds that claims 2 and 4 pass muster under 35 U.S.C. § 112(b), because they provide reasonable certainty and clarity as to the scope of the invention. Prelim. Resp. 54–62 (citing *Nautilus*, 572 U.S. at 911). In support, Patent Owner contends the ’547 patent specification informs a person of ordinary skill in the art that “the term ‘a ratio between 4:1’ [means] a torque which varies between 4 and 1 times some minimum torque.” *Id.* at 58–62 (citing Ex. 1001, Fig. 12, 5:19–50, 5:59–64); Ex. 2001 ¶¶ 100–102. Patent Owner particularly cites Figure 12 of the ’547 patent, which Patent Owner asserts illustrates maximum torque T₂ which is 4 times minimum torque T₀. Prelim. Resp. 58–60; Ex. 2001 ¶¶ 101–102.

Dr. Vallee testifies in support that: “A ratio between 4:1 would allow the designer to compensate for design variables . . . which could require different maximum and minimum torque values for the desired operation.” Ex. 2001 ¶¶ 101–102; Prelim. Resp. 58, 60.

Upon review of the foregoing, and based on the present preliminary record, we determine it is more likely than not that claims 2 and 4 are indefinite. The parties both apply the *Nautilus* decision as setting the standard to be applied here. There is an open issue, however, as to whether the “reasonable certainty” of *Nautilus* or the “clear” standard of *In re Packard*, 751 F.3d 1307, 1313 (Fed. Cir. 2014), should be applied in this PGR proceeding. *See, e.g., Tinnus Enters., LLC v. Telebrands Corp.*, 733 Fed. Appx. 1011, 1016–18 (Fed. Cir. 2018). For the following reasons, we conclude it is more likely than not that claims 2 and 4 are unpatentable as

indefinite, regardless of whether we apply the *Nautilus* or the *Packard* standard.

The first difficulty with claims 2 and 4 is not a lack of precision in an uncertain or a new art, or in a term of degree, as some of Patent Owner's arguments would have it. The difficulty, instead, is that the claims recite the "spring generates . . . torque *values with a ratio between,*" thereby suggesting a range of ratios is contemplated, but then recite only one ratio "4:1." Ex. 1001, 8:18–20 (emphasis added). The problem is thus a matter of missing subject matter, in failing to specify a maximum ratio corresponding to a minimum ratio of 4:1 (i.e., "between 4:1 and X:Y"), or alternatively a minimum ratio corresponding to a maximum ratio of 4:1 (i.e., "between X:Y and 4:1"). Because of this, the claims are both not reasonably certain under *Nautilus* and fatally unclear under *Packard*.

We disagree with Patent Owner's argument that Figure 12 of the '547 patent informs a person of ordinary skill in the art that the term "a ratio between 4:1" means a torque which varies between 4 and 1 times some minimum torque. There is no scale on the vertical "Kg" axis of Figure 12 to support Patent Owner's assertion that the maximum torque T2 is four times the minimum torque T0, or more generally to indicate that any of the torques is equal to four times any of the other torques. *See* Ex. 1001, Fig. 12. The written description of the '547 patent concerning torque ratios does not support Patent Owner's position, because it merely mimics the unclear verbiage used in the claims. *Id.* at 4:12–14, 5:59–60. The additional '547 patent disclosures cited by Patent Owner as allegedly tying the verbiage of claims 2 and 4 to the "maximum" and "minimum" torques in Figure 12 is similarly unavailing. *Id.* at 5:19–50. These disclosures indicate Figure 12

illustrates the “arc” trend of the torque values along the length of reed strip 3, not that Figure 12 illustrates any specific torque ratios or range of torque ratios. *Id.*

The second difficulty with claims 2 and 4 is that the Specification and claims are unclear in first describing five different torque regions TC and T1–T4 (*id.* at 5:19–50, 8:4–17), and then indicating “[a] ratio *between the above-described torque forces* can be set between 4:1” (*id.* at 5:59–60 (emphasis added), 8:18–20). This disclosure does not specify which of the five previously-described torques is being compared in the ratio of 4:1.

For the foregoing reasons, we determine the information presented in the Petition demonstrates it is more likely than not that claims 2 and 4 of the ’547 patent are unpatentable under 35 U.S.C. § 112(b) as indefinite.

D. Anticipation by Lin ’943 (Claims 1 and 3)

Petitioner asserts claims 1 and 3 of the ’547 patent are unpatentable under 35 U.S.C. § 102(a)(2) as anticipated by Lin ’943. Pet. 2, 14–31. Petitioner cites the Zhang Declaration in support. Ex. 1015 ¶¶ 41–127. Patent Owner opposes. Prelim. Resp. 23–38. Patent Owner cites the Vallee Declaration in support. Ex. 2001 ¶¶ 50–71.

1. Law of Anticipation

“A patent [claim] is invalid for anticipation under 35 U.S.C. § 102 if a single prior art reference discloses each and every limitation of the claimed invention.” *Purdue Pharma L.P. v. Epic Pharma, LLC*, 811 F.3d 1345, 1351 (Fed. Cir. 2016) (citing *Schering Corp. v. Geneva Pharm., Inc.*, 339 F.3d 1373, 1377 (Fed. Cir. 2003)). “A reference may anticipate inherently if a claim limitation that is not expressly disclosed ‘is necessarily

present, or inherent, in the single anticipating reference.” *In re Montgomery*, 677 F.3d 1375, 1379–80 (Fed. Cir. 2012) (quoting *Verizon Servs. Corp. v. Cox Fibernet Va., Inc.*, 602 F.3d 1325, 1337 (Fed. Cir. 2010) and *Schering*, 339 F.3d at 1377). “[I]nherency . . . may not be established by probabilities or possibilities.” *Id.* at 1380 (citing *Bettcher Indus., Inc. v. Bunzl USA, Inc.*, 661 F.3d 629, 639 (Fed. Cir. 2011) and *In re Oelrich*, 666 F.2d 578, 581 (CCPA 1981)).

2. Summary of Lin '943

Lin '943 discloses “[a] window covering [that] includes at least one spring motor.” Ex. 1003, code (57). An excerpt from Figure 1, and the entirety of Figure 4, are reproduced below.

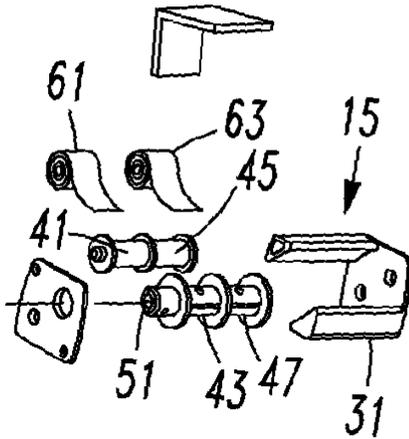


Figure 1 (Excerpt)

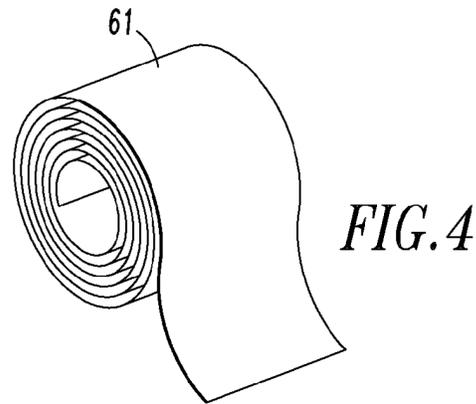


Figure 4

Figure 1 is an exploded view of spring motor 15, powered by two spring members 61 and 63, for use in connection with window covering 1 (not shown in the excerpt above) via shaft 13 (also not shown in the excerpt above) received in opening 51 of second roller 43. *Id.* at Fig. 1, ¶¶ 28, 36, 41, 44, 45, 50. Figure 4 is a perspective view of spring 61; spring 63 is identical to spring 61. *Id.* ¶¶ 31, 50. Spring 61 is attached between first

roller 41 and second roller 43, and spring 63 is attached between third roller 45 and fourth roller 47, each in a substantially similar fashion as the '547 patent's coil spring 30 is attached between axle 23 and coiling axle 24. *Id.* ¶¶ 48, 50. Springs 61 and 63 are unequal torque springs, as is illustrated in the load graph of Figure 6. *Id.* ¶¶ 33, 45, 49–52, 54.

3. *Claim 1*

a. Reed Strip Sections Having Different Curvatures

Petitioner asserts spring 61 of Lin '943 comprises a reed strip having different sections that “have different curvatures . . . to generate different torque,” as claimed. Pet. 14–16, 19–20 (citing Ex. 1003, Abstract, Figs. 4–5, ¶¶ 45, 46, 48, 49⁹; Ex. 1015 ¶¶ 44, 46, 47, 54–58). For the following reasons, we conclude the Petition does not support this contention sufficiently to demonstrate it is more likely than not that claim 1 is anticipated by Lin '943.

To the extent this contention relies on Petitioner's claim construction that the curvature limitation is not a structural limitation, and instead is a mere statement of intended use, we are not persuaded on the present preliminary record for the reasons provided above. *See supra* Section V.B.1.

The cited disclosures of Lin '943 reflect that different sections of spring 61 generate different torques by having a different “strength,” “microstructure,” or “toughness.” Ex. 1003, Abstract, ¶¶ 45, 49. It is not clear to us, and Petitioner does not explain, how or why a different strength,

⁹ A quotation of the Lin '943 disclosure on page 19 of the Petition (“[t]he first spring member is configured to . . .”) is found in paragraph 49 of Lin '943, not paragraph 45 as is indicated in the Petition.

microstructure, or toughness as described in Lin '943 equates to a different curvature as required by claim 1. *See* Pet. 14–16, 19–20. Dr. Zhang's testimony does not appear to bridge this gap. *See* Ex. 1015 ¶¶ 46, 54–58. Thus, we conclude the Petition does not demonstrate it is more likely than not that claim 1 is anticipated by Lin '943.

b. Second Torque Equal to Maximum Value of First Torque

Petitioner asserts spring 61 of Lin '943 provides “*a second torque that follows the first torque and is equal to a maximum value of the first torque . . . between the second length and a third length,*” as claimed. Ex. 1001, 8:8–11 (emphases added); Pet. 15–18, 22 (citing Ex. 1003, Fig. 6, ¶ 52; Ex. 1015 ¶¶ 47–49, 77–80). For the following reasons, we conclude the Petition supports this contention sufficiently to demonstrate it is more likely than not that claim 1 is anticipated by Lin '943.

Petitioner relies on the spring load graph depicted in Figure 6 of Lin '943, which Petitioner annotates as reproduced below to illustrate Petitioner's contention. Pet. 17; Ex. 1015 ¶ 49.

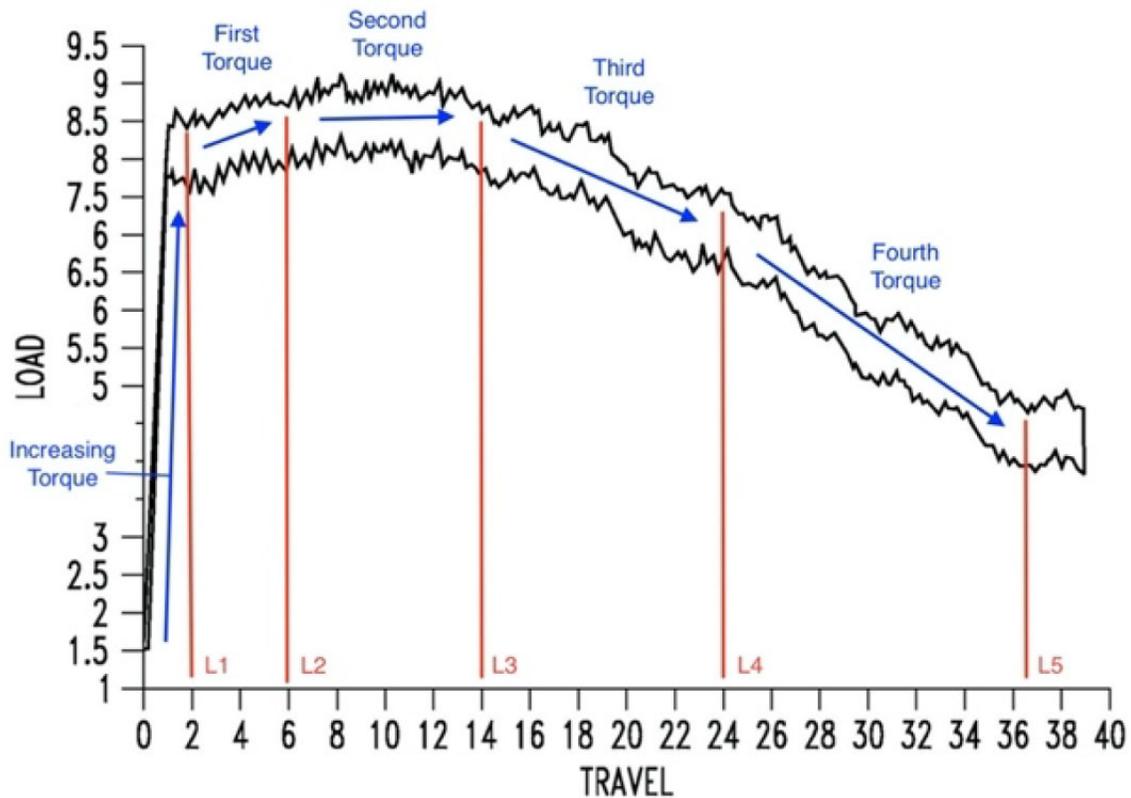


FIG. 6

Figure 6 is a graph illustrating the load applied by spring 61 when window covering material is extended.¹⁰ Ex. 1003 ¶¶ 33, 52. Petitioner has annotated Figure 6 to identify where Petitioner contends the graph reflects the torques (in blue) and lengths (in red) of claim 1 to be found in the graph. Pet. 16–17, 22; Ex. 1015 ¶¶ 47–49. Thus, Petitioner contends the “second torque” is found between the 6-inch position and the 14-inch position along

¹⁰ Lin ‘943 does not appear to describe the difference between the upper and lower curves depicted in Figure 6. *See, e.g.*, Ex. 1003 ¶¶ 33, 52. Neither Dr. Zhang nor Dr. Vallee provides a direct opinion on this issue, although Dr. Vallee testifies that, generally speaking, “[m]easurements of force or torque would be recorded as the spring motor was wound or unwound.” Ex. 2001 ¶ 58; *id.* ¶ 83 (opining that Ex. 1004, Fig. 3(a), similarly “shows two curves, presumably measurements of torque while the spring is wound and unwound”).

the length of spring 61. Pet. 16–17, 22; Ex. 1015 ¶¶ 77–80; Prelim. Resp. 26 n.3 (“Though units are not provided in FIG. 6, the description of the Lin ’943 reference refers to inches for length measurements.”).

Patent Owner asserts the identified “second torque” region in Figure 6 “does not show torque ‘equal to a maximum value of the first torque’ (e.g., a substantially constant torque region),” as required by claim 1. Prelim. Resp. 26–27 (citing Ex. 2001 ¶ 56). Instead, in Patent Owner’s view, the upper curve in this region “demonstrates a constantly changing, parabolic torque region” that starts with a load of about 8.7 kg at 6 inches, increases to a load of about 9.1 kg at 8 inches, and decreases to a load of about 8.6 kg at 14 inches. *Id.* at 27–28 (citing Ex. 2001 ¶ 57). Patent Owner contends the lower curve reflects a similar parabolic shape at lesser loads. *Id.*

Patent Owner recognizes that Figure 6 of Lin ’943 “depicts test data representative of the measured load values of an actual spring motor being taken under real world conditions using measurement sensors.” *Id.* at 28 (citing Ex. 2001 ¶ 58). “As such, sensor noise is evident in the constant fluctuation of the torque measurements throughout” Figure 6. *Id.* Patent Owner asserts that “[f]iltering out this sensor noise, a person of ordinary skill in the art would understand that the region between 6 and 14 inches demonstrates a parabolically changing torque region” as described above. *Id.*

We have difficulty discerning a parabolic arc in the region between 6 and 14 inches of travel in Figure 6 of Lin ’943, as Patent Owner contends, is present. The scattering of the measurements in that region due to sensor noise, in our view, tends to swing up and down around a constant median value of about 8.7 kg in the upper curve, and about 7.9 kg in the lower

curve, rather than illustrating a discernable upward trend followed by a discernable downward trend.

More generally, in following the curves shown in Figure 6 from left to right, we discern an initial sharp upward trend in load (from 0 inch to about 1 inch of travel), followed by a slight upward trend in load (from about 1 inch to an indeterminate point of travel), followed by a definite downward trend in load (from another indeterminate point to about 39 inches of travel). This overall impression of Figure 6 is not inconsistent with Petitioner’s position that the region between 6 and 14 inches of travel corresponds to a constant torque, after accounting for the sensor noise in the recorded data. *See, e.g.*, Ex. 1015 ¶¶ 78–79 (opining that this region reflects a “steady” torque).

Patent Owner asserts Petitioner’s position is inconsistent with paragraph 52 of Lin ’943, which describes Figure 6 as showing “the load applied by the spring members . . . *progressively increase[s]* when the window covering material is raised or *progressively decrease[s]* when the window covering material is lowered.” Ex. 1003 ¶ 52 (emphases added); Prelim. Resp. 31–33; Ex. 2001 ¶¶ 61, 63. From our understanding of what is shown in Figure 6, based on the present record, a raising of the window covering corresponds to a decreasing travel of the spring, moving from right to left in Figure 6. Similarly, a lowering of the window covering corresponds to an increasing travel of the spring, moving from left to right in Figure 6. The slight upward trend in load we discern beginning at about 1 inch is not inconsistent with the disclosure in Lin ’943 that, overall, Figure 6 demonstrates a progressive downward trend in load from 8.5 kg to 5.5 kg. Ex. 1003 ¶ 52. We note, also, that the upper curve in Figure 6

reflects a load of 8.5 kg at *two* spring positions, at about 1 inch and at about 14 inches. From the present record, it may be that paragraph 52 of Lin '943 is referring to the latter position as beginning the progressive downward trend.

In view of the foregoing, we determine the record presently before us sufficiently supports Petitioner's contention that Figure 6 of Lin '943 discloses the claimed second torque, so as to establish it is more likely than not that claim 1 is anticipated by Lin '943.

c. Type of Window Covering Material

Patent Owner contends Lin '943 fails to anticipate claim 1 because Lin '943 discloses using its spring to support roman blinds or cellular shades, whereas the '547 patent discloses using its spring to support venetian blinds. Prelim. Resp. 29–33 (citing Ex. 1003, Figs. 1 & 8, ¶ 52; Ex. 2001 ¶¶ 59–64). According to Patent Owner: “These different types of coverings necessitate a significant difference [in spring characteristics] due to [the] manner in which the lift cords of blinds are connected with the covering material.” *Id.* at 29, 32–33.

This argument is not persuasive, because it relies on unclaimed limitations. Claim 1 of the '547 patent is directed simply to “[a]n unequal torque coil spring,” and does not recite any limitation concerning the environment in which the spring is employed, much less a specific type of window covering to be supported by the spring. Ex. 1001, 7:63–8:17.

d. Conclusion as to Claim 1

We institute review of claim 1 as anticipated by Lin '943, pursuant to *SAS* and the *SAS* Guidance. Nonetheless, as discussed in the Consolidated

Guide (at 5–6), we have also addressed certain aspects of Petitioner’s contentions as to anticipation, on the present record. We conclude the record does not sufficiently support Petitioner’s contention that Lin ’943 discloses a reed strip having sections with “different curvatures.” We conclude the record sufficiently supports Petitioner’s contention that Lin ’943 discloses a reed strip having the claimed second torque. We conclude Patent Owner’s argument seeking to distinguish claim 1 from Lin ’943 based on the type of window coverings disclosed in Lin ’943 is not persuasive, because it relies on unclaimed limitations.

4. *Claim 3*

Claim 3 of the ’547 patent recites a spring motor comprising a coil spring, recited using language identical to that used in claim 1, discussed above. *See* Ex. 1001, 8:21, 8:39–57. Patent Owner’s Preliminary Response as to claim 3 addresses only the coil spring limitations that are identical to claim 1, as discussed above. *See* Prelim. Resp. 34–38; Ex. 2001 ¶¶ 66–71. For the reasons identified above in relation to claim 1, we institute review of claim 3 to determine whether it is anticipated by Lin ’943. *See supra* Section V.D.3.

In addition, though not raised by Patent Owner on the present record, we have reservations concerning Petitioner’s contention that Lin ’943 discloses the four “chainrings” recited in claim 3. Ex. 1001, 8:31–36 (four chainring limitations); Pet. 26–27 (asserting the chainrings linked to the first and second reel drums, and the chainring at the end of the axle, are all found in Lin ’943 where shaft 13 is received in second roller 43), 27 (asserting the

chainring at the end of the coiling axle is found in Lin '943 where shaft 13 interfaces with pulleys 17).

E. Obviousness over Lin '943 and Yamashita (Claims 1 and 3)

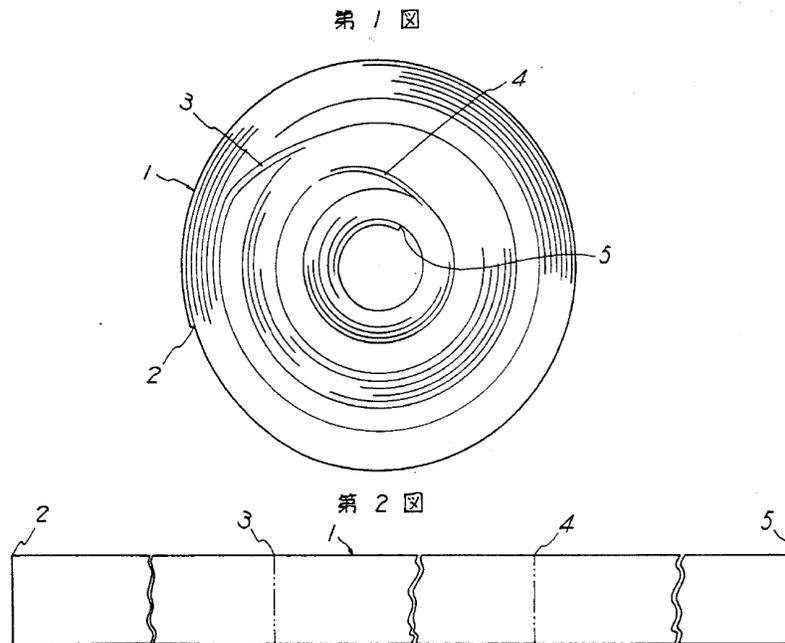
Petitioner asserts claims 1 and 3 of the '547 patent are unpatentable under 35 U.S.C. § 103 as having been obvious over Lin '943 and Yamashita. Pet. 2, 31–40. Petitioner cites the Zhang Declaration in support. Ex. 1015 ¶¶ 128–149. Patent Owner opposes. Prelim. Resp. 38–39. Patent Owner cites the Vallee Declaration in support. Ex. 2001 ¶¶ 72–74.

1. Law of Obviousness

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness, if made available in the record. *See Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

2. *Summary of Yamashita*

Yamashita discloses “[a] constant-force mainspring that provides different outputs in stages.” Ex. 1007, 1.¹¹ Figures 1 and 2 are reproduced below.



Ex. 1008, 2. These figures illustrate mainspring 1 formed as a continuous coil, in which outermost section 2–3 has a greatest winding radius to provide a minimum output; intermediate section 3–4 has a medium winding radius to provide a medium output; and innermost section 4–5 has a smallest winding radius to provide a maximum output. Ex. 1007, 2. This results in mainspring 1 providing “stepwise changes in the tractive force.” *Id.*

¹¹ Our citations to Exhibits 1007 and 1008 refer to the page numbering added by Petitioner at the bottom of each page.

3. *Claims 1 and 3*

Petitioner contends “to the extent the Board finds that [Lin ’943] does not explicitly disclose that the spring generates different outputs by having different curvatures . . . , claims 1 and 3 are nonetheless unpatentable because they are obvious in view of the combination of [Lin ’943] and Yamashita.” Pet. 31. For this ground, Petitioner asserts Lin ’943 discloses every limitation of claims 1 and 3 as set forth in the Lin ’943 anticipation ground, except for the spring having “different curvatures,” which Petitioner asserts is disclosed by Yamashita. Pet. 34–40; Ex. 1015 ¶¶ 134–149. Petitioner provides reasons for why it would have been obvious to modify spring 61 of Lin ’943 to have different curvatures (as opposed to different strengths, microstructures, or toughnesses) along its length to generate different torques, in light of Yamashita. Pet. 33–34, 35–36 (citing Ex. 1001, 3:39–44; Ex. 1003 ¶¶ 11, 16, 45; Ex. 1007, 2; Ex. 1015 ¶¶ 131–133, 136–139).

Patent Owner objects on the basis that Lin ’943 fails to disclose a coil spring having the claimed second torque, as discussed above in relation to the Lin ’943 anticipation ground. Prelim. Resp. 38–39; Ex. 2001 ¶¶ 72–74. For reasons provided above, we determine the present record sufficiently supports Petitioner’s contention that Lin ’943 discloses a reed strip having the claimed second torque, so as to establish it is more likely than not that claims 1 and 3 would have been obvious over Lin ’943 and Yamashita.

Petitioner’s other contentions in relation to the ground, including the contentions as to why it would have been obvious to modify the spring of Lin ’943 to employ different curvatures, stand unrebutted in the present record. We thus determine, based on that record, that the information

presented in the Petition demonstrates it is more likely than not that claims 1 and 3 would have been obvious over Lin '943 and Yamashita.

F. Obviousness over Admitted Prior Art and Lin '943 (Claims 1 and 3)

Petitioner asserts claims 1 and 3 of the '547 patent are unpatentable under 35 U.S.C. § 103 as having been obvious over admitted prior art and Lin '943. Pet. 2, 40–55. Petitioner cites the Zhang Declaration in support. Ex. 1015 ¶¶ 150–203. Patent Owner opposes. Prelim. Resp. 40–41. Patent Owner cites the Vallee Declaration in support. Ex. 2001 ¶¶ 75–76.

1. Summary of Admitted Prior Art in the '547 Patent

The admitted prior art in the '547 patent is discussed above. *See supra* Section II.B.1.

2. Claims 1 and 3

Petitioner contends the prior art curtain set 1 described in the '547 patent (Figures 1–5) discloses every limitation of claims 1 and 3 except that (i) coil spring 20 is an equal-torque spring rather than the claimed unequal-torque spring, so (ii) coil spring 20 does not have different sections with different curvatures generating the claimed increasing, first, second, third, and fourth “different” torques. Pet. 41–42, 44–55; Ex. 1015 ¶¶ 151–152, 158–203. Petitioner asserts the '547 patent admits it was “well known” in the prior art “that the needed pulling force [for a curtain set] varies during the curtain-folding process,” such that “there was a known need for a spring member of a spring motor of a curtain set to generate varied torque to meet the actual requirements for torque.” Pet. 41–42, 43, 45 (citing Ex. 1001, 2:32–3:44); Ex. 1015 ¶¶ 151–152, 154, 162. Patent Owner

does not, on the present preliminary record, oppose Petitioner’s foregoing contentions. *See* Prelim. Resp. 40–41.

Petitioner next contends Lin ’943 discloses an unequal-torque coil spring, having different sections with different curvatures generating the five different torques recited in the claims, as set forth in the Lin ’943 anticipation ground. Pet. 44–46 (claim 1), 52–54 (claim 3); Ex. 1015 ¶¶ 158–167, 198–203. Petitioner asserts it would have been obvious to modify the admitted prior art curtain set of the ’547 patent to incorporate an unequal-torque coil spring such as disclosed in Lin ’943, as motivated by the combined teachings of the admitted prior art and Lin ’943. Pet. 43–44, 45–46; Ex. 1015 ¶¶ 154–157, 161–167.

Patent Owner opposes on the basis that Lin ’943 fails to disclose a coil spring having the claimed second torque, as discussed above in relation to the Lin ’943 anticipation ground. Prelim. Resp. 40–41; Ex. 2001 ¶¶ 57–58, 75–76. For reasons provided above, we determine the present record sufficiently supports Petitioner’s contention that Lin ’943 discloses a reed strip having the claimed second torque, so as to establish it is more likely than not that claims 1 and 3 would have been obvious over admitted prior art and Lin ’943. *See supra* Section V.D.3.b.

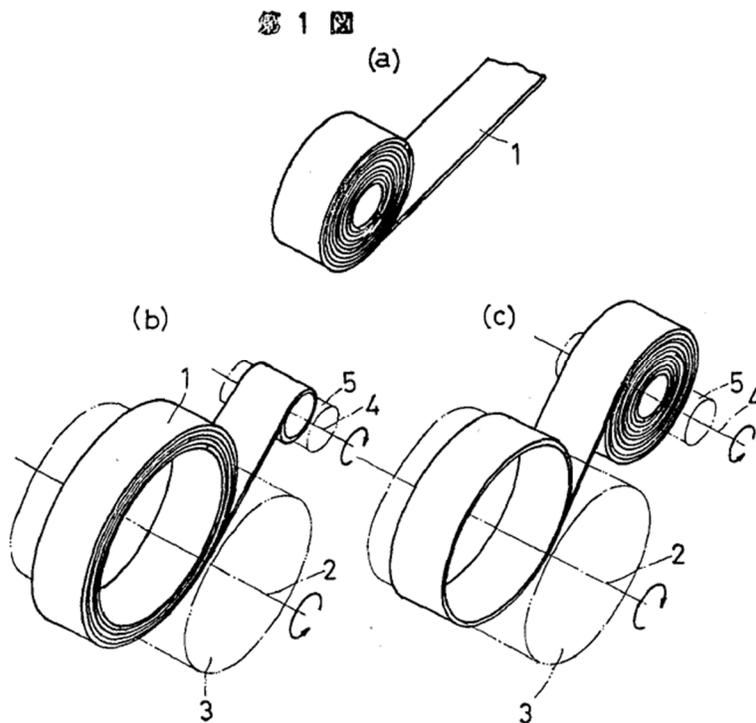
However, for other reasons provided above, we determine the present record does not sufficiently support Petitioner’s contention that Lin ’943 discloses a reed strip having sections with “different curvatures,” so as to establish it is more likely than not that claims 1 and 3 would have been obvious over admitted prior art and Lin ’943. *See supra* Section V.D.3.a. We nonetheless institute review of claims 1 and 3 on this ground, pursuant to *SAS* and the *SAS* Guidance.

G. Obviousness over Maeda (Claim 1)

Petitioner asserts claim 1 of the '547 patent is unpatentable under 35 U.S.C. § 103 as having been obvious over Maeda. Pet. 2, 55–64. Petitioner cites the Zhang Declaration in support. Ex. 1015 ¶¶ 204–245. Patent Owner opposes. Prelim. Resp. 41–50. Patent Owner cites the Vallee Declaration in support. Ex. 2001 ¶¶ 77–89.

1. Summary of Maeda

Maeda discloses a “torque-characteristic mainspring.” Ex. 1004, 1.¹² Figures 1(a)–(c) are reproduced below.

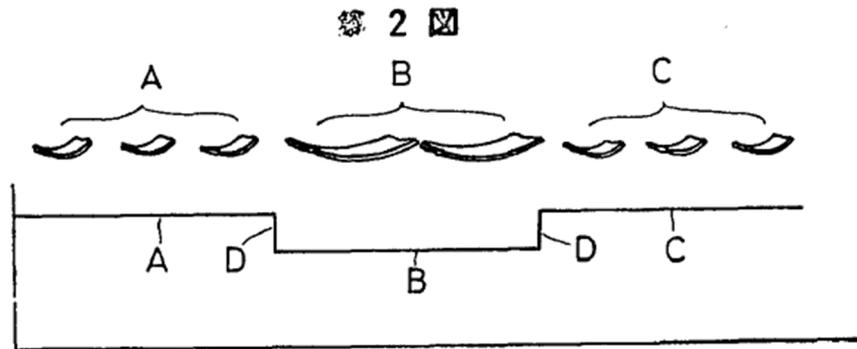


Ex. 1005, 3. Figures 1(a)–(c) illustrate mainspring 1, which is wound around reel 3 and winding drum 5, such that the winding of mainspring 1 on

¹² Our citations to Exhibits 1004 and 1005 refer to the page numbering added by Petitioner at the bottom of each page.

to and off of drum 5 accumulates and dissipates torque around output axis 4.
Ex. 1004, 1–2.

Mainspring 1 has “level-difference-based torque characteristics that are achieved by providing greater curvature in the center section of the entire length than the curvature in other sections so as to create a difference in the level of the step.” *Id.* at 1. Thus, Figure 2 is reproduced below.



Ex. 1005, 3. Figure 2 illustrates how center section B of mainspring 1 has a first curvature factor, while right and left sections A and C have a second curvature factor, with a level difference D between the first and second curvature factors. Ex. 1004, 2. The curvature factor of section B is greater than that of sections A and C, so the repulsive force provided at sections A and C is stronger than at section B. *Id.*

The “torque characteristics” of mainspring 1 are illustrated in Figures 3(a)–(d). *Id.* at 2, 3; Ex. 1005, 3. Figures 3(a) and 3(c) are reproduced in our analysis below.

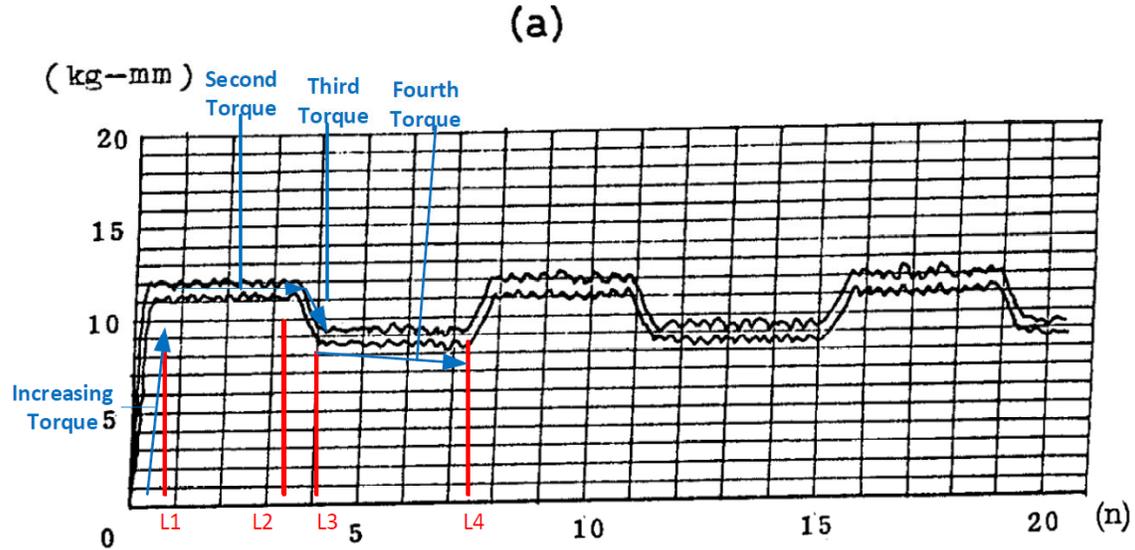
2. Claim 1

Petitioner contends Maeda’s mainspring 1 is an unequal-torque coil spring comprising a reed strip having different sections, with the sections having different curvatures to generate different torques. Pet. 55–56, 60–61;

Ex. 1015 ¶¶ 205–206, 216–225. Patent Owner does not, on the present preliminary record, oppose this contention. See Prelim. Resp. 41–50.

a. Increasing, Second, Third, and Fourth Torques

Petitioner contends Maeda’s Figure 3(a), reproduced below with Petitioner’s annotations, discloses that the different torques generated by mainspring 1 include the increasing torque, the second torque, the third torque, and the fourth torque of claim 1. Pet. 56–57, 61–64; Ex. 1015 ¶¶ 207, 226–245.



Winding → Number of turns ← Rewinding

Figure 3(a) is a graph illustrating the torque characteristics of a spring, apparently in units of kg-mm on the vertical axis, versus the number of turns n of the spring along the horizontal axis.¹³ Ex. 1004, 5. Petitioner has

¹³ Maeda’s written description of Figures 3(a)–3(d) is exceedingly sparse, reflecting only that “[t]he torque characteristics thus recorded are illustrated in Figure 3” (Ex. 1004, 2), and “Figure 3 shows line graphs that illustrate the

annotated Figure 3(a) to identify where Petitioner contends the graph reflects the torques (in blue) and lengths (in red) of claim 1 to be found in the graph. Pet. 56–57, 61–64; Ex. 1015 ¶¶ 207, 226–245. Thus, Petitioner’s view is that Maeda’s Figure 3(a) discloses a spring having all of the properties of claim 1, except a *first torque* that follows the increasing torque and *slowing increases*.

Patent Owner contends Maeda’s Figure 3(a) does not disclose, as recited in claim 1, “*a fourth torque that . . . gradually decreases.*” Ex. 1001, 8:14–17 (emphases added); Prelim. Resp. 42–46 (citing Ex. 2001 ¶¶ 80–84). Patent Owner asserts “[t]he Petition attempts to disguise the failings of Maeda by artificially grafting an alleged trend line (e.g. blue trend line labeled ‘fourth torque’) showing alleged downward movement of the torque.” Prelim. Resp. 43–44 (citing Ex. 2001 ¶ 82). Patent Owner’s view is that the recorded torque between turns 4 and 7 in Figure 3(a) is not decreasing, but rather remains constant, given the limitations of signal noise in the recorded data. *Id.* at 44–45 (citing Ex. 2001 ¶ 83). Patent Owner asserts this view is supported by Figure 2 of Maeda, reflecting that the spring is designed to have a “constant curvature” and therefore a “constant torque” within any given region B of the spring, which corresponds to turns 4 through 7 in Figure 3(a). *Id.* at 45–46 (citing Ex. 2001 ¶ 84).

In following the curves shown in Maeda’s Figure 3(a) from left to right, between Petitioner’s L3 (approximately at turn 4) and L4 (approximately at turn 7.25), we discern a potential albeit very slight

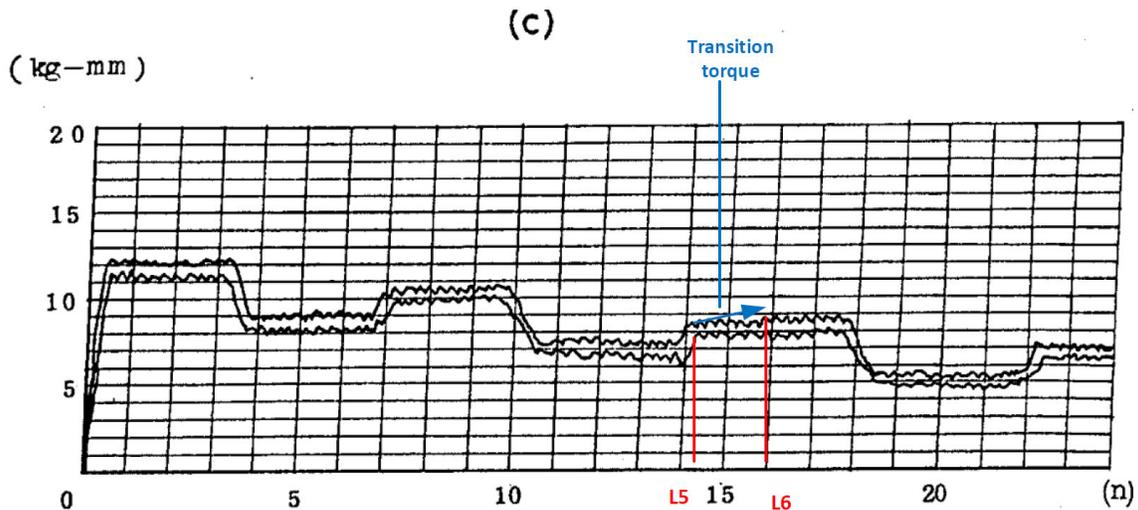
torque characteristics of the present invention” (*id.* at 3). Dr. Vallee testifies that Figure 3(a) “graphs load (in number of turns (n)) vs. Torque (kilogram-millimeters).” Ex. 2001 ¶ 81 n.2.

downward trend in torque. In particular, it appears that the ending torque values for each of the upper and lower curves is slightly less than the respective beginning torque values. Nonetheless, it may very well be, as Patent Owner suggests, that the sensor noise in the recorded data is too significant in this region to reach an affirmative conclusion as to a decreasing trend based on a preponderance of the evidence. For example, Maeda's Figure 2 tends to suggest each of the five complete steps illustrated in Figure 3(a) is designed to provide a constant level of torque. Moreover, several other steps shown in Maeda's Figure 3(a) look to be more level than the step of Petitioner's "fourth torque" region, after accounting for the sensor noise in the recorded data. For example, Petitioner identifies a "second torque" region in Figure 3(a) which claim 1 requires to be "equal to" a maximum value of the first torque, and therefore held constant at that value. Pet. 56–57; Ex. 1001, 8:6–11. To the extent we are able to discern a very slight downward trend in Petitioner's fourth torque region, versus a constant torque in Petitioner's second torque region, the degree of the downward trend may be subsumed within the squiggles that signify sensor noise.

In view of the foregoing, we determine the record presently before us sufficiently supports Petitioner's contention that Maeda's Figure 3(a) discloses a spring having the increasing, second, third, and fourth torques, so as to establish it is more likely than not that claim 1 would have been obvious over Maeda.

b. First Torque, and Obviousness

Petitioner contends Maeda's Figure 3(c), reproduced below with Petitioner's annotations, discloses a spring having "a transition torque" that "follows a previous increasing torque and slowly increases between two lengths [L5 and L6]," which is "featured as 'a first torque' in" claim 1. Pet. 57–58, 62–63; Ex. 1015 ¶¶ 208, 232–236.



Winding → Number of turns ← Rewinding

Figure 3(c) is a graph illustrating the torque characteristics of a spring, in a similar fashion to Figure 3(a).¹⁴ Ex. 1004, 5. Petitioner has annotated Figure 3(c) to identify where Petitioner contends the graph reflects a slowly increasing transition torque (in blue) between two lengths (in red). Pet. 57–58, 62–63; Ex. 1015 ¶¶ 208, 232–236.

Petitioner asserts it would have been obvious to modify the embodiment of Maeda's Figure 3(a), to include the first torque of claim 1, in

¹⁴ Maeda does not disclose the conditions under which the various graphs illustrated in Figures 3(a), 3(b), 3(c), and 3(d) were recorded, or discuss the significance of the different curves illustrated therein.

light of the embodiment of Maeda's Figure 3(c). Pet. 59–60, 62–63; Ex. 1015 ¶¶ 204, 211–214, 232–236. For motivation, Petitioner cites the '547 patent as admitting it was known in the prior art that “there was a known need for a spring member of a spring motor of a curtain set to generate varied torque to meet the actual requirements for torque.” Pet. 59 (citing Ex. 1001, 3:39–44); Ex. 1015 ¶ 211. Petitioner then asserts the spring of Maeda's Figure 3(a) “is in need for generating different torque characteristics by designing curvature factors *to satisfy a particular end requirement*,” and the spring of Maeda's Figure 3(c) “illustrates a spring having a transition torque” that will satisfy the needed end requirement. Pet. 59–60, 62–63 (emphasis added); Ex. 1015 ¶¶ 211–212, 233–235.

Patent Owner contends Maeda's Figure 3(c) does not disclose, as recited in claim 1 for the first torque, a torque that “*slowly increases*” between turns 14 and 16. Ex. 1001, 8:6–8 (emphasis added); Prelim. Resp. 46–49 (citing Ex. 2001 ¶¶ 85–88). Patent Owner asserts “[t]he Petition attempts to disguise the failings of Maeda by imposing an alleged trend line (e.g. blue trend line labeled ‘transition’) showing alleged upward movement of the torque” in this region. Prelim. Resp. 47 (citing Ex. 2001 ¶ 86). Patent Owner's view is that the recorded torque in this region of Figure 3(c) is not increasing, but rather remains constant, given the limitations of signal noise in the recorded data. *Id.* at 47–49 (citing Ex. 2001 ¶¶ 86–88).

In following the curves shown in Maeda's Figure 3(c) from left to right, between Petitioner's L5 (approximately at turn 14) and L6 (approximately at turn 16), the scattering of the measurements in that region due to sensor noise, in our view, tends to swing up and down around a

constant median value of about 8.5 kg-mm in the upper curve, and about 7.9 kg-mm in the lower curve, rather than illustrating a discernable upward trend. Thus, based on the present record, we find Patent Owner's reading of Figure 3(c) to be more persuasive than Petitioner's.

Although not challenged by Patent Owner, we also question Petitioner's rationale for obviousness, which relies on the region in Maeda's Figure 3(c) extending approximately between turns 14 and 16 as disclosing a suitable "end requirement" for use in the spring of Maeda's Figure 3(a) between turns 0 and 1. Petitioner does not explain how these two regions must satisfy similar "end requirements" in support of the proposed obviousness. *See* Pet. 59–60, 62–63. Dr. Zhang's testimony also appears to lack a supporting explanation. Ex. 1015 ¶¶ 204, 211–213, 233–235. Indeed, the two regions appear to be materially different. The region in Figure 3(c) is the transition between two steps of the spring, in the middle of the spring, not at the end of the spring. The region in Figure 3(a) by contrast is the transition from a sharp increase in torque at one end of the spring to the first step of the spring. Thus, based on the present record, there does not appear to be a rational basis for the proposed obviousness ground.

c. Conclusion

For the foregoing reasons, we conclude the Petition does not demonstrate it is more likely than not that claim 1 is obvious over Maeda. Despite that conclusion, we institute review of claim 1 on this ground, pursuant to *SAS* and the *SAS* Guidance.

H. Obviousness over Lin '109 and Maeda (Claim 3)

Petitioner asserts claim 3 of the '547 patent is unpatentable under 35 U.S.C. § 103 as having been obvious over Lin '109 and Maeda. Pet. 2, 64–73. Petitioner cites the Zhang Declaration in support. Ex. 1015 ¶¶ 246–283. Patent Owner opposes. Prelim. Resp. 50. Patent Owner cites the Vallee Declaration in support. Ex. 2001 ¶¶ 90–91.

1. Summary of Lin '109

Lin '109 discloses a reeling device for curtain cords, including multiple S-shaped resilient coils. Ex. 1006, code (57). Figure 3 of Lin '109 is reproduced below.

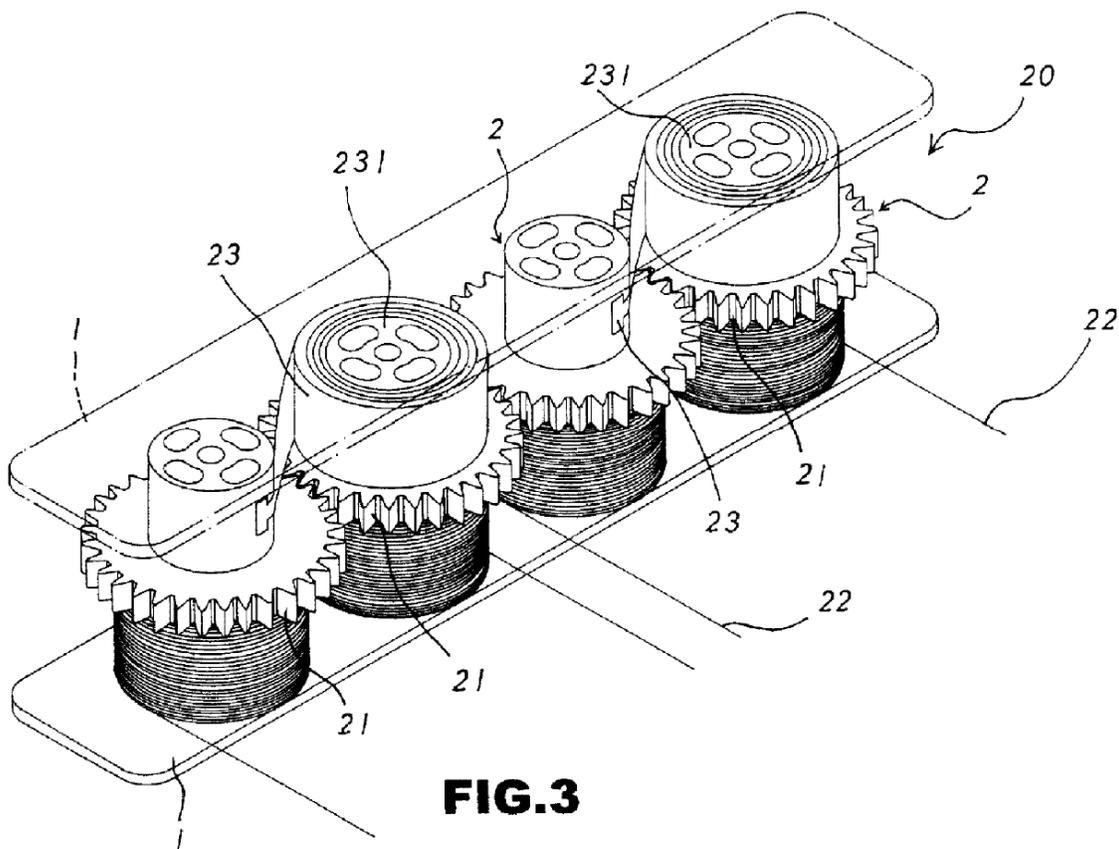


FIG. 3

Figure 3 is a perspective view of reeling device 20, comprising two S-shaped resilient coils 23, each attached to two adjacent guiding wheels 2 with inter-meshing toothed edges 21, to provide a resilient force to cords 22 for suspending a curtain at a desired height. *Id.* ¶¶ 2, 5, 18, 23–24. Although Lin ’109 describes coils 23 as “resilient,” Lin ’109 does not specify any details of such resiliency, or the structure(s) of coils 23 that leads to the resiliency. *Id.* ¶¶ 5, 23–24, 27–28.

2. Claim 3

Petitioner contends Lin ’109 discloses every limitation of claim 3 except that coil springs 23 are not disclosed as being (i) unequal-torque springs, (ii) having different sections with different curvatures generating the claimed increasing, first, second, third, and fourth “different” torques. Pet. 64–66, 67–73; Ex. 1015 ¶¶ 247–249, 253–283. Petitioner contends Maeda renders obvious the use of an unequal-torque coil spring, having different sections with different curvatures generating the five different torques recited in claim 3, as set forth in the Maeda obviousness ground as to claim 1. Pet. 66, 70–72; Ex. 1015 ¶¶ 250–251, 277–280.

For additional obviousness as to claim 3, Petitioner asserts the ’547 patent admits “there was a known need for a spring member of a spring motor of a curtain set to generate varied torque to meet the actual requirements for torque.” Pet. 66 (citing Ex. 1001, 3:39–44); Ex. 1015 ¶ 250. Petitioner asserts it would have been obvious to modify one coil spring 23 of Lin ’109, to be an unequal-torque coil spring such as was obvious over Maeda, “to solve the known need and enable the coil of the reeling device in [Lin ’109] to output different amount of torque so as to

keep the operation of the curtain in balance.” Pet. 66–67 (citing Ex. 1004, 2; Ex. 1006, code (57), ¶¶ 5, 23); Ex. 1015 ¶¶ 250–252. Patent Owner does not, on the present preliminary record, oppose Petitioner’s foregoing contentions of obviousness. *See* Prelim. Resp. 50.

Patent Owner objects on the basis that Maeda’s Figure 3(a) fails to disclose a coil spring having the claimed fourth torque, and Maeda’s Figure 3(c) fails to disclose a coil spring having the claimed first torque, as discussed above in relation to the Maeda obviousness ground as to claim 1. Prelim. Resp. 50; Ex. 2001 ¶¶ 90–91. For reasons provided above, we determine the present record sufficiently supports Petitioner’s reliance on Maeda for the fourth torque, but not Petitioner’s reliance on Maeda for the obviousness of the first torque, so as to establish it is more likely than not that claim 3 would have been obvious over Lin ’109 and Maeda. *See supra* Section V.G.2.

We nonetheless institute review of claim 3 on this ground, pursuant to *SAS* and the *SAS* Guidance.

I. Obviousness over the Wang Drawing (Claim 1)

Petitioner asserts claim 1 of the ’547 patent is unpatentable under 35 U.S.C. § 103 as having been obvious over the Wang Drawing. Pet. 2, 73–77. Petitioner cites the Zhang Declaration in support. Ex. 1015 ¶¶ 284–315. Patent Owner opposes. Prelim. Resp. 51–53.

1. Summary of the Wang Drawing

The Wang Drawing is an engineering drawing depicting a “[s]piral spring,” for use in a “curtain.” Exs. 1010 & 1011. On its face, the Wang Drawing indicates it was prepared by Wei Wang for Beautiful Windows

Enterprises Co., Ltd. (“Beautiful Window”), on September 17, 2015.
Ex. 1010.

2. *Whether the Wang Drawing is Prior Art*

Petitioner asserts the Wang Drawing “qualifies as prior art under 35 U.S.C. § 102(a) because its creation date is September 17, 2015, which is before the ’547 [p]atent’s claimed priority date, March 22, 2016.” Pet. 75 (citing Ex. 1015 ¶ 287). Petitioner does not offer further argument or evidence to establish that the Wang Drawing is prior art to the ’547 patent. *Id.*; Ex. 1015 ¶ 287.

Patent Owner disputes whether the Wang Drawing is prior art to the ’547 patent. Prelim Resp. 51–53. Patent Owner asserts there is no evidence in the record to establish that the Wang Drawing, even if it was created on September 17, 2015, “was made available to the relevant public” so as to qualify as prior art under 35 U.S.C. § 102(a)(1). *Id.*

We agree with Patent Owner. Petitioner has adduced very little evidence tending to suggest the Wang Drawing was publicly accessible prior to March 22, 2016. The only pertinent evidence in the record we can discern establishes, at most, that the Wang Drawing was shared between two companies to complete a purchase transaction. *See infra* Section V.K. This is insufficient to establish the Wang Drawing was publicly accessible before March 22, 2016. *See, e.g., Hulu, LLC v. Sound View Innovations, LLC*, IPR2018-01039, Paper 29 at 8–11 (PTAB Dec. 20, 2019) (precedential) (discussing, in the context of an *inter partes* review, Federal Circuit case law concerning printed publications). Therefore, we conclude the Petition does not demonstrate it is more likely than not that claim 1 is unpatentable as

having been obvious over the Wang Drawing. Despite that conclusion, we institute review of claim 1 on this ground, pursuant to *SAS* and the *SAS* Guidance.

J. Obviousness over Ruggles and the Wang Drawing (Claim 3)

Petitioner asserts claim 3 of the '547 patent is unpatentable under 35 U.S.C. § 103 as having been obvious over Ruggles and the Wang Drawing. Pet. 2, 78–85. Petitioner cites the Zhang Declaration in support. Ex. 1015 ¶¶ 316–355. Patent Owner opposes. Prelim. Resp. 53–54. Patent Owner cites the Vallee Declaration in support. Ex. 2001 ¶¶ 94–96.

Patent Owner disputes whether the Wang Drawing is prior art to the '547 patent, and contends that without the Wang Drawing, Ruggles cannot establish the obviousness of claim 3. Prelim Resp. 53–54; Ex. 2001 ¶ 96. For the reasons provided above, we determine Petitioner has not established a reasonable likelihood that the Wang Drawing was publicly accessible prior to March 22, 2016. *See supra* Section V.I.2. It is, further, clear that Petitioner's reliance on Ruggles absent the Wang Drawing does not establish the obviousness of claim 3. *See, e.g.*, Pet. 83–85 (relying solely on the Wang Drawing in relation to the obviousness of employing the coil spring limitations recited in claim 3). Thus we conclude the Petition does not demonstrate it is more likely than not that claim 3 is unpatentable as having been obvious over Ruggles and the Wang Drawing. Despite that conclusion, we institute review of claim 3 on this ground, pursuant to *SAS* and the *SAS* Guidance.

K. Anticipation by Prior Art Sales of the Wang Springs (Claim 1)

Petitioner asserts claim 1 of the '547 patent is unpatentable under 35 U.S.C. § 102(a)(1) as anticipated by the prior art sale of 480 coil springs embodying the spring design of the Wang Drawing (“the Wang Springs”). Pet. 3, 88–89. Petitioner cites the Zhang Declaration in support. Ex. 1015 ¶¶ 284–315. Patent Owner opposes. Prelim. Resp. 62–66. Dr. Vallee was not asked to render an opinion as to the Wang Drawing, or this ground which relies in part on the Wang Drawing. Ex. 2001 ¶¶ 92–93, 95, 103.

It is undisputed that the earliest potential effective filing date for the '547 patent is March 22, 2016. *See supra* Section IV.B; Pet. 88; Prelim. Resp. 65.

The Petition presents the following contentions, none of which is disputed by Patent Owner at this time. On September 22, 2015, Shanghai Jingjie Plastic Products Limited Company (“Shanghai Jingjie”) sent an e-mail communication to Haimen Binli Mainspring Co. Ltd. (“Haimen Binli”), requesting a quotation pursuant to which Haimen Binli might manufacture the Wang Springs. Pet. 88; Ex. 1012 ¶¶ 1, 3, 12–14. This communication included a copy of the Wang Drawing, to assist Haimen Binli in preparing the requested quotation, and in manufacturing the springs. Pet. 88; Ex. 1012 ¶¶ 5–6, 12–13, Attachment 5. On November 4 & 5, 2015, Shanghai Jingjie and its parent company Taicang Jingfu Plastic Products Co., Ltd. (“Taicang Jingfu”) communicated Purchase Order No. B15110477 to Haimen Binli, requesting Haimen Binli to manufacture the Wang Springs. Pet. 88–89; Ex. 1012 ¶¶ 6–9, 14. On November 9, 2015, Haimen Binli shipped the Wang Springs to Shanghai Jingjie, which received the springs on November 12, 2015. Pet. 89; Ex. 1012 ¶ 10–11.

We conclude Petitioner’s foregoing undisputed contentions are supported sufficiently by the evidence of record to establish that the invention of claim 1 was on sale under 35 U.S.C. § 102(a)(1) before March 22, 2016. *See, e.g., Helsinn Healthcare S.A. v. Teva Pharms. USA, Inc.*, 139 S. Ct. 628, 633–34 (2019) (concluding “‘secret sales’ can invalidate a patent” under § 102(a)(1)). Importantly, however, this sales activity occurred less than one year before March 22, 2016.

Patent Owner does not dispute, on the present record, that the Wang Springs were sold prior to March 22, 2016, or that the Wang Springs embodied the invention of claim 1. Prelim. Resp. 62–66. Instead, Patent Owner contends the sale of the Wang Springs is excepted from the scope of prior art by virtue of 35 U.S.C. § 102(b)(1)(A). Prelim. Resp. 62–66. According to Patent Owner, Wei Wang obtained the substance of the Wang Drawing directly or indirectly from Hsien-Te Huang (“Mr. Huang”), a joint inventor of the ’547 patent. *Id.* at 62, 64–65. In support, Mr. Huang testifies that he “served as an outside consultant to Beautiful Window,” pursuant to which Mr. Huang and his joint inventor disclosed the substance of the Wang Drawing to Shanghai Jingjie and its employee Wei Wang at least as early as June 9, 2015. Ex. 2004 ¶¶ 7–9, 11–13. Patent Owner presents further evidence indicating Beautiful Window owned Taicang Jingfu and its subsidiary Shanghai Jingjie, and Wei Wang was an employee of Shanghai Jingjie, during the pertinent time frame. Prelim. Resp. 63 (citing Exs. 2003, 2004, 2006, 2009, & 2010); Ex. 2004 ¶ 10.

We conclude Patent Owner’s foregoing contentions and evidence are sufficient to establish, based on the present preliminary record, that Wei Wang obtained the substance of the Wang Drawing from Mr. Huang, a

joint inventor. Thus, it appears that the sale of the Wang Springs less than one year before March 22, 2016 is not prior art to the '547 patent. *See* 35 U.S.C. § 102(b)(1)(A). Nonetheless, we institute review of claim 1 as anticipated by the sale of the Wang Springs, pursuant to *SAS* and the *SAS* Guidance.

VI. CONCLUSION

For the above reasons, we determine the information presented in the Petition, if such information is not rebutted, demonstrates it is more likely than not that at least one of claims 1–4 of the '547 patent is unpatentable. Accordingly, we institute a post-grant review of claims 1–4. 35 U.S.C. § 324(a); *SAS, supra*; *SAS* Guidance.

At this preliminary stage, the Board has not made a final determination with respect to the patentability of the challenged claims or any underlying factual or legal issue. The Board's final determination will be based on the record as developed during the post-grant review.

VII. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 324(a), a post-grant review is instituted for claims 1–4 of the '547 patent on each of the grounds presented in the Petition;

FURTHER ORDERED that pursuant to 35 U.S.C. § 324(d) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial, which commences on the entry date of this decision.

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