

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

KAIDI LLC and CHANGZHOU KAIDI ELECTRICAL CO., LTD.,
Petitioner,

v.

LIMOSS US, LLC,
Patent Owner.

IPR2019-01184
Patent 10,066,717 B2

Before MITCHELL G. WEATHERLY, JAMES A. TARTAL, and
CHARLES J. BOUDREAU, *Administrative Patent Judges*.

BOUDREAU, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

Kaidi LLC and Changzhou Kaidi Electrical Co., Ltd. (“Petitioner”)¹ filed a Petition requesting *inter partes* review of claims 1, 5–12, 15, and 18–20 (the “challenged claims”) of U.S. Patent No. 10,066,717 B2 (Ex. 1001, “the ’717 patent”). Paper 2 (“Pet”). Limoss US, LLC (“Patent Owner”) filed a Preliminary Response. Paper 12 (“Prelim. Resp.”). After reviewing these papers, we determined that Petitioner had demonstrated a reasonable likelihood of success in proving that the challenged claims are unpatentable, and we instituted an *inter partes* review of all challenged claims on the ground set forth in the Petition. Paper 16 (“Institution Decision” or “Inst. Dec.”).

After institution, Patent Owner filed a Response (Paper 20, “PO Resp.”), Petitioner filed a Reply (Paper 24, “Pet. Reply”), and Patent Owner filed a Sur-Reply (Paper 26, “PO Sur-Reply”). Concurrently with the filing of the Response, Patent Owner also filed a statutory disclaimer of claim 9. Ex. 2017. An oral hearing in this proceeding was held on September 16, 2020, and a transcript of the hearing is included in the record (Paper 38, “Tr.”).

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons discussed below, we conclude that Petitioner has shown by a

¹ Petitioner indicates that, in addition to Kaidi LLC and Changzhou Kaidi Electrical Co., Ltd., Kaidi Electrical Vietnam Co. Ltd. also is a real party in interest. Pet. 1.

preponderance of the evidence that claims 1, 5–8, 10–12, 15, and 18–20 of the '717 patent are unpatentable under 35 U.S.C. § 103(a).²

A. Related Proceedings

The parties report that the '717 patent is the subject of ongoing district court litigation in *Limoss US, LLC v. Kaidi LLC*, No. 1:18-cv-00166-SA-RP (N.D. Miss.), and that the '717 patent previously was asserted in *Limoss US, LLC v. Remacro Machinery & Technology Co.*, No. 1:18-cv-00948 (M.D.N.C.). Pet. 1; Paper 4, 2.

B. The '717 Patent

The '717 patent, titled “Linear Actuator,” issued September 4, 2018, from U.S. Patent Application No. 15/639,307 (“the '307 application”), filed June 30, 2017. Ex. 1001, codes (21), (22), (45), (54). The Related U.S. Application Data field on the front page of the '717 patent, as issued, included a claim that the '717 patent is a “[c]ontinuation of application No. 14/445,432, filed on Jul. 29, 2014, now Pat. No. 9,732,832” (Ex. 1001, code (63)), as well as a reference to “[p]rovisional application No. 61/862,409 [(“the '409 provisional”)], filed on Aug. 5, 2013” (*id.* at code (60)). In a section titled “CROSS-REFERENCE TO RELATED APPLICATIONS,” the '717 patent states:

This application is a continuation of U.S. patent application Ser. No. 14/445,432, filed on Jul. 29, 2014 and

² As stated above, Patent Owner filed a statutory disclaimer of claim 9 concurrently with its Response. Ex. 2017. Because “[a] statutory disclaimer under 35 U.S.C. § 253 has the effect of canceling the claims from the patent and the patent is viewed as though the disclaimed claims had never existed in the patent” (*Guinn v. Kopf*, 96 F.3d 1419, 1422 (Fed. Cir. 1996)), we treat claim 9 as though it never existed and do not address Petitioner’s asserted grounds with respect to that claim below.

entitled LINEAR ACTUATOR, which claims the benefit of U.S. Provisional Application No. 61/862,409, filed Aug. 5, 2013 and entitled IMPROVED LINEAR ACTUATOR, both of which are hereby incorporated by this reference in their entireties.

Ex. 1001, 1:6–12.

On July 26, 2019, with the Board’s authorization provided in an Order dated July 19, 2019 (Paper 8), Patent Owner filed a petition to accept an unintentionally delayed priority claim under 37 C.F.R. § 1.78(e), a request for a certificate of correction under 37 C.F.R. § 1.322, a petition under 37 C.F.R. § 1.182 to expedite processing, and other related papers with the Office. Ex. 2001. On October 22, 2019, the Office issued the requested Certificate of Correction (Ex. 2007), which replaces the Related U.S. Application Data under code (63) on the front page of the ’717 patent with the following: “Continuation-in-part of application No. 14/445,432, filed on Jul. 29, 2014, now Pat. No. 9,732,832, and continuation of application No. 14/445,399 [(“the ’399 application”)], filed on Jul. 29, 2014, now abandoned.” Ex. 2007, 1. The Certificate of Correction also replaces the text recited in column 1, lines 6–12 with the following:

This application is a continuation-in-part of U.S. patent application Ser. No. 14/445,432, filed on Jul. 29, 2014 and entitled LINEAR ACTUATOR, which claims the benefit of U.S. Provisional Application No. 61/862,409, filed Aug. 5, 2013 and entitled IMPROVED LINEAR ACTUATOR, both of which are hereby incorporated by this reference in their entireties, and is also a continuation of U.S. patent application Ser. No. 14/445,399, filed on Jul. 29, 2014 and entitled LINEAR ACTUATOR, now abandoned, which also claims the benefit of U.S. Provisional Application No. 61/862,409, filed Aug. 5, 2013 and entitled IMPROVED LINEAR ACTUATOR.

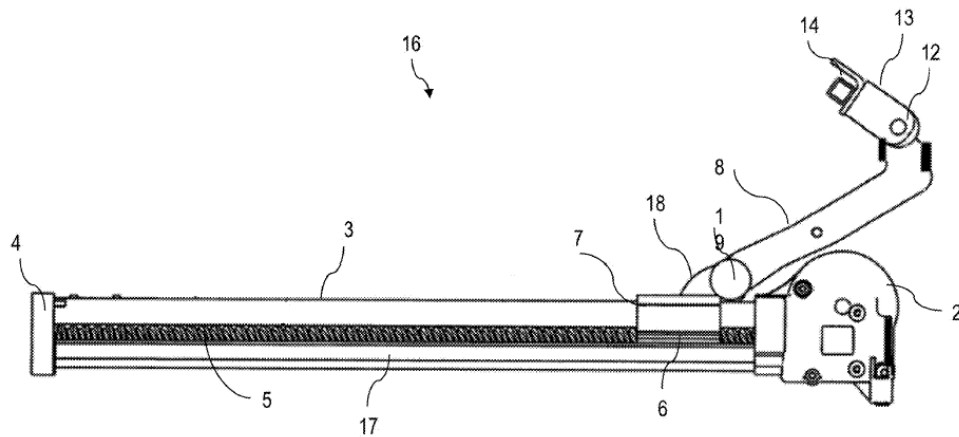
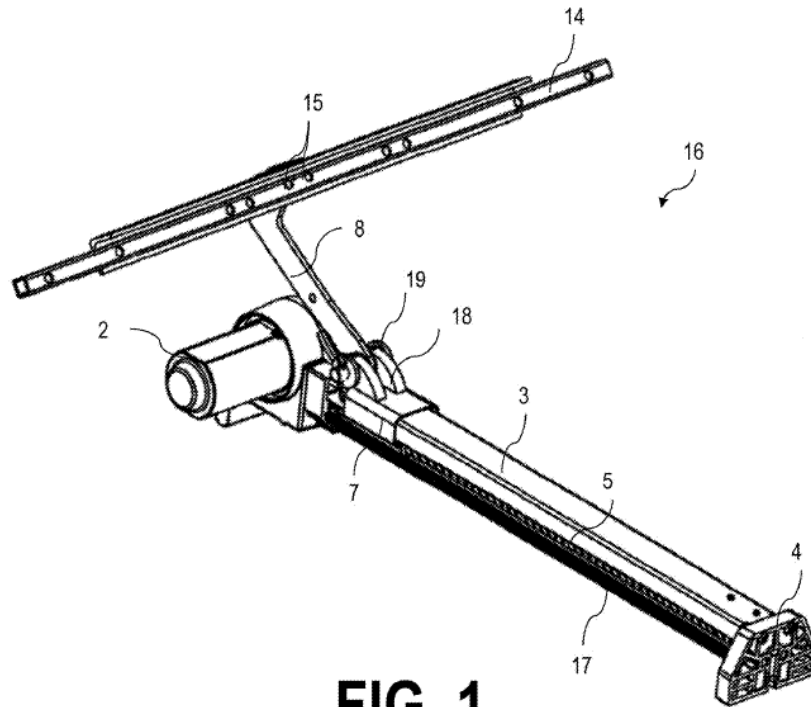
Ex. 2007. Thus, in view of the Certificate of Correction, the '717 patent claims the benefit of the July 29, 2014, filing date of the '399 and '432 applications, as well as the August 5, 2013, filing date of the '409 provisional. Ex. 1001, code (60); Ex. 2007.³

The '717 patent is directed to “a new design for a linear actuator that modifies the positioning in adjustable furniture.” Ex. 1001, 1:16–17. In a section labeled as “Background,” the '717 patent describes that a linear actuator typically comprises an electric motor drive assembly that drives a threaded spindle retained within a rigid arm attached to the electric drive motor assembly. *Id.* at 1:28–32. “A pusher block is threaded onto the spindle and is secured in linear recesses within the arm,” and “[a]s the electric motor drive assembly turns the spindle, the pusher block moves from one end of the arm to the other end.” *Id.* at 1:32–36. One end of the linear actuator is secured to furniture using a bracket, and the pusher block connects to levers or linkages that transfer movement from the pusher block to the furniture. *Id.* at 1:38–45. The '717 patent explains that prior art linkages were attached to the pusher block using threaded fasteners (e.g., screws), but that such attachments were time-consuming and difficult for assembly workers to align. *Id.* at 1:41–42, 1:51–54. According to the

³ In the Reply, Petitioner contends that certificates of correction have only a prospective effect and that Patent Owner’s Certificate of Correction should not be given effect in this proceeding because it was filed after the filing of the Petition. Pet. Reply 18–19. Patent Owner disagrees, contending that the Certificate of Correction should be given effect at least because it issued prior to our institution of trial. PO Sur-Reply 2–6. Because the priority date of the challenged claims is relevant only to asserted grounds not reached in this Decision, we need not address the question of whether the Certificate of Correction should be given effect in this proceeding. *See infra* § II.E.

'717 patent, the invention is an improved linear actuator that simplifies assembly to save production costs. *Id.* at 2:15–17.

Figures 1 and 4 of the '717 patent are reproduced below.



Figures 1 and 4 of the '717 patent, above, are perspective and side views, respectively, illustrating an embodiment of linear actuator 16. Ex. 1001, 1:41–42, 1:46, 3:9–10. With reference to Figures 1 and 4 (as well as

Figure 7, not reproduced here), the '717 patent explains that electric drive motor assembly 2 is connected to rigid arm 3, with threaded spindle 5 retained therein. *Id.* at 3:10–14. Spindle nut 6 is threaded onto spindle 5, and pusher block 7 attaches to spindle nut 6. *Id.* at 3:14–16. The top of pusher block 7 incorporates clevis 18 with apertures to receive clevis pin 19, which is used to connect pusher block 7 to the lower end of linkage 8, and the upper end of linkage 8 is attached to torque tube assembly 14 for communicating with the adjustable furniture. *Id.* at 3:24–30, 3:58–59. The '717 patent explains that using clevis pin 19 to attach linkage 8 and pusher block 7 simplifies assembly of the actuator with adjustable furniture by eliminating the need for additional brackets, threaded fasteners, and threaded apertures in pusher block 7. *Id.* at 3:23–25, 3:31–35.

C. Illustrative Claims

Challenged claims 1 and 15 are independent, illustrative of the challenged claims, and reproduced below:

1. A method of assembling a linear actuator for adjustable furniture comprising:
 - assembling an arm assembly of the linear actuator, wherein assembling the arm assembly comprises :
 - housing a threaded spindle within a rigid arm;
 - threadably engaging a spindle nut coupled to a pusher block with the threaded spindle;
 - slidably engaging the pusher block with the rigid arm by inserting the rigid arm within a rigid arm passage defined by the pusher block such that the rigid arm extends through the rigid arm passage; and
 - pivotally connecting a first end of a linkage within a linkage channel of an attachment projection of the pusher block, wherein the attachment projection

extends outwardly from an outer surface of the pusher block; and

connecting a drive assembly to the arm assembly, wherein the drive assembly is configured to rotate the threaded spindle within the rigid arm.

15. An arm assembly for a linear actuator for adjustable furniture comprising:

a rigid arm;

a threaded spindle housed within the rigid arm;

a spindle nut threadably engaged with the threaded spindle; and

a pusher block coupled with the spindle nut and comprising:

a rigid arm passage, wherein the rigid arm extends through the rigid arm passage such that the pusher block is slidable along the rigid arm; and

an attachment projection integrally formed with the pusher block and extending outwardly from an outer surface of the pusher block and defining a linkage channel,

wherein the attachment projection is configured to receive an end of a linkage within the linkage channel and pivotally connect the linkage to the pusher block in the linkage channel of the attachment projection.

Ex. 1001, 5:21–39, 6:49–67. Challenged claims 5–12 depend directly or indirectly from independent claim 1, and challenged claims 18–20 depend directly or indirectly from independent claim 15. *Id.* at 5:56–6:38, 7:12–32.

D. Asserted Grounds

Petitioner asserts the following grounds of unpatentability:⁴

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1, 5–7, 10, 15, 18, 20	102 ⁵	Duhamé ⁶
1, 5, 6, 8, 11, 12, 15, 18, 19	103	Koch, ⁷ Lipinski ⁸
1, 5–8, 10–12, 15, 18–20	102	'885 Publication ⁹

Petitioner submits the testimony of Dr. Kimberly K. Cameron to support its contentions. Ex. 1004; Ex. 1030. Patent Owner submits testimony of Mr. James Bennett Babcock in support of its contentions with respect to claim construction. Ex. 2008.

⁴ In the Petition, Petitioner also asserted two grounds with respect to now-disclaimed claim 9. *See* Pet. 10, 39–46, 93–97. As stated in note 2 above, we treat claim 9 as though it never existed and do not further address those grounds.

⁵ The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011), amended 35 U.S.C. §§ 102 and 103 effective March 16, 2013. The amended statutory provisions apply to any patent application that contains or contained at any time a claim to a claimed invention that has an effective filing date that is on or after the effective date of the amendment. Because the '717 patent does not claim the benefit of any filing date earlier than the August 5, 2013, filing date of the '409 provisional application, we refer to the AIA-amended versions of §§ 102 and 103.

⁶ Duhamé et al., U.S. Patent No. 5,588,257, issued December 31, 1996 (Ex. 1013, “Duhamé”).

⁷ Koch, U.S. Patent No. 5,927,144, issued July 27, 1999 (Ex. 1009, “Koch”).

⁸ Lipinski et al., U.S. Patent No. 4,512,208, issued April 23, 1985 (Ex. 1015, “Lipinski”).

⁹ Kristen, U.S. Patent Application Publication No. 2015/0033885 A1, published February 5, 2015 (Ex. 1007, “the '885 Publication”).

II. DISCUSSION

A. Principles of Law

In an *inter partes* review, the petitioner has the burden of proving unpatentability by a preponderance of the evidence. 35 U.S.C. § 316(e). That burden never shifts to the patentee. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).

A claim is anticipated under 35 U.S.C. § 102 “only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros., Inc. v. Union Oil Co. of Cal.*, 814 F.2d 628, 631 (Fed. Cir. 1987). Moreover,

unless a reference discloses within the four corners of the document not only all of the limitations claimed but also all of the limitations arranged or combined in the same way as recited in the claim, it cannot be said to prove prior invention of the thing claimed and, thus, cannot anticipate under 35 U.S.C. § 102.

Net MoneyIN, Inc. v. VeriSign, Inc., 545 F.3d 1359, 1371 (Fed. Cir. 2008); *accord In re Arkley*, 455 F.2d 586, 587 (CCPA 1972).

A patent claim is unpatentable under 35 U.S.C. § 103 if the 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 legal 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 skill in the art;¹⁰ and (4) when in evidence, objective evidence of obviousness or nonobviousness, i.e., secondary considerations.¹¹ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). One seeking to establish obviousness based on more than one reference also must articulate sufficient reasoning with rational underpinnings to combine teachings. *See KSR*, 550 U.S. at 418.

We analyze the asserted grounds with the principles stated above in mind.

B. Claim Construction

For an *inter partes* review petition filed on or after November 13, 2018, we interpret claim terms 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).” *See* Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340, 51,340, 51,358 (Oct. 11, 2018) (amending 37 C.F.R. § 42.100(b) effective November 13, 2018) (now codified at 37 C.F.R. § 42.100(b) (2019)). In applying that standard, we are guided by the

¹⁰ Petitioner proposes that a person of ordinary skill in the art as of the alleged or claimed priority date of the ’717 patent “would have had at least an undergraduate degree in mechanical engineering, with at least one year of experience with the design and development of rotary and linear motion systems.” Pet. 14–15 (citing Ex. 1004 ¶¶ 15–17). Patent Owner does not challenge this definition. Petitioner’s unopposed proposal is supported by the testimony of Dr. Cameron and is consistent with both the ’717 patent specification and the asserted prior art. Accordingly, we adopt the level of ordinary skill as articulated by Petitioner.

¹¹ The record does not include allegations or evidence of objective indicia of obviousness or nonobviousness.

principle that the words of a claim “are generally given their ordinary and customary meaning,” as understood by a person of ordinary skill in the art in question at the time of the invention. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc) (citation omitted).

Only terms that are in controversy need to be construed, and then only to the extent necessary to resolve the controversy. *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999); *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (applying *Vivid Techs.* in the context of an *inter partes* review). Further, any special definition for a claim term must be set forth in the specification with reasonable clarity, deliberateness, and precision. *See In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). In the absence of such a definition, limitations are not to be read from the specification into the claims. *See Hill-Rom Servs., Inc. v. Stryker Corp.*, 755 F.3d 1367, 1371 (Fed. Cir. 2014).

1. Preambles of Claims 1 and 15

The preamble of claim 1 recites a “method of assembling a linear actuator for adjustable furniture.” Ex. 1001, 5:21–22. The preamble of claim 15 recites an “arm assembly for a linear actuator for adjustable furniture.” *Id.* at 6:49–50. In view of arguments raised in the Petition and Patent Owner’s Preliminary Response, we preliminarily determined in the Institution Decision that the recitations of “assembling a linear actuator” in the preamble of claim 1 and an “arm assembly for a linear actuator” in the preamble of claim 15 should be treated as limitations of those claims but that the additional recitation “for adjustable furniture” in the preamble of each claim merely states the intended use for the purported invention, and, as

such, is not a limitation. Inst. Dec. 8–14 (citing, e.g., Pet. 18, 47–48, 60–61, 72; PO Resp. 25–32).

In its Response, Patent Owner contends that, notwithstanding the Board’s preliminary determination, “the preambles of claims 1 and 15 require construction to confirm that the preambles as a whole are limiting.” PO Resp. 25. According to Patent Owner, “[t]he claims and the specification confirm that [Patent Owner’s] invention is limited to linear actuators ‘for adjustable furniture,’ and that the claims do not cover other linear actuators or devices for converting rotary to linear motion.” *Id.* at 26. Patent Owner argues, “the preamble of claim 1 . . . provides antecedent basis for other limitations of the claim and its dependent claims,” citing, for example, the recitation of “assembling an arm assembly *of the linear actuator*” in the body of the claim and the recitation of “pivotally connecting a dual angle bracket with a torque tube assembly configured to engage *adjustable furniture*” in dependent claim 2. *Id.* at 27 (quoting Ex. 1001, 5:23, 5:41–43 (emphasis added)). Similarly, Patent Owner argues, “[t]he preamble of claim 15 . . . provides antecedent basis for at least dependent claim 18, which further recites and refers back to ‘*the arm assembly*.’” *Id.* at 27–28 (quoting Ex. 1001, 7:22 (emphasis added)). Patent Owner analogizes the preambles of claims 1 and 15 to those at issue in *Deere & Co. v. Bush Hog, LLC*, 703 F.3d 1349 (Fed. Cir. 2012). In that case, Patent Owner argues, the Federal Circuit held that the preamble term “rotary cutter deck” was a limitation of the claim because, for example, (1) it was “necessary to understand the subject matter encompassed by the claim”; (2) “the specification repeatedly referred to the invention as ‘an improved deck for a rotary cutter’ or a ‘rotary cutter deck,’ and explained ‘that the

invention addresses a concern specific to rotary cutters”]; and (3) the recitation of a rotary cutter deck informed the meaning of another limitation in the body of the claim, “torsional stiffness,” insofar as the Court found that “the claimed structure must possess sufficient stiffness to withstand the torsional loads imposed by the operation of a rotary cutter.” *Id.* at 28–29 (quoting *Deere*, 703 F.3d at 1353, 1357–58). As in *Deere*, Patent Owner contends, the preambles of claims 1 and 15 “inform[] one of skill in the art as to the structure required by the claim.” *Id.* at 29. For example, Patent Owner alleges, “that the claims are drawn to a ‘linear actuator for adjustable furniture’ informs the meaning of the ‘rigid arm’ limitation in each of claims 1 and 15,” as “[t]he claimed structure must possess sufficient rigidity to withstand the loads imposed by the operation of a linear actuator for adjustable furniture.” *Id.* at 29–30 (citing Ex. 2008 ¶ 47; *Deere*, 703 F.3d at 1358). Similarly, Patent Owner contends, the preamble informs the meaning of spindle nut as “an element . . . that mates with and circumscribes the threaded spindle, and thus cannot disengage from the spindle under the forces experienced in furniture applications.” *Id.* at 29–30 (citing Ex. 1001, 3:14–15; Ex. 2008 ¶¶ 28–36).

Patent Owner further contends that the Board improperly “parse[d] the preamble into limiting and non-limiting portions in this case,” alleging that “the linear actuator that forms the antecedent basis is ‘a linear actuator for adjustable furniture,’” and “[t]he ‘adjustable furniture’ portion of the preamble cannot be separated from the linear actuator that it describes and that forms antecedent basis for other claim limitations.” *Id.* at 30–31 (citing *Frac Shack Inc. v. Fuel Automation Station, LLC*, 300 F. Supp. 3d 1333, 1353 (D. Colo. 2018); *Blue Calypso, Inc. v. Groupon, Inc.*, 93 F. Supp. 3d

575, 594 (E.D. Tex. 2015)). Finally, Patent Owner contends that “the . . . recitation ‘for adjustable furniture’ does not ‘merely state’ the intended use of the claimed invention,” but that “the invention addresses a concern specific to linear actuators ‘used within the area of adjustable furniture,’ noting that ‘prior art actuators are . . . difficult to mount on adjustable furniture’” and “the preambles . . . inform one of skill in the art as to the structure required by the claim, . . . just as in *Deere*.” *Id.* at 31–32.

Petitioner responds that it agrees with the Board’s determinations in the Institution Decision that the preamble recitations of “assembling a linear actuator” and an “arm assembly for a linear actuator” are limiting whereas the further recitations of “for adjustable furniture” are not. Pet. Reply 2–3 (citing Inst. Dec. 12–13). Petitioner points out that, “[w]hile Patent Owner correctly identifies a reference to ‘the linear actuator’ in claim 1’s body, noticeably absent is the phrase ‘for adjustable furniture.’” *Id.* at 3. Therefore, Petitioner contends, “while ‘the linear actuator’ might be structurally relevant, the phrase ‘for adjustable furniture’ is not.” *Id.* at 3–4. Moreover, Petitioner contends that the reference in dependent claim 18 to “the arm assembly” of claim 15, cited by Patent Owner, “fails to recite ‘the linear actuator’ or make any mention of furniture.” *Id.* at 4. Similarly, Petitioner argues that the language of dependent claim 2 undermines Patent Owner’s argument that claim 2’s recitation of a torque tube assembly configured “to engage adjustable furniture” has an antecedent basis in claim 1, because the phrase “‘adjustable furniture’ is introduced anew in claim 2, *i.e.*, there is no antecedent reference to ‘the adjustable furniture.’” *Id.*

Responding to Patent Owner’s arguments based on *Deere*, Petitioner contends:

[W]hile it was important in *Deere* that the “specification repeatedly refers to the ‘present invention’ as ‘an improved deck for a rotary cutter,’ or a ‘rotary cutter deck’” (*Deere*, 703 F.3d at 1358), the specification here fails to link the purported invention to “adjustable furniture.” Unlike *Deere*, neither the title nor the figures of the ’717 patent mention or show furniture. *Cf. id.* (noting in *Deere* that “title of the patent, the summary of the invention, and every drawing describe the invention as a deck for a rotary cutter.”).

And, even if the ’717 patent had any statements linking the invention to “adjustable furniture,” which it does not, the patent forbids limiting the claims based on such statements. Ex-1001, 1:61–2:11 (noting that statements concerning the invention “should be understood **not to** limit the subject matter described herein or to **limit the meaning or scope of the patent claims** below.”), 2:64–67, and 4:59–5:18.

Pet. Reply 5–6.

Responding to Patent Owner’s argument that meanings of the claim terms “rigid arm” and “spindle nut” are informed by the preambles of claims 1 and 15, Petitioner contends that argument is belied by the specification and its own expert. Pet. Reply 6. According to Petitioner,

Rather than indicate that the “rigid arm” must be rigid enough “such that is [*sic*] does not deform enough to affect its intended purpose under expected loads” ([PO Resp. 30], the specification mentions no rigidity requirements of the “rigid arm,” let alone mentioning specific rigidity requirements for adjustable furniture. Likewise, the specification does not mention a no-disengagement requirement for the spindle nut, contrary to Patent Owner’s contention (*id.*). Patent Owner’s expert even explained that his understanding of “spindle nut” and “rigid arm passage” was not informed by the preambles’ recitation of “for adjustable furniture” because that is a mere **statement of intended use . . .**

Id. at 6–7 (citing Ex. 1031, 197:2–17 (Babcock Deposition Tr.)).

Finally, Petitioner argues that the cases cited by Patent Owner in support of its contention that it is not proper to parse the preamble into limiting and non-limiting portions are easily distinguishable, and controlling precedent from the Federal Circuit has held, for example, that a finding that one phrase in a preamble can provide necessary structure “does not necessarily convert the entire preamble into a limitation.” Pet. Reply 8–9 (emphasis omitted) (quoting *TomTom, Inc. v. Adolph*, 790 F.3d 1315, 1323 (Fed. Cir. 2015)) (citing *Cochlear Bone Anchored Sols. AB v. Oticon Med. AB*, No. 2019-1105, 2020 WL 2503475, at *5 (Fed. Cir. May 15, 2020); *Frac Shack*, 300 F. Supp. 3d at 1352; *Koninklijke KPN N.V. v. Samsung Elecs. Co.*, No. 2:14-cv-1165-JRG, 2016 WL 2610649, at *14 (E.D. Tex. May 6, 2016)).

In the Sur-Reply, Patent Owner repeats its contention that “the recited ‘linear actuator for adjustable furniture’ provides antecedent basis for ‘the linear actuator’ recited in the body of the claims,” arguing that “[t]here is no linear actuator recited in the claims other than ‘a linear actuator for adjustable furniture.’” PO Sur-Reply 10. According to Patent Owner, Petitioner misleads the Board in the Reply by incorrectly arguing that the specification of the ’717 patent does not mention “adjustable furniture” as part of the “present invention,” quoting disclosure that “[t]he present invention relates to an improved linear actuator,” where “[t]he improved linear actuator is designed to provide the moving force for adjustable furniture, such as beds, chairs, or tables”; that “[t]he present disclosure reveals a new design for a linear actuator that modifies the positioning in adjustable furniture”; and that “[a] linear actuator is configured to provide

the moving force for adjustable furniture.” PO Sur-Reply 8–9 (quoting Ex. 1001, 2:12–15, 1:16–17, code (57)) (citing Pet. Reply 5 & n.3). Patent Owner argues, “[t]he ‘invention’ both described and claimed in the ’717 Patent is a ‘linear actuator for adjustable furniture,’” and “[t]he *Deere* case . . . is on all fours.” *Id.* at 9. Patent Owner further contends that “[a] Federal Circuit decision issued after institution further confirms that a term in the body of a claim that relies on the preamble for antecedent basis need not re-recite the entirety of a phrase in the preamble for the entire phrase to be limiting.” *Id.* at 10 (citing *Shoes by Firebug LLC v. Stride Rite Children’s Grp., LLC*, 962 F.3d 1362, 1365, 1368 (Fed. Cir. 2020)).

As explained by the Federal Circuit, preamble language “as a general rule . . . is not treated as limiting” (*Aspex Eyewear, Inc. v. Marchon Eyewear, Inc.*, 672 F.3d 1335, 1347 (Fed. Cir. 2012) (citing *Allen Eng’g Corp. v. Bartell Indus., Inc.*, 299 F.3d 1336, 1346 (Fed. Cir. 2002))), and “[w]hether to treat a preamble as a limitation is ‘determined on the facts of each case in light of the overall form of the claim, and the invention as described in the specification’” (*Deere*, 703 F.3d at 1357 (quoting *Applied Materials, Inc. v. Advanced Semiconductor Materials Am., Inc.*, 98 F.3d 1563, 1572–73 (Fed. Cir. 1996))). Further, it is a “‘well settled’ fundamental principle ‘that the recitation of a new intended use for an older product does not make a claim to that old product patentable.’” *Arctic Cat Inc. v. GEP Power Prods., Inc.*, 919 F.3d 1320, 1328 (Fed. Cir. 2019) (quoting *In re Schreiber*, 128 F.3d 1473, 1477 (Fed. Cir. 1997)). Accordingly, the Federal Circuit has “long ruled that ‘a preamble is not limiting, “where a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use for

the invention.””” *Id.* (quoting *Catalina Mktg. Int’l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002); *Rowe v. Dror*, 112 F.3d 473, 478 (Fed. Cir. 1997)). On the other hand, the court also has explained that “a preamble is limiting if it is necessary to give life, meaning, and vitality to the claim.” *Deere*, 703 F.3d at 1357 (internal quotation marks omitted). For example, “when limitations in the body of the claim rely upon and derive antecedent basis from the preamble, then the preamble may act as a necessary component of the claimed invention.” *Pacing Techs., LLC v. Garmin Int’l, Inc.*, 778 F.3d 1021, 1024 (Fed. Cir. 2015) (quoting *Eaton Corp. v. Rockwell Int’l Corp.*, 323 F.3d 1332, 1339 (Fed. Cir. 2003)).

With these principles in mind, and having fully considered the parties’ respective contentions, we maintain our prior determination that the preamble recitations of “assembling a linear actuator” and an “arm assembly for a linear actuator” provide antecedent basis for limitations in the bodies of claims 1 and 15 and thus are limiting, whereas the further recitations of “for adjustable furniture” merely state an intended use of the recited linear actuator and do not constitute claim limitations. As we explained in the Institution Decision, the recitations of adjustable furniture in the preambles of claims 1 and 15 do not provide antecedent basis for any other claim limitations. There is no recitation of furniture elsewhere either in claim 1 or claim 15 or in any dependent claim other than claim 2 pointed to by Patent Owner. *See* PO Resp. 27–28. And although dependent claim 2 recites the phrase “adjustable furniture,” that recitation, read in context, does not require any antecedent. In particular, the recitation in claim 2 of “a torque tube assembly configured to engage adjustable furniture” (Ex. 1001, 5:41–43) appears to define characteristics of the torque tube assembly first

recited in claim 2, rather than any limitations of the “linear actuator” recited in the preamble of claim 1. Likewise, claim 18 introduces nothing about “adjustable furniture.”

Indeed, the ’717 patent expressly contemplates applications for the described linear actuator other than in adjustable furniture, stating, for example, that “the improved linear actuator may be adapted for use in machine tools and industrial machinery, in computer peripherals such as disk drives and printers, in valves and dampers, and in many other places where linear motion is required.” Ex. 1001, 2:18–23. We recognize Patent Owner’s contention that the phrase “may be adapted for” in the quoted sentence indicates that “[t]his portion of the specification is not describing the invention, but rather other adaptations that may be possible.” PO Sur-Reply 9 n.2. That argument is unpersuasive, however, not least because the quoted disclosure is followed immediately by further statements that “[v]arious implementations described in the present disclosure can include additional systems, methods, features, and advantages, which cannot necessarily be expressly disclosed herein but will be apparent to one of ordinary skill in the art upon examination of the following detailed description and accompanying drawings,” and that “[i]t is intended that all such systems, methods, features, and advantages be included within the present disclosure and protected by the accompanying claims.” Ex. 1001, 2:24–32 (emphasis added).

Further, we find no persuasive evidence in the record that the arm assembly for a linear actuator as recited in claim 15 or the assembly method as recited in claim 1 is particular to adjustable furniture such that a limitation to adjustable furniture is necessary to give life, meaning, and vitality to any

challenged claim. *Cf. Deere*, 703 F.3d at 1357. Notwithstanding Patent Owner’s argument that “[t]he claimed structure must possess sufficient rigidity to withstand the loads imposed by the operation of a linear actuator for adjustable furniture (i.e., such that [it] does not deform enough to affect its intended purpose under expected loads)” (PO Resp. 30 (citing Ex. 2008 ¶ 47)), we do not find any reference to “rigidity” in the ’717 patent, and we find no persuasive evidence of record that a linear actuator for adjustable furniture requires any greater or lesser rigidity than linear actuators for other applications, such as, for example, a garage door opener. Indeed, the purported improvement of the claimed linear actuator is in “overcom[ing] problems with the prior art by reducing the number of necessary parts and simplifying assembly to save production costs”—not, for example, any alleged improvement in rigidity. Ex. 1001, 2:15–17; *see also id.* at 1:46–54 (describing prior art linear actuators as “costly to manufacture,” “time-consuming and complicated [to] . . . assembl[e],” and “difficult to mount”).

We acknowledge that Mr. Babcock testifies that it is important “that the pusher block have excellent structural integrity, as well as a strong structural relationship with the rigid arm housed within the pusher block,” and that a configuration in which the cross section of the rigid arm is housed within the pusher block “would promote a compact form factor of the linear actuator, which is required for installation in adjustable furniture.” Ex. 2008 ¶ 47. Mr. Babcock, however, does not testify or point to any evidence that such “excellent” structural integrity, “strong” structural relationship, and “compact” form factor is in any way uniquely directed to linear actuators for use in adjustable furniture applications or that such characteristics would not

be generally desirable characteristics of linear actuators irrespective of their intended application.

We also agree with Petitioner that parsing of the preamble into limiting and non-limiting portions is proper and that the *Frac Shack* and *Blue Calypso* cases cited by Patent Owner are distinguishable for the reasons argued by Petitioner. *See* Pet. Reply 8–9. In particular, as Petitioner points out, the Federal Circuit held in *TomTom* that a conclusion that one phrase in a preamble is necessary to provide structure “does not necessarily convert the entire preamble into a limitation, particularly one that only states the intended use of the invention.” *TomTom*, 790 F.3d at 1323; *see also Cochlear Bone Anchored Sols.*, 2020 WL 2503475, at *5 (explaining that a “conclusion that some preamble language is limiting does not imply that other preamble language, or the entire preamble, is limiting”).

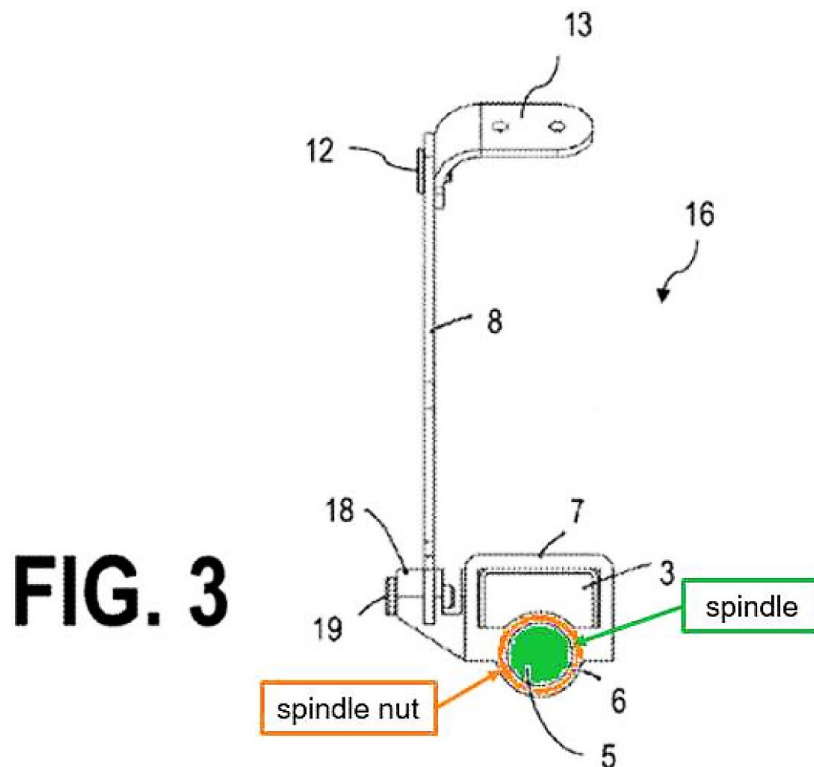
Accordingly, consistent with our Institution Decision, we determine that the recitations of “assembling a linear actuator” in claim 1 and an “arm assembly for a linear actuator” in claim 15 are limitations of those claims but that the remaining elements of claims 1 and 15 fully set forth a structurally complete invention and that the additional recitations of “for adjustable furniture” in the claims’ preambles merely state the intended use for the purported invention, and, as such, are not limitations. *See Catalina Mktg.*, 289 F.3d at 808.

2. “*spindle nut*”

Claim 1 recites “threadably engaging a spindle nut coupled to a pusher block with the threaded spindle.” Ex. 1001, 5:26–27. Claim 15 similarly recites “a spindle nut threadably engaged with [a] threaded spindle.” *Id.* at 6:53–54.

Patent Owner contends that “[a] person of ordinary skill in the art at the time of the ’717 Patent would have understood the ordinary and customary meaning of ‘spindle nut,’ as used in the ’717 Patent, to be ‘an element with an internally threaded hole that mates with a threaded spindle.’” PO Resp. 32 (citing Ex. 2008 ¶ 28). Patent Owner further contends that “the specification of the ’717 Patent describes and illustrates ‘spindle nut 6’ as an element with a hole to receive and threadably engage with ‘spindle 5.’” *Id.* at 32–33.

A version of Figure 3 of the ’717 patent, annotated by Patent Owner, is reproduced below:



Patent Owner’s annotated Figure 3 above is a sectional view of a linear actuator of the ’717 patent, with color coding and labels added by Patent Owner. PO Resp. 33; Ex. 1001, 2:45. With reference to annotated Figure 3, Patent Owner contends, “a person of ordinary skill in the art at the time of

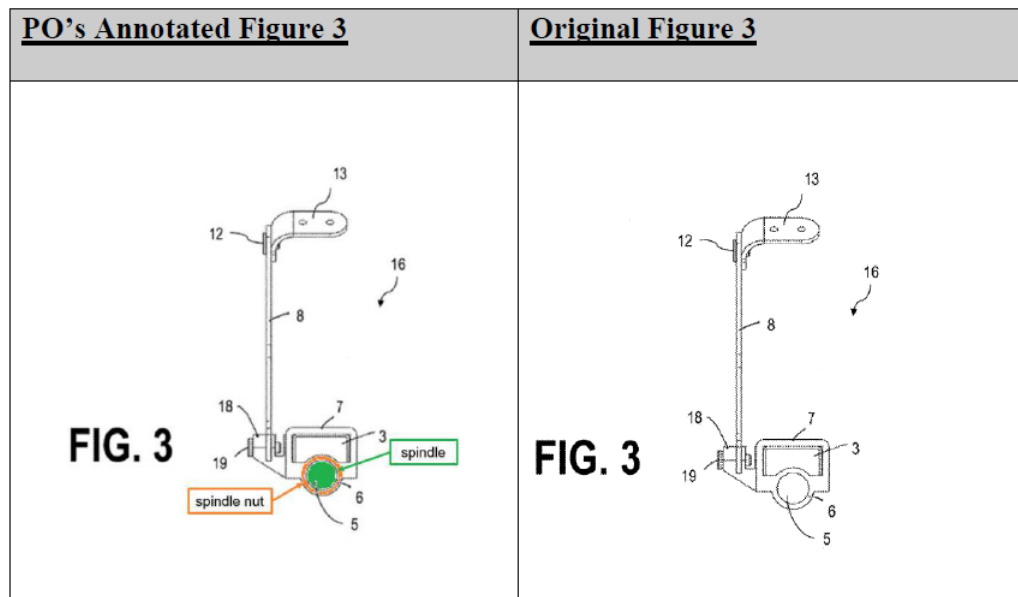
the invention of the '717 Patent would understand that a full circumscribing of the spindle (shown in green) by the 'spindle nut' (shown in orange) is required by the ordinary and customary meaning of the term 'spindle nut.'" *Id.* at 32–33 (citing Ex. 1001, 3:14–16, 4:44–45, Figs. 3, 6, 10; Ex. 2008 ¶¶ 23–26). In fact, Patent Owner contends, "a person of ordinary skill in the art would understand that a full circumscribing of the 'spindle' by the 'spindle nut' in the '717 Patent would be required due to the forces applied on linear actuators for adjustable furniture." *Id.* at 33 (citing Ex. 2008 ¶¶ 34–35). Quoting Mr. Babcock, Patent Owner argues that a spindle nut is required to ensure the nut "cannot accidentally or otherwise disengage from the threaded spindle during the use of the linear actuator" and that a nut "is internally or self-balanced, with regard to the forces that are created due to the thread angle of trapezoidal threads present in spindle nuts and threaded spindles for linear actuators," meaning that, "for example, the separating force generated by the threads on the right side of the nut is counterbalanced by the separating force on the left side of the nut." *Id.* at 33–34 (quoting Ex. 2008 ¶ 35). Citing several dictionary definitions, Patent Owner further contends that "[t]he extrinsic record is also consistent with the ordinary and customary meaning of the term 'nut'—one of the most common machine elements in the world—as evidenced by both technical and general purpose dictionaries," and that "[e]ach of these dictionaries support the ordinary and customary meaning of 'nut' as an element with an internally threaded hole that engages the full circumference of a threaded bolt or screw." *Id.* at 34 (citing Ex. 2002 ¶¶ 30–32; Exs. 2009–2016).

In the Reply, relying on the testimony of Dr. Cameron, Petitioner responds that "a 'spindle nut' is nothing more than 'a mechanical element

with internal threads that engage with external threads of a spindle, where the internal threads are on an inner or concave surface of the mechanical element.” Pet. Reply 9 (quoting Ex. 1030 ¶ 35). According to Petitioner, “[t]his construction is consistent with the claims, the specification and figures, as well as Patent Owner’s extrinsic evidence,” whereas “Patent Owner’s claim construction is myopically focused, *not* on the plain and ordinary meaning of the term ‘spindle nut,’ but on excluding one particular type of nut—a half nut—from the claims’ scope.” *Id.* at 9–10. Petitioner points out that the specification of the ’717 patent mentions “spindle nut” only twice, each time indicating only that “spindle nut 6 is threaded onto the spindle 5,” and never excluding any particular type of nut as the spindle nut. *Id.* (quoting Ex. 1001, 3:14–16, 4:44–45). Even more significantly, Petitioner contends that by reciting “threadably engaged” rather than the specification’s narrower “threaded onto,” “the claims seek broader coverage than any examples described in the specification.” *Id.* at 12.

Petitioner further contends that Patent Owner “violates the cardinal rule of claim construction by importing a purported feature from the preferred embodiment into the claims” in order to support its narrow interpretation requiring the spindle nut to have a “hole.” Pet. Reply 10 (citing PO Resp. 32–33). But, Petitioner points out, even the intrinsic evidence relied upon by Patent Owner does not show that purported feature, absent Patent Owner’s annotations:

[T]he only intrinsic evidence relied on by Patent Owner to support its narrow claim construction is Figures 3, 6, and 10. [PO Resp.] 32–33. But, Patent Owner had to draw-in a circular-shaped spindle nut over Figure 3, because the figures do not delineate the boundaries of the spindle nut 6, let alone show if the spindle nut is a full or half nut:



[*Id.* at] 33 (PO’s annotated figure on left-hand side); Ex[.] 1001, Figure 3 (original figure on right-hand side). Patent Owner’s new annotation is one example of the depicted spindle nut 6, but not the only example covered by the scope of the claims as written. . . .

And crucially, by using the language “threadably engaged” rather than the specification’s narrower “threaded onto,” the claims seek broader coverage than any examples described in the specification. Patent Owner avoids accounting for this, and improperly seeks to limit the claimed “spindle nut” to a single ambiguous example from the figures.

Id. at 10–12 (citing *SuperGuide Corp. v. DirecTV Enters., Inc.*, 358 F.3d 870, 875 (Fed. Cir. 2004); *Electro Med. Sys. S.A. v. Cooper Life Sci., Inc.*, 34 F.3d 1048, 1054 (Fed. Cir. 1994)). Petitioner further contends that Patent Owner’s attempt to exclude half nuts is inconsistent with Mr. Babcock’s testimony referring, for example, to a half nut as “*a nut* with less than 180 degrees of contact with [a] mating screw,” and also cannot be squared with recognized mechanical uses of half nuts as spindle nuts. *Id.* at 11–12

(quoting Ex. 1031, 18:18–20) (citing Ex. 1030 ¶ 32; Ex. 1031, 113:25–114:6, 114:8–14; Ex. 1038, 1:23–25, 1:61, 2:4).

Lastly, Petitioner contends that Patent Owner’s extrinsic evidence also “countenances against including ‘hole’ in the construction,” because (1) none of the three technical definitions of “nut” relied on by Patent Owner and Mr. Babcock mentions the word “hole”; (2) Mr. Babcock admitted that the word “hole” adds no clarity to the meaning of “spindle nut”; and (3) the extrinsic “technical considerations” cited by Patent Owner require accepting that the claims are limited to adjustable furniture, are based on an incomplete understanding of the patent and claimed linear actuator, and contain numerous flaws, as demonstrated by Dr. Cameron. Pet. Reply 12–14 (citing PO Resp. 33–34; Ex. 1030 ¶¶ 38–44; Ex. 1031, 131:15–133:14, 136:13–143:17, 188:3–192:4).

In the Sur-Reply, Patent Owner contends that Petitioner’s construction and supporting evidence are untimely because Petitioner took the position at the outset of this proceeding that it was giving claim terms their plain and ordinary meaning but now proposes a new construction that, according to Patent Owner, “contradicts the plain and ordinary meaning.” PO Sur-Reply 6–7 (citing Pet. 15; Pet. Reply 9, 14). Moreover, Patent Owner asserts, Petitioner relies on a dictionary definition of “internal thread” as “a screw thread on an inner or concave surface,” but the same dictionary also defines “nut” as “a *perforated* block usually of metal that has an internal screw thread and is used on a bolt or screw for tightening or holding something,” or as “a piece of metal that has a *hole* though it so that it can be screwed onto a bolt or screw.” *Id.* at 11 (quoting Ex. 2018, 1, 5 (emphasis added)). Patent Owner contends that “Petitioner cannot maintain that a nut

does not need a hole on the basis of a dictionary that itself defines ‘nut’ as requiring a hole.” *Id.* at 11–12.

Having considered the parties’ respective contentions, we agree with Petitioner that the claim term “spindle nut” is properly understood as “a mechanical element with internal threads that engage with external threads of a spindle, where the internal threads are on an inner or concave surface of the mechanical element,” and that this construction reflects the plain and ordinary meaning of that term. Pet. Reply 9; Pet. 15. The only requirement the claims impose on the spindle nut is that it be capable of being threadably engaged with the spindle. They do not require that there be a “hole” or “perforated block” or that the spindle nut “engages the full circumference” of the spindle, as alleged by Patent Owner, or even that the spindle nut be capable of being “threaded onto” the spindle. *See* PO Resp. 34–35; PO Sur-Reply 11–12; Ex. 1001, 3:14–16, 4:44–45. Further, despite Patent Owner’s addition of an orange circular-shaped annotation to Figure 3 with the label “spindle nut,” neither the figures nor the corresponding description in the specification provides any indication of the shape of the spindle nut. Absent Patent Owner’s annotations, Figure 3 (and identically Figure 6) merely labels an undelineated portion of pusher block 7 adjacent to spindle 5 as “spindle nut 6.” As Petitioner points out, a spindle nut that circumferentially surrounds a spindle is only one possible configuration, and other configurations have been recognized in the art. Pet. Reply 11–12; *see also SuperGuide Corp. v. DirecTV Enters., Inc.*, 358 F.3d 870, 875 (Fed. Cir. 2004) (citing *Electro Med. Sys. S.A. v. Cooper Life Sci., Inc.*, 34 F.3d 1048, 1054 (Fed. Cir. 1994) (“Though understanding the claim language may be aided by the explanations contained in the written description, it is

important not to import into a claim limitations that are not a part of the claim. For example, a particular embodiment appearing in the written description may not be read into a claim when the claim language is broader than the embodiment.”).

Further, we disagree with Patent Owner’s contention that Petitioner’s Reply violates the Board’s rules prohibiting submission of certain new evidence or argument in a reply. *See* PO Sur-Reply 7–8 (citing Patent Trial and Appeal Board Consolidated Trial Practice Guide 73 (Nov. 2019) (“CTPG”), <https://www.uspto.gov/sites/default/files/documents/tpgnov.pdf>). The Trial Practice Guide expressly permits that “[a] petitioner may file a reply to a patent owner response,” that “the Board will permit the petitioner, in its reply brief, to address issues discussed in the institution decision,” and that “[a] party also may submit rebuttal evidence in support of its reply.” CTPG 73. The Federal Circuit supports certain uses of new argument and evidence by petitioners as well. *See, e.g., Chamberlain Grp., Inc. v. One World Techs., Inc.*, 944 F.3d 919, 925 (Fed. Cir. 2019) (interpreting the prohibition against presentation of new “arguments” in the Trial Practice Guide as referring to new “issues” and explaining that “[p]arties are not barred from elaborating on their arguments on issues previously raised”); *Anacor Pharm., Inc. v. Iancu*, 889 F.3d 1372, 1380–81 (Fed. Cir. 2018) (explaining that “the petitioner in an inter partes review proceeding may introduce new evidence after the petition stage if the evidence is a legitimate reply to evidence introduced by the patent owner, or if it is used ‘to document the knowledge that skilled artisans would bring to bear in reading the prior art identified as producing obviousness.’” (quoting *Genzyme*

Therapeutic Prod. Ltd. P'ship v. Biomarin Pharm. Inc., 825 F.3d 1360, 1366 (Fed. Cir. 2016))).

In view of arguments raised by Patent Owner in its Preliminary Response regarding the scope of the term “spindle nut,” we expressly stated in our Institution Decision that the record was not sufficiently developed with respect to the meaning of that term and that the parties would have the opportunity during trial to present claim construction briefing to assist in our final resolution of this proceeding. Inst. Dec. 35–37. The Response and Reply were Patent Owner’s and Petitioner’s respective first opportunities to provide such briefing under the Scheduling Order in this case (*see* Paper 13), and the Reply was, moreover, Petitioner’s first and only opportunity to reply to Patent Owner’s arguments. Because Petitioner’s arguments and evidence are responsive to Patent Owner’s Response and to our Institution Decision, we find the Reply complies with our Rules. Moreover, the Petition makes clear that Petitioner contended from the outset that the plain and ordinary meaning of “spindle nut” includes a half nut because Petitioner’s unpatentability contentions expressly rely on a “half nut” taught by Duhome as corresponding to the recited “spindle nut.” Pet. 50–52. For this additional reason, we find that Petitioner has not materially changed its position with respect to the scope of that term, “relied on an entirely new rationale,” or otherwise to have raised any “new issue” as that phrase is used in the Trial Practice Guide. *See, e.g.*, CTPG 74–75 (providing examples of “indications that a new issue has been raised in the reply).

Notwithstanding Patent Owner’s argument that it had no opportunity to submit testimony from its own expert to address Petitioner’s proposed constructions (*see* PO Sur-Reply 7), Patent Owner neither requested leave

from the Board to submit additional evidence with its Sur-Reply nor filed a motion to strike any material allegedly outside the proper scope of Petitioner's Reply. Patent Owner notably also did not either seek to depose Dr. Cameron or move to exclude her reply declaration. *See also* CTPG 73 (providing that “[i]f a party submits a new expert declaration with its reply, the opposing party may cross-examine the expert, move to exclude the declaration, and comment on the declaration at a cross-examination in any sur-reply”); *Genzyme*, 825 F.3d at 1366 (“[T]he introduction of new evidence in the course of the trial is to be expected in inter partes review trial proceedings and, as long as the opposing party is given notice of the evidence and an opportunity to respond to it, the introduction of such evidence is perfectly permissible under the APA.”).

3. “*the rigid arm extends through the rigid arm passage*”

Claim 1 recites “slidably engaging the pusher block with the rigid arm by inserting the rigid arm within a rigid arm passage defined by the pusher block such that *the rigid arm extends through the rigid arm passage.*” Ex. 1001, 5:28–31 (emphasis added). Claim 15 similarly recites “a pusher block . . . comprising: a rigid arm passage, wherein *the rigid arm extends through the rigid arm passage* such that the pusher block is slidable along the rigid arm.” *Id.* at 6:55–59 (emphasis added).

Patent Owner contends that “[a] person of ordinary skill in the art at the time of the invention of the ’717 Patent would . . . understand the ordinary and customary meaning of the claim to require ‘an opening within the pusher block configured to house the rigid arm, so as to allow the cross-section of the full body of the rigid arm—not just a portion thereof—to pass through.’” PO Resp. 36 (citing Ex. 2008 ¶ 46). According to Patent

Owner, the person of ordinary skill “would understand that this configuration is ‘desirable for technical reasons due to the forces applied on linear actuators for adjustable furniture.’” *Id.* at 37 (citing Ex. 2008 ¶ 47 (stating that “[t]he pusher block 7 provides a connection point for communicating forces generated by the improved linear actuator 16 to the adjustable furniture” and that “it is important that the pusher block have excellent structural integrity, as well as a strong structural relationship with the *rigid* arm housed within the pusher block”)). Quoting the testimony of Mr. Babcock, Patent Owner further contends:

Furthermore, “in embodiments wherein the linkage 8 and clevis 18 are to the side of the pusher block 7, such as those illustrated in Figures 3 and 6, a moment or twisting force will likely be created in the pusher block around the rigid arm. If the pusher block did not house the full cross-section of the rigid arm within an opening in the pusher block, the moment or twisting force would increase the risk of separation of the pusher block from the rigid arm and severely reduce the capability of the linear actuator to perform as intended.” Ex. 2008 at ¶ 47. “Additionally, a person of ordinary skill in the art at the time of the invention of the ’717 Patent would understand that this configuration—wherein the cross-section of the rigid arm is housed within the pusher block—would promote a compact form factor of the linear actuator, which is required for installation in adjustable furniture.” Ex. 2008 at 47; *see also* Ex. 1009 at Abstract (noting same with respect to “compact” form factor).

Id. at 37–38. Thus, Patent Owner contends, “in view of both the intrinsic and extrinsic evidence,” a person of ordinary skill in the art at the time of the invention “would understand the claimed ‘rigid arm passage’ defined by the pusher block such that ‘the rigid arm extends through the rigid arm passage’ requires an opening within the pusher block ‘that allows the full cross-

section of the rigid arm—not just a portion thereof—to pass through.” *Id.* at 38 (citing Ex. 2008 ¶ 48).

In the Reply, Petitioner responds that independent claims 1 and 15 do not specify that a full cross section of the rigid arm passes through the pusher block, but only that the rigid arm passage be “defined by” or “comprised as part of” the recited pusher block; that “the rigid arm extends though the rigid arm passage”; and that the pusher block has “an outer surface.” Pet. Reply 14. Petitioner points out that, outside of the independent claims, the term “passage” does not appear anywhere in the ’717 patent. *Id.* Petitioner further points out that dependent claims 3, 4,¹² 16, and 17 each recite that “the outer surface of the pusher block comprises a top surface and at least one side surface extending downwardly from the top surface.” *Id.* at 15. Under the doctrine of claim differentiation, Petitioner contends, the pusher block of the independent claims thus must be broad enough to include just top and side surfaces and need not circumferentially surround the rigid arm. *Id.* (citing Ex. 1030 ¶ 48).

Petitioner further contends that, although the ’717 patent states that pusher block 7 in certain embodiments straddles and slides up and down rigid arm 3 as electric driver motor 2 turns spindle 5 (*see* Ex. 1001, 3:16–18), that does not require “the cross-section of the full body of the rigid arm—not just a portion thereof—to pass through.” *Id.* at 15–16. Rather, citing dictionary definitions of “passage” and “through,” as well as the

¹² Although Petitioner refers to “claims 2 and 3” in the context of this argument (Pet. Reply 14), claim 2 does not include the quoted limitation (*see* Ex. 1001, 5:40–45). Claims 3 and 4 do, however (*see id.* at 5:46–55), and we accordingly understand Petitioner’s reference to claim 2 to be a typographical error.

testimony of Dr. Cameron, Petitioner contends that a person of ordinary skill in the art would instead have understood the recited “rigid arm passage” to be “a path or channel through, over, or along which a rigid arm passes,” and would have further understood that phrase “rigid arm extends through the rigid arm passage” to mean that “a portion of the rigid arm extends from one side of a channel or path of the pusher block to the other.” *Id.* at 16–17 (citing Ex. 1030 ¶¶ 46–47; Ex. 1041). According to Petitioner, these constructions not only encompass the embodiment of Figure 3 of the ’717 patent, to which Patent Owner improperly seeks to import into the claims, but also properly capture the “straddling” described in the specification. *Id.* Finally, Petitioner contends that the extrinsic “technical matters” cited by Patent Owner are unsupported by the intrinsic record, require accepting the premise that the claims are limited to adjustable furniture, are based on an incomplete understanding of the patent and its claims, and contain numerous flaws, as demonstrated by Dr. Cameron. *Id.* at 17–18 (citing PO Resp. 37–38; Ex. 1030 ¶¶ 48–49).

In the Sur-Reply, Patent Owner contends that Petitioner’s construction and supporting evidence are untimely because Petitioner took the position at the outset of this proceeding that it was giving claim terms their plain and ordinary meaning but now proposes a new construction that, according to Patent Owner, “broadens the term beyond its plain and ordinary meaning by reading ‘a portion of’ into the claims.” PO Sur-Reply 6–8 (citing Pet. 15; Pet. Reply 16–17; CTPG 73–74), 12. According to Patent Owner, “[t]he claims could not be more clear that it is ‘the rigid arm’—not a portion thereof—that must extend through the passage in the pusher block.” *Id.* at 12. Still further, Patent Owner contends that Petitioner’s claim

differentiation argument is flawed because the claims are “open-ended.” *Id.* at 12–13. In particular, Patent Owner argues, “[t]he recitation that the pusher block ‘**comprises**’ top and side surfaces does not mean that the pusher block **only** has just those two surfaces,” but instead “[t]he claims recite those surfaces not to encompass a pusher block that has only a top and a side, but rather to specify the location of the attachment projections in those claims.” *Id.* at 13.

Having considered the parties’ respective contentions, we agree with Petitioner that the phrase “the rigid arm extends through the rigid arm passage” does not require that the “full cross-section of the rigid arm” necessarily must pass through the rigid arm passage, as Patent Owner contends. Pet. Reply 14. We agree with Petitioner that this is made clear by the recitation in dependent claims 3, 4, 16, and 17 of the pusher block comprising “a top surface and at least one side surface extending downwardly from the top surface.” *Id.* at 15; Ex. 1001, 5:46–48, 5:51–53, 7:1–3, 7:6–8. Although Patent Owner correctly states that this recitation “does not mean that the pusher block **only** has just those two surfaces,” it does mean that the pusher block is broadly defined to *encompass* a block that only has just those two surfaces. Strictly speaking, this is not an issue of claim differentiation because it does not require us to presume that the dependent claims are narrower in scope than the independent claims. Rather, it is an application of the “axiom[] that a dependent claim cannot be broader than the claim from which it depends.” *Alcon Research, Ltd. v. Apotex Inc.*, 687 F.3d. 1362, 1367 (Fed. Cir. 2012). In other words, because claims 16 and 17 encompass an arm assembly having a pusher block without two side surfaces, we conclude that independent claim 15 from which they

depend also does. We adopt Petitioner’s proposed construction of “rigid arm passage” as “path or channel through, over, or along which a rigid arm passes,” as well as its construction of the phrase “rigid arm extends through the rigid arm passage” as requiring that “a portion of the rigid arm extends from one side of a channel or path of the pusher block to the other.” *See* Pet. Reply at 16–17. We agree with Petitioner that these constructions are consistent with and encompass the embodiment shown in Figure 3, as well as the description relied upon by Patent Owner that “pusher block 7 straddles the rigid arm 3.” *See* Pet. 15 (citing PO Resp. 35–36); Ex. 1001, 3:16–18, Fig. 3.

Finally, we again disagree with Patent Owner’s contention that Petitioner’s arguments and evidence in the Reply are untimely, for the reasons previously stated. *See supra* § II.B.2.

C. Anticipation of Claims 1, 5–7, 10, 15, 18, and 20 by Duhamel

1. Brief Overview of Duhamel

Duhamel, titled “Garage Door Operator” (Ex. 1013, code (54)), is a United States Patent that “relates to an apparatus for operating a garage door and the like, and more particularly to a screw drive type of operator” (*id.* at 1:6–8). An embodiment of a screw drive garage door operator is illustrated in Figure 1 of Duhamel, reproduced below.

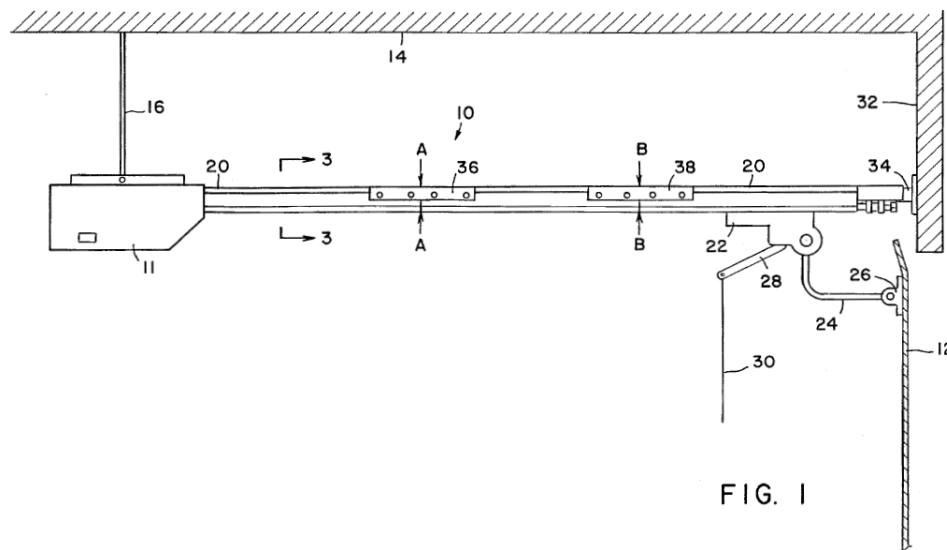


Figure 1 of Duhamel, above, is a cross-sectional side view of an embodiment for apparatus 10 for opening and closing overhead garage door 12. *Id.* at 2:29–31, 62–64. Duhamel explains that apparatus 10 “includes drive assembly 18 (not shown in FIG. 1), guide rail 20 for supporting drive assembly 18 and traveler 22 coupled to garage door 12. Traveler 22 is connected to door 12 by means of pivoting link 24 and door bracket 26.” *Id.* at 3:6–10 (boldface omitted). “As the motor in housing 11 rotates, traveler 22 is caused to be displaced along guide rail 20 between preset limits of travel which correspond to fully opened and fully closed positions of door 12.” *Id.* at 3:13–17 (boldface omitted).

A cross-sectional view of apparatus 10 is shown in Figure 3 of Duhamel, reproduced below.

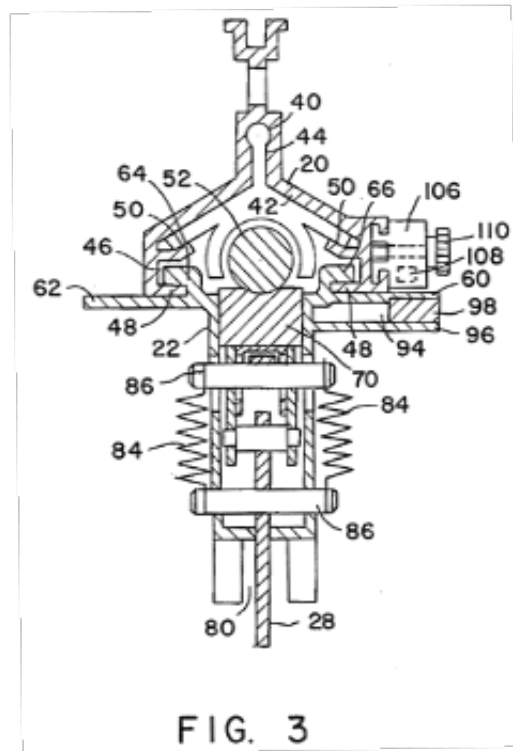


Figure 3 of Duhamel, above, depicts guide rail 20 having triangular channel 42, within which is drive screw 52 of drive assembly 18. *Id.* at 3:36–38. Drive screw 52 “is driven in alternate directions by the motor in housing 11 to cause bidirectional travel of traveler 22 along guide rail 20 for the purpose of opening and closing door 12.” *Id.* at 3:38–41. More particularly, traveler 22 includes half nut 70, which is threaded to mesh with drive screw 52. *Id.* at 3:59–61. “During engagement between drive screw 52 and half nut 70, half nut 70 is held against rotation whereby the rotation of drive screw 52 causes nut 70 to be displaced linearly along guide rail 20.” *Id.* at 4:15–18.

2. Analysis

We begin by considering each element recited by independent claim 15, followed by the remaining claims challenged as anticipated by Duhamel.

a. Independent claim 15

i. “An arm assembly for a linear actuator for adjustable furniture”

The preamble of independent claim 15 recites “[a]n arm assembly for a linear actuator for adjustable furniture.” Ex. 1001, 6:49–50. As discussed in Section II.B.1 above, the parties dispute whether this preamble language should be treated as a claim limitation. *See* Pet. 47–48; PO Resp. 25–32. “Even if limiting,” Petitioner contends, “*Duhamé* teaches the preamble,” by, for example, “disclos[ing] a screw-drive type of operator or apparatus 10, which is a linear actuator.” *Id.* at 47 (citing Ex. 1013, 1:5–8, 3:6–8, Fig. 1). Patent Owner responds that “*Duhamé* does not disclose a ‘linear actuator for adjustable furniture,’” but instead “describes and illustrates a ‘door operator for garage doors.’” PO Resp. 40; PO Sur-Reply 8. According to Patent Owner, the issues *Duhamé* is intended to address are “specific to commercial apparatuses for opening and closing garage doors” and “do[] not arise in the context of adjustable furniture.” PO Resp. 40. At most, Patent Owner contends, “*Duhamé* states its ‘invention relates to an apparatus for operating a garage door and the like,’” and “[s]uch a non-descriptive, generic statement is not an anticipatory disclosure of a ‘linear actuator for adjustable furniture.’” *Id.* (emphasis omitted) (quoting Ex. 1013, 1:5–8).

For the reasons previously stated, we determine for purposes of this Decision that the preamble phrase “arm assembly for a linear actuator” is limiting, but that the further preamble recitation, “for adjustable furniture,” merely states the intended use of the purported invention and is not a claim limitation. *See supra* § II.B.1. Moreover, Patent Owner does not dispute that *Duhamé* discloses the recited “arm assembly for a linear actuator,” apart

from arguing that Duhamé does not disclose a linear actuator specifically “for adjustable furniture,” and we are persuaded that Petitioner has shown by a preponderance of the evidence that Duhamé discloses this limitation. *See* Pet. 47–48.¹³

ii. “a rigid arm”

Independent claim 15 recites “a rigid arm.” Ex. 1001, 6:51. Petitioner has persuasively shown that Duhamé’s guide rail 20 corresponds to this limitation. Pet. 48–49 (citing Ex. 1013, 3:7–8, 3:13–16, 3:26–31, Fig. 1; Ex. 1004 ¶ 174). Patent Owner does not challenge Petitioner’s contentions with respect to this¹⁴ limitation. Petitioner’s assertions are supported by the cited evidence (*see id.*), and we are persuaded that Petitioner has shown by a preponderance of the evidence that the recited rigid arm is disclosed by Duhamé.

¹³ Petitioner also argues, for the first time in its Reply, that “[t]he plain and ordinary meaning of ‘furniture’ includes components attached to a garage door, such as those disclosed in Duhamé,” and that, “[t]hus, even if the Board finds that the recitation of ‘for adjustable furniture’ is limiting . . . Duhamé’s garage door operator is a linear actuator for adjustable furniture.” Pet. Reply 22 (citing Ex. 1039; Ex. 1040). Patent Owner argues in its Sur-Reply that the Board’s “rules forbid the new argument in reply.” PO Sur-Reply 8 (citing CTPG 74). Because we conclude that the recitation “for adjustable furniture” is not limiting, we do not reach either the merits or the propriety of this alternative argument.

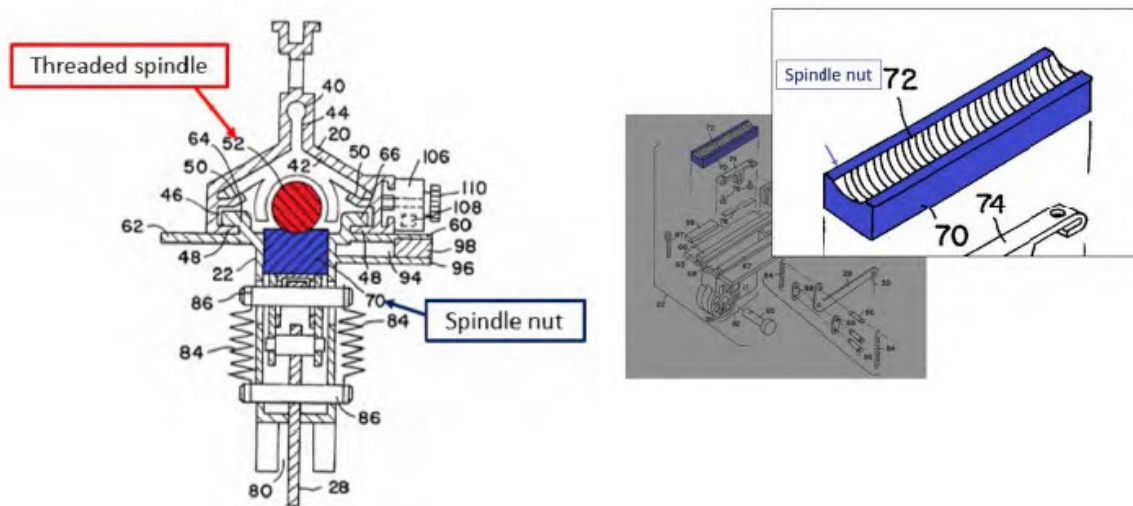
¹⁴ As discussed in more detail in Section II.C.2.a.v below, Patent Owner *does* challenge Petitioner’s contention that Duhamé’s guide rail 20 satisfies a later limitation of claim 15, concerning the positioning of the recited rigid arm relative to another claim element. *See* PO Resp. 46–49.

iii. “a threaded spindle housed within the rigid arm”

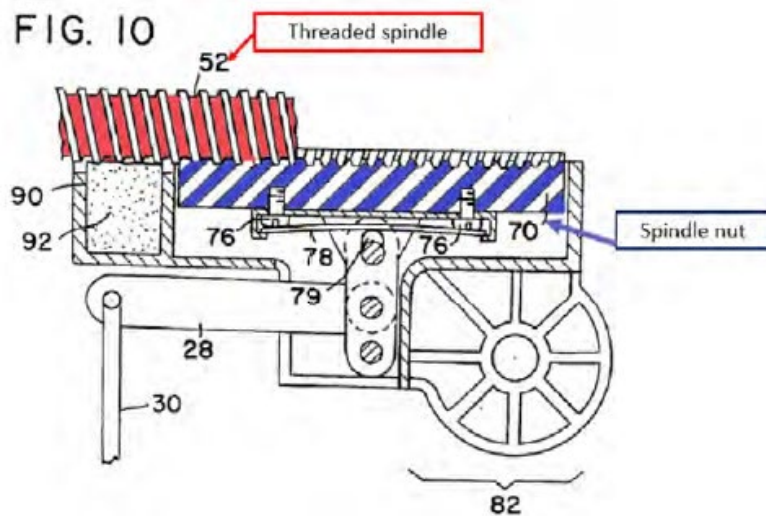
Independent claim 15 recites “a threaded spindle housed within the rigid arm.” Ex. 1001, 6:52. Petitioner has persuasively shown that Duhamé’s drive screw 52 corresponds to the recited threaded spindle and that it is housed within the triangular channel 42 of guide rail 20, previously identified as the recited rigid arm. Pet. 49–50 (citing Ex. 1013, 3:26–31, 3:36–38, Fig. 3; Ex. 1004 ¶ 175). Patent Owner does not challenge Petitioner’s contentions with respect to this limitation. Petitioner’s assertions are supported by the cited evidence (*see id.*), and we are persuaded that Petitioner has shown by a preponderance of the evidence that the recited threaded spindle is disclosed by Duhamé.

iv. “a spindle nut threadably engaged with the threaded spindle”

Independent claim 15 recites “a spindle nut threadably engaged with the threaded spindle.” Ex. 1001, 6:53–54. Petitioner maps Duhamé’s half nut 70 to the recited “spindle nut,” pointing out, for example, that Duhamé discloses that “upper surface 72 of half nut 70 is **threaded to mesh with** the threads of drive screw 52” and that “[d]uring **engagement** between drive screw 52 and half nut 70, half nut 70 is held **against rotation . . .**” Pet. 50–51 (quoting Ex. 1013, 3:60–61, 4:15–18). To illustrate, Petitioner provides the following annotated versions of Figures 3 and 10 of Duhamé and annotated enlarged version of a portion of Duhamé’s Figure 9.



Duhamel, FIGS. 3 and 9



Duhamel, Figure 10

In the annotated figures reproduced above, showing cross-sectional and perspective views of Duhamel's apparatus and components thereof, Petitioner highlights drive screw 52 in red, labeled as "threaded spindle," and half nut 70 in blue, labeled as "spindle nut." *Id.* at 51–52; Ex. 1013, 2:36–37, 2:52–55.

Patent Owner responds that "Duhamel's 'half nut' is not a 'spindle nut' as described and claimed in the '717 Patent" because it "does not

contain an internally threaded hole that mates with a threaded spindle.” PO Resp. 42. According to Patent Owner, “instead of being a nut threaded onto the drive screw, Duhamé’s ‘half nut’ requires support by a bracket that holds the half nut against the threads of the drive screw.” *Id.* (citing Ex. 1013, 3:62–4:9). “[W]ithout the support of the bracket,” Patent Owner contends, “the half nut disengages the drive screw.” *Id.* at 42–43 (citing Ex. 1013, 4:10–14). According to Patent Owner, the “difference between Duhamé and the claims of the ’717 Patent is a significant and intentional one on the part of Duhamé.” *Id.* at 43. In particular, Patent Owner argues, “Duhamé specifically uses a ‘half nut’ with threads on an upper surface of the block in order to enable an emergency release for Duhamé’s garage door operator.” *Id.* (citing Ex. 1013, 4:10–24). According to Patent Owner, “[i]f Duhamé were to use a nut instead of a half nut, the garage door operator could not perform its emergency release function—because the nut could not be disengaged like the ‘half nut’ of Duhamé,” and, “on the other hand, if a linear actuator for adjustable furniture were to use a ‘half nut’ instead of a nut, any disengagement of the half nut from the spindle would cause the linear actuator to stop working and could cause a catastrophic failure and serious injury to anyone using the furniture.” *Id.* (citing Ex. 2008 ¶ 35).

Patent Owner further contends that a person of ordinary skill in the art would understand that “nuts” and “half nuts” are “distinctly different machine elements with different uses, including distinct advantages for each.” *Id.* at 44 (quoting Ex. 2008 ¶ 40). For example, Patent Owner argues, a nut cannot disengage from a threaded member such as a bolt or screw without being completely unscrewed, whereas a half nut is intentionally designed to freely disengage with a bolt or screw. *Id.* at 44–45

(citing Ex. 2008 ¶¶ 40–41). Patent Owner contends that the specification of the '717 patent “demonstrates a design in which a ‘nut’—not a half nut or other portion of a nut—is required to achieve the purpose of the linear actuator.” *Id.* at 45 (citing Ex. 2008 ¶ 42).

In its Reply, Petitioner responds that Patent Owner’s arguments are based on an incorrect claim construction and that, under the proper construction, the evidence establishes that Duhamel anticipates claims 1, 5–7, 10, 15, 18, and 20. Pet. Reply 19–20 (citing Ex. 1013, Figs. 3, 9, 10; Ex. 1030 ¶¶ 61, 64–69). Petitioner contends that Duhamel’s half nut is a spindle nut, as that term is properly construed, consistent with other recognized mechanical uses of half nuts as spindle nuts in the prior art. *Id.* at 11–12. Petitioner points out that U.S. Patent No. 3,498,152 to Gerner (Ex. 1038), for example, disclosed an invention “relat[ing] to a backlash-free adjustable spindle nut for machine-tool carriages and slides, using a half-nut half-embracing the spindle” and interchangeably referred to “half-nuts 5” and “spindle nut 5.” Pet. Reply 12 (quoting Ex. 1038, 1:23–25, 1:61, 2:4) (citing Ex. 1030 ¶ 32).

In the Sur-Reply, Patent Owner argues again that Duhamel does not disclose a “spindle nut,” based on its claim construction positions that a spindle nut must have an internally threaded hole, not merely threads on a concave surface, and that, under the ordinary and customary meaning of the term, “a half-nut is less than a nut and is a different machine element that would not be suitable for linear actuators for adjustable furniture.” PO Sur-Reply 11–12 (citing PO Resp. 32–35, 41–45; Ex. 1030 ¶ 35; Ex. 1031, 222:6–223:12; Pet. Reply 9; Ex. 2009; Ex. 2018).

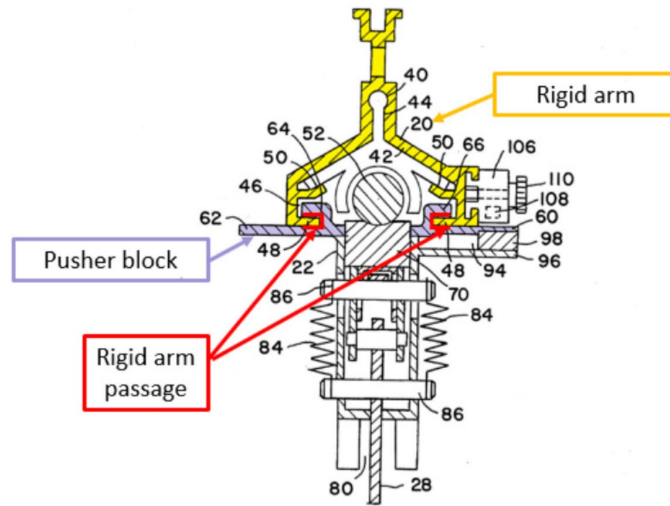
Having considered the parties' arguments and the full record, we are persuaded by Petitioner's arguments and evidence that Duhamé's half nut 70 is a "spindle nut" as that term is properly construed and that half nut 70 is "threadably engaged" with the threaded spindle (i.e., drive screw 52). As explained in Section II.B.2 above, we disagree with Patent Owner's contentions that a spindle nut necessarily must have a hole that fully circumscribes the recited spindle. We are not persuaded to the contrary by Patent Owner's contentions that, for example, the potential for disengagement of a half nut from the spindle is a "significant and material difference between Duhamé and the claims of the '717 Patent" that "could cause a catastrophic failure and serious injury to anyone using the furniture." PO Resp. 43. As an initial matter, we find no persuasive evidence in the record that disengagement of adjustable furniture poses a materially or significantly greater risk of "catastrophic failure and serious injury" than would the failure of the garage door operator described by Duhamé, or even that there is a risk of unintentional disengagement. *See* Tr. 33:20–34:7 (Petitioner arguing that a falling garage door would cause more damage than a falling chair); *see also* Ex. 1013, 4:7–9 (Duhamé disclosing that bracket 28 engages threads 72 of half nut 70 to engage drive screw 52); Ex. 1030 ¶ 42 (Dr. Cameron testifying that "components besides the spindle nut are used to structurally support the spindle in the patent, which would mitigate any limited concerns of a disengaging spindle"). Moreover, Petitioner has adduced evidence that half nuts have, in fact, been long-recognized as spindle nuts in linear actuators, and, indeed, that Duhamé's half nut is itself a spindle nut that is threadably engaged with a threaded spindle (i.e., drive screw 52) in a linear actuator. *See* Pet. Reply 11–12 (citing Ex. 1038,

1:23–25, 1:61, 2:4; Ex. 1030 ¶ 32); Pet. 50–52 (citing, *e.g.*, Ex. 1013, 3:60–61 (describing upper surface 72 of half nut 70 as being “threaded” to mesh with the threads of drive screw 52), 4:15–18 (referring to “engagement” between drive screw 52 and half nut 70, such that “rotation of drive screw 52 causes nut 70 to be displaced linearly along guide rail 20”); Ex. 1004 ¶ 176).

Accordingly, we conclude that Petitioner has shown by a preponderance of the evidence that Duhamel discloses “a spindle nut threadably engaged with the threaded spindle,” as recited in claim 15.

- v. *“a pusher block coupled with the spindle nut and comprising: a rigid arm passage, wherein the rigid arm extends through the rigid arm passage such that the pusher block is slidable along the rigid arm; and . . .”*

Independent claim 15 recites “a pusher block coupled with the spindle nut and comprising: a rigid arm passage, wherein the rigid arm extends through the rigid arm passage such that the pusher block is slidable along the rigid arm . . .” Ex. 1001, 6:55–59. Petitioner maps Duhamel’s traveler 22 to this limitation, arguing that the recited coupling of the pusher block with the spindle nut is shown in various figures of Duhamel and also disclosed by Duhamel’s disclosure that half nut 70 is connected to traveler 22 and fits within a seat defined by the walls of cavity 68 thereof. Pet. 52–54 (citing Ex. 1013, 3:6–8, 3:58–60, 4:18–21, Figs. 3, 9; Ex. 1004 ¶ 177). Petitioner further contends that Duhamel “discloses a passage . . . through which the rigid arm extends,” defined by L shaped extensions 64 and 66 and flanges 60 and 62 running along the length of traveler 22, as shown in cross section in Petitioner’s annotated version of Duhamel’s Figure 3, reproduced below. *Id.* at 54–55 (citing Ex. 1013, 3:32–33, 3:46–57).



Duhamel, Figure 3

In the annotated figure reproduced above, Petitioner highlights traveler 22 in purple, labeled as “pusher block”; guide rail 20 in yellow, labeled as “rigid arm”; and portions of the surfaces of L shaped extensions 64 and 66 and flanges 60 and 62 in red, labeled as “rigid arm passage.” *Id.* at 54–55. With reference to the annotated Figure, Petitioner contends that a person having ordinary skill in the art would have understood that the passage shown in red corresponds to the claims rigid arm passage. *Id.* at 55 (citing Ex. 1004 ¶ 178). Petitioner further argues that “the body of traveler 22 slides along the rigid arm within the passage,” quoting disclosure in Duhamel that “L shaped extensions 64, 66 each have an inner surface which rests on, i.e., supported by flanges 48 as traveler 22 moves along guide rail 20.” *Id.* at 54 (emphasis omitted) (quoting Ex. 1013, 3:49–51).

Patent Owner responds that Duhome does not disclose either a “rigid arm passage” or “a rigid arm that extends ‘through’ the rigid arm passage as described and claimed in the ’717 Patent.” PO Resp. 46. In particular, according to Patent Owner, Duhome’s traveler 22 “does not include []or otherwise form a ‘rigid arm passage’—a defined opening within the pusher

block configured to house the rigid arm,” but “[i]nstead . . . forms only two separate L-shaped extensions 64, 66.” *Id.* at 47. Moreover, Patent Owner argues, “the body of guide rail 20 of Duhamé does not ‘extend through’ a ‘rigid arm passage’ in traveler 22, as required by the challenged claims,” but instead “sits on top of traveler 22 (as opposed to being housed within), and traveler 22 simply rests on two separate flanges 48 of the guide rail 20.” *Id.* at 47–48. Accordingly, Patent Owner contends, “[t]he interface of the purposed pusher block of Duhamé (traveler 22) and purported rigid arm of Duhamé (guide rail 20) thus does not disclose the ‘rigid arm passage’ of the challenged claims.” *Id.* at 48. Additionally, Patent Owner contends, “a person of ordinary skill in the art at the time of the invention of the ’717 Patent would understand that the claimed configuration in which ‘the rigid arm extends through the rigid arm passage’ would promote a compact form factor of the linear actuator, which is required for installation in adjustable furniture,” whereas “the configuration of the purposed pusher block of Duhamé (traveler 22) and purported rigid arm of Duhamé (guide rail 20) is far from compact.” *Id.* at 48–49 (citing Ex. 2008 ¶ 47; Ex. 1009, code (57); Ex. 1013, Fig. 3).

We are persuaded that Petitioner has shown by a preponderance of the evidence that Duhamé discloses this limitation under the construction of “rigid arm passage,” adopted above. *See supra* § II.B.3. In particular, we are persuaded that flanges 60, 62 and L shaped extensions 64, 66 of Duhamé’s traveler 22 (i.e., the recited pusher block) together define rigid arm passages through and along which flanges 48 of guide rail 20 (the recited rigid arm) pass and extend, such that traveler 22 is slidable along guide rail 20. Pet. 54–55. Notwithstanding Patent Owner’s contentions, we

find no recitation in claim 15 requiring that the “body” of the rigid arm must extend through the passage (*see* PO Resp. 47–48), nor do we find any recitation requiring the recited linear actuator to have a “compact form factor” (*see id.* at 48–49).

- vi. *“an attachment projection integrally formed with the pusher block and extending outwardly from an outer surface of the pusher block and defining a linkage channel,” “wherein the attachment projection is configured to receive an end of a linkage within the linkage channel and pivotally connect the linkage to the pusher block in the linkage channel of the attachment projection”*

Independent claim 15 lastly recites that the pusher block further comprises “an attachment projection integrally formed with the pusher block and extending outwardly from an outer surface of the pusher block and defining a linkage channel,” “wherein the attachment projection is configured to receive an end of a linkage within the linkage channel and pivotally connect the linkage to the pusher block in the linkage channel of the attachment projection.” Ex. 1001, 6:60–67. Petitioner asserts that Duhome teaches this limitation by virtue of its disclosure of hanging portion 82 of traveler 22. Pet. 56. A version of Duhome’s Figure 9, annotated by Petitioner, is reproduced below.

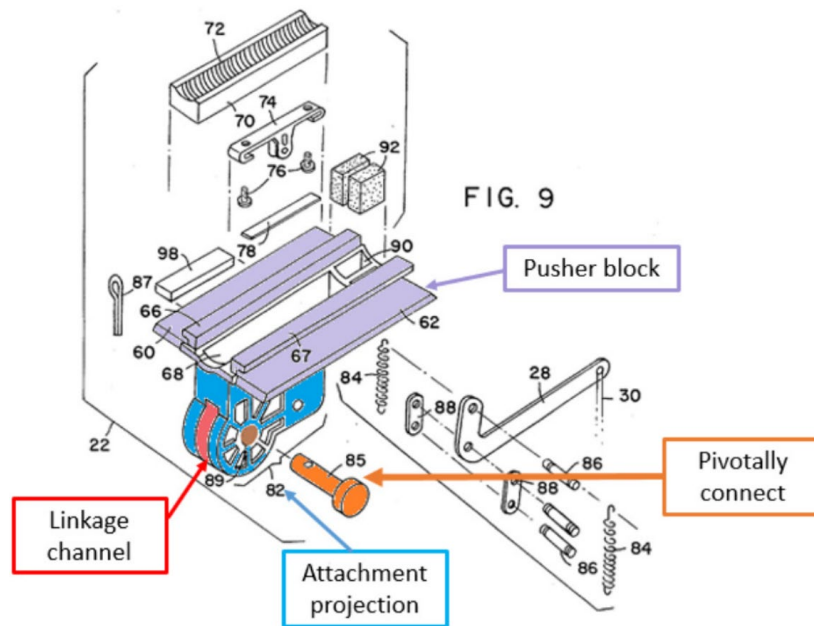


Figure 9 of Duhamé is a perspective view of traveler 22 shown in Duhamé's Figure 1. Ex. 1013, 2:52–53. In the annotated version of Figure 9 reproduced above, Petitioner highlights traveler 22 in purple, labeled as “pusher block”; hanging portion 82 in blue, labeled as “attachment projection”; channel 80¹⁵ in hanging portion 82 in red, labeled as “linkage channel”; and hole 89 in hanging portion 82 and unthreaded bolt 85 in orange, labeled as “pivotally connect.” Pet. 59. With reference to the illustration in annotated Figure 9, as well as Figures 1 and 3 of Duhamé previously reproduced, Petitioner contends that hanging portion 82 is integrally formed with the body of traveler 22, extends outwardly therefrom, and defines a linkage channel (channel 80) configured to receive an end of a linkage (pivoting link 24) and to pivotally connect that linkage to traveler 22

¹⁵ We note that although the reference numeral 80 does not expressly appear in Figure 9, the same channel is shown in a different view in Figure 3 of Duhamé with that numeral associated with it. Ex. 1001, Fig. 3; *see also id.* at 3:65–66 (“Manual bracket 28 is disposed in channel 80 of hanging portion 82 of traveler 22 . . .”).

(the pusher block) using unthreaded bolt 85. Pet. 56–60 (citing Ex. 1013, 3:8–10, 3:64–66, 5:7–10, Figs. 1, 3, 9; Ex. 1004 ¶¶ 179–186). Patent Owner does not challenge Petitioner’s contentions with respect to this limitation in its Response. Petitioner’s assertions are supported by the cited evidence (*see id.*), and we are persuaded that Petitioner has shown by a preponderance of the evidence that it is disclosed by Duhame.

b. Independent Claim 1

Independent claim 1 recites “[a] method of assembly a linear actuator for adjustable furniture” that includes (i) a step of “assembling an arm assembly of the linear actuator,” where the arm assembly includes elements substantially similar to those recited in independent claim 15, discussed above, and (ii) a step of “connecting a drive assembly to the arm assembly, wherein the drive assembly is configured to rotate the threaded spindle within the rigid arm.” *Id.* at 5:21–39. Petitioner asserts that, except for the “connecting” step, claim 1 recites elements that are analogous in scope to the elements of claim 15 and are disclosed by Duhame for the same reasons as that claim. Pet. 61. With regard specifically to the connecting step, Petitioner raises two arguments. First, Petitioner contends, Figure 1 of Duhame, like Figure 1 of the ’717 Patent, discloses connecting a drive assembly (i.e., motor housing 11 of Duhame) to its arm assembly, and “*Duhame* discloses that motor housing 11 is connected to drive screw 52,” “within guide rail 20.” *Id.* at 62–63 (citing Ex. 1013, 2:66–3:3, 6:43, 7:63–65, Fig. 1). Second, Petitioner contends that “*Duhame* discloses that the motor in motor housing 11 is configured to rotate drive screw 52 (*i.e.*, the claimed threaded spindle) within the guide rail 20 (*i.e.*, the claimed rigid arm),” and, therefore, Duhame discloses each limitation of the connecting

step. *Id.* at 63–64 (citing Ex. 1013, 3:38–40, 4:15, 6:43; Ex. 1004 ¶¶ 194–198).

Patent Owner relies on the same arguments for claim 1 as for the corresponding recitations of claim 15 and does not raise any additional arguments specific to claim 1. *See* PO Resp. 39–49; PO Sur-Reply 6–13. For the same reasons as set forth for claim 15 (*see supra* § II.C.2.a), as well as for the additional reasons presented by Petitioner with respect to the connecting step of claim 1 (*see* Pet. 62–63), we conclude that Petitioner also has shown by a preponderance of the evidence that Duhamel discloses all limitations of claim 1.

c. Dependent Claim 5

Claim 5 depends from claim 1 and further recites that (i) “the attachment projection further defines a securing aperture extending transversely to the linkage channel and in communication with the linkage channel”; (ii) “the securing aperture extends along a securing aperture axis”; (iii) “the threaded spindle extends along a threaded spindle axis”; and (iv) “the securing aperture axis is vertically offset from the threaded spindle axis.” Ex. 1001, 5:56–65. Petitioner maps hole 89 of hanging portion 82 of Duhamel’s traveler 22 to the recited “securing aperture,” arguing that the axis along which hole 89 extends is vertically offset from the axis along which Duhamel’s drive screw 52 (i.e., the recited threaded spindle) extends. Pet. 64–67 (citing Ex. 1013, 3:66, 5:5–10, Figs. 1, 9, 10; Ex. 1004 ¶¶ 200–202. Patent Owner does not challenge Petitioner’s contentions. Petitioner’s mapping is supported by the cited evidence (*see id.*), and we are persuaded that Petitioner has shown by a preponderance of the evidence that the limitations of claim 5 are disclosed by Duhamel.

d. Dependent Claims 6, 7, 18, and 20

Claim 6 depends from claim 5 and further recites “removably positioning a fastener within the securing aperture such that the fastener is engaged with the first end of the linkage positioned within the linkage channel.” Ex. 1001, 5:66–6:2. Claim 18 depends from claim 15 and recites essentially the same additional limitations as claims 5 and 6 taken together. *Id.* at 7:12–26. Claims 7 and 20 depend from claims 6 and 18, respectively, and add to the respective base claims the further limitation “wherein the fastener is a clevis pin.” *Id.* at 6:3–4; 7:31–32.

Petitioner maps Duhamé’s unthreaded bolt 85 to the fastener of claims 6 and 18, arguing that it is a clevis pin, as recited in claims 7 and 20, and that it is removably positioned within hole 89 (i.e., the recited securing aperture) such that it is engaged with the first end of link 24 (the linkage) positioned within channel 80 (the linkage channel). Pet. 67–71 (citing Ex. 1013, 5:7–10, Figs. 1, 9; Ex. 1004 ¶¶ 204–206, 208–210, 215–218, 220–221). Patent Owner does not challenge Petitioner’s contentions with respect to these limitations, and Petitioner’s contentions are supported by the cited evidence. *See id.* Accordingly, we are persuaded that Petitioner has shown by a preponderance of the evidence that the limitations of each of claims 6, 7, 18, and 20 are disclosed by Duhamé.

e. Dependent Claim 10

Claim 10 depends from claim 1 and further recites “attaching a holder to an end of the rigid arm.” Ex. 1001, 6:25–26. Petitioner has persuasively shown that Duhamé’s header bracket 34, which according to Duhamé mounts guide rail 20 (i.e., the recited rigid arm) to wall 32 of a garage, corresponds to the recited “holder.” Pet. 69–70 (citing Ex. 1013, 3:18–19,

Fig. 1; Ex. 1004 ¶¶ 212–213). Patent Owner does not challenge Petitioner’s contentions with respect to this limitation. Petitioner’s assertions are supported by the cited evidence (*see id.*), and we are persuaded that Petitioner has shown by a preponderance of the evidence that it is disclosed by Duhamel.

f. Conclusion Regarding Anticipation by Duhamel

For the foregoing reasons, we conclude that Petitioner has shown by a preponderance of the evidence that each of claims 1, 5–7, 10, 15, 18, and 20 is anticipated by Duhamel.

D. Obviousness of Claims 1, 5, 6, 8, 11, 12, 15, 18, and 19 over Koch and Lipinski

1. Brief Overview of Koch

Koch, titled “Drive for Adjusting Parts of Seating and Reclining Furniture” (Ex. 1009, code (54)), is a United States Patent that “relates to a drive for adjusting parts of seating and reclining furniture, preferably for adjustable chairs” (*id.* at 1:4–6).

An embodiment of a drive for adjusting parts of seating and reclining furniture is illustrated in Figure 1 of Koch, reproduced below.

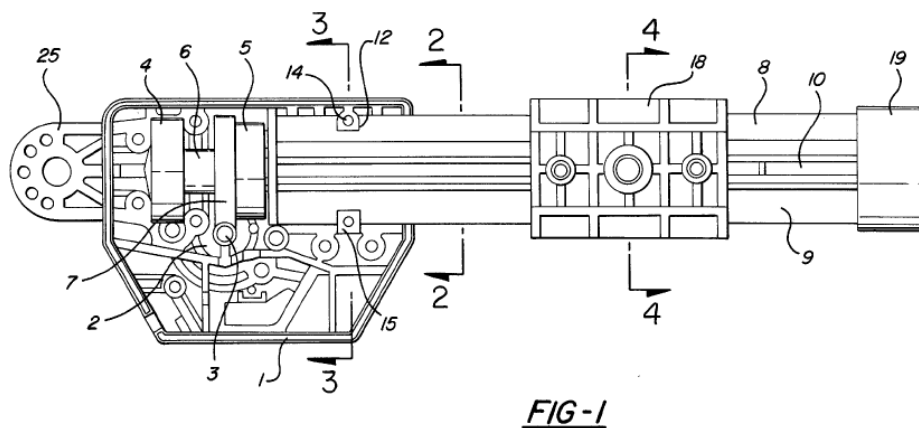


Figure 1 of Koch, above, depicts a drive including basic housing 1, motor 2, guide sections 8 and 9, and rotating spindle 6, to which gearwheel 6 is fastened. *Id.* at 4:13–15, 20–21, 24. Koch explains that “gearwheel 7 engages with worm 3 driven by motor 2, so that rotating worm 3 causes spindle 6 to rotate.” *Id.* at 4:22–23 (boldface omitted). “Arranged between guide sections 8 and 9 on spindle 6, which has a screw thread, is a nut 16 whose external profile corresponds to the internal profile of guide sections 8 and 9. Nut 16 can thus be moved backwards and forwards by spindle 6 without twisting (FIG. 4).” *Id.* at 4:53–57 (boldface omitted). Nut 16 is connected to slider 18, which surrounds guide sections 8 and 9. *Id.* at 4:58–59, 66–67.

An installation of the drive is shown in Figure 7 of Koch, reproduced below.

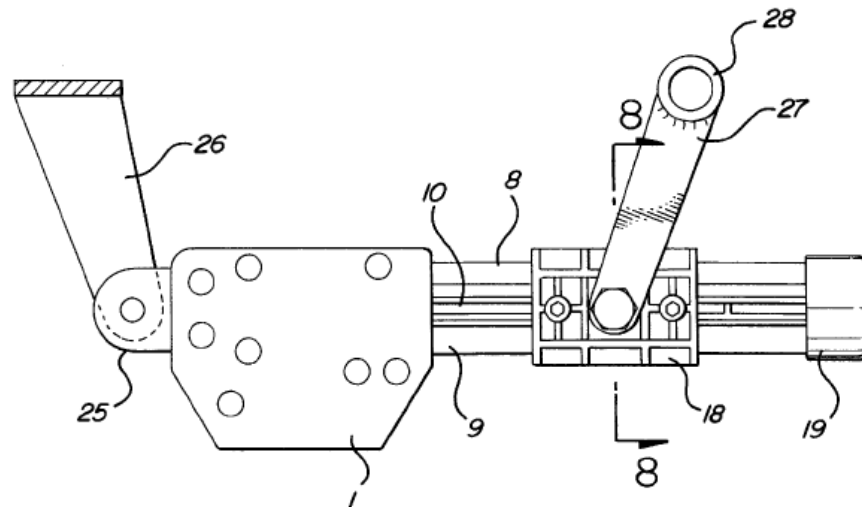


FIG-7

Figure 7 of Koch, above, depicts basic housing 1 hinged to holding arm 26 by accepting device 25. *Id.* at 5:42–45. Koch explains that

fork 27 is fastened in pivoting fashion to slider 18, the fork in turn being connected to an operating device (not illustrated) for

adjustable parts of seating and reclining furniture via a shaft 28. Fork 27 can be fastened to slider 18 by a fastening device 29—via screws laterally screwed into slider 18, for example.

Id. at 5:45–50 (boldface omitted).

2. Brief Overview of Lipinski

Lipinski, titled “Mechanical Rotary-to-Linear Motion Conversion Element” (Ex. 1015, code (54)), is a United States Patent that “relates to a mechanical element which converts rotary motion, applied to a spindle, to linear motion, by sensing travel of a spindle nut on the spindle” (*id.* at 1:6–8).

An embodiment of a rotary-to-linear motion conversion element is shown in Figure 1 of Lipinski, reproduced below.

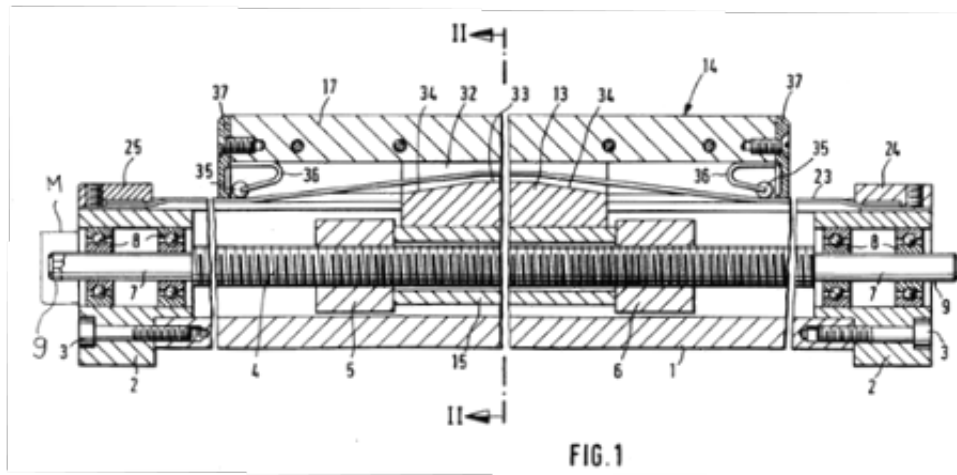


Figure 1 of Lipinski, above, depicts elongated housing 1 and, located therein, a spindle drive having central spindle 4 and spindle nuts 5 and 6. *Id.* at 2:63–67.

A cross-section view of Lipinski's rotary-to-linear motion conversion element is shown in Figure 2, reproduced below.

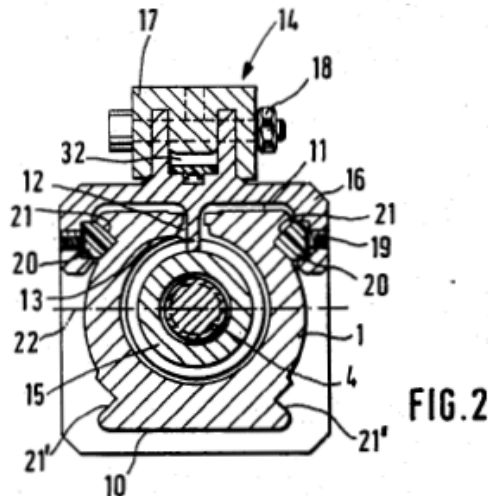


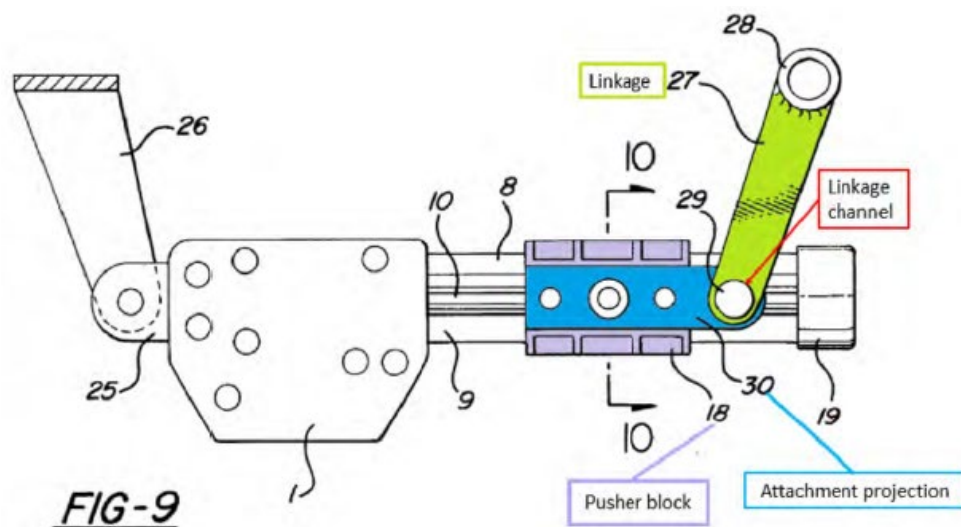
Figure 2 of Lipinski, above, depicts web-shaped portion 13 of force transfer element 14 extending through longitudinal slit 12 of housing 1 and merging with cylindrical element 15 that surrounds spindle 4 inside housing 1. *Id.* at 3:16–21. Guide yolk 16 is secured to web-shaped portion 13 of force transfer element 14 outside of housing 1 and connects to coupling member 16 via screw 18. *Id.* at 3:28–30. Rotation of spindle 4 moves spindle nuts 5 and 6 in an axial direction, which, thereby, shifts transfer element 14 axially. *Id.* at 3:49–51, 4:56–58.

3. Analysis

a. Independent claims 1 and 15

Petitioner asserts that claims 1, 5, 6, 8, 11, 12, 15, 18, and 19 are unpatentable over Koch and Lipinski. Pet. 71–92. Petitioner relies on Koch as teaching all limitations of independent claims 1 and 15, with the exception of the step of “pivotaly connecting a first end of a linkage within a linkage channel of an attachment projection of the pusher block, wherein the attachment projection extends outwardly from an outer surface of the

pusher block” recited in claim 1 and the similar recitation “wherein the attachment projection is configured to receive an end of a linkage within the linkage channel and pivotally connect the linkage to the pusher block in the linkage channel of the attachment projection” in claim 15. Pet. 72–82, 90–91. With respect to those specific limitations, Petitioner relies on the combination of Koch with Lipinski. *Id.* at 77–80. A version of Figure 9 of Koch, annotated by Petitioner, is reproduced below.

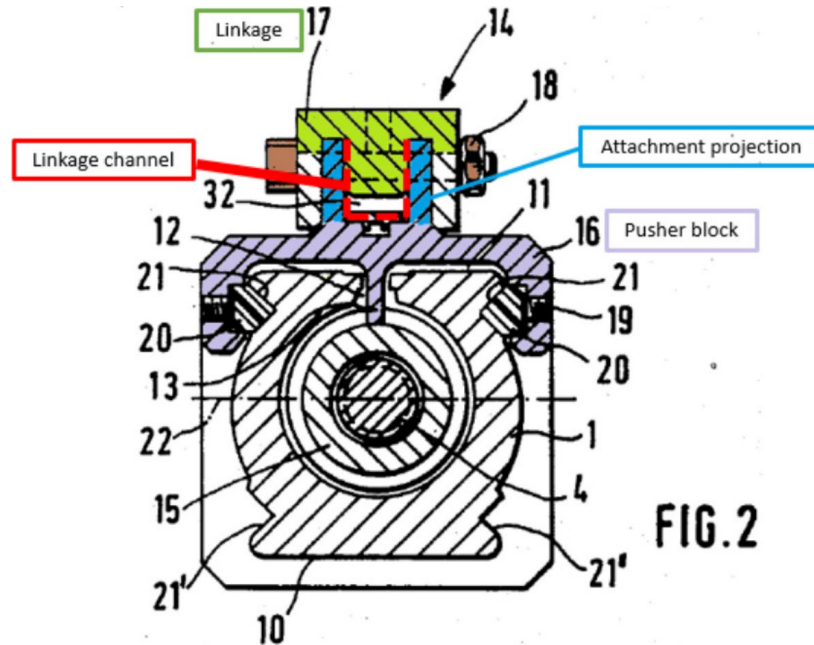


Koch, FIG. 9

Figure 9 depicts a side view of a version of Koch’s drive with fork 27 hinged to slider 18 via plate 30. Ex. 1009, 3:65–67, 5:56–60. In the annotated version of Figure 9 reproduced above, Petitioner highlights Koch’s slider 18 in lavender, labeled as “pusher block”; fork 27 in green, labeled as “linkage”; the location of fastening device 29 in red, labeled as “linkage channel”; and plate 30 in blue, labeled as “attachment projection.” Pet. 77.

With reference to annotated Figure 9, Petitioner contends that Koch discloses “pivotally connecting a first end” of fork 27 to slider 18 via plate 30, but concedes that “*Koch* does not explicitly disclose that its

attachment projection of the pusher block both extends outwardly from the pusher block and defines a linkage channel.” Pet. 77–78 (citing Ex. 1009, 5:45–52; Ex. 1004 ¶ 232). Nonetheless, Petitioner contends, “*Lipinski* fills this gap.” *Id.* at 78 (citing Ex. 1004 ¶ 233). A version of Figure 2 of *Lipinski*, annotated by Petitioner, is reproduced below.



Lipinski, FIG. 2

Figure 2 of *Lipinski* is a section view along a line II—II depicted in *Lipinski*’s Figure 1. Ex. 1015, 2:57. In the annotated version of Figure 2 reproduced above, Petitioner highlights *Lipinski*’s guide yoke 16 mostly in lavender, labeled as “pusher block,” with a portion thereof colored in blue and labeled as “attachment projection” and another portion thereof colored in red and labeled as “linkage channel”; coupling member 17 in green, labeled as “linkage”; and screw 18 in brown. Pet. 78.

With reference to annotated Figure 2, Petitioner contends that *Lipinski* “discloses a guide yoke 16 (*i.e.*, the claimed pusher block, lavender) that has an attachment projection (blue) extending outwardly therefrom and also

defining a linkage channel (red) that is used to pivotally connect a first end of a coupling member 17 (*i.e.*, claimed linkage, green) with the pusher block.” Pet. 78 (citing Ex. 1015, Abstract, 3:28–34, 4:33–36). Petitioner further contends that Lipinski shows “it was known to include outwardly extending attachment projections on a pusher block, which attachment projections include a linkage channel,” and accordingly, Petitioner argues, a person having ordinary skill in the art “would have found it a routine matter to modify Koch in accordance with this known technique.” *Id.* at 79.

Petitioner concludes:

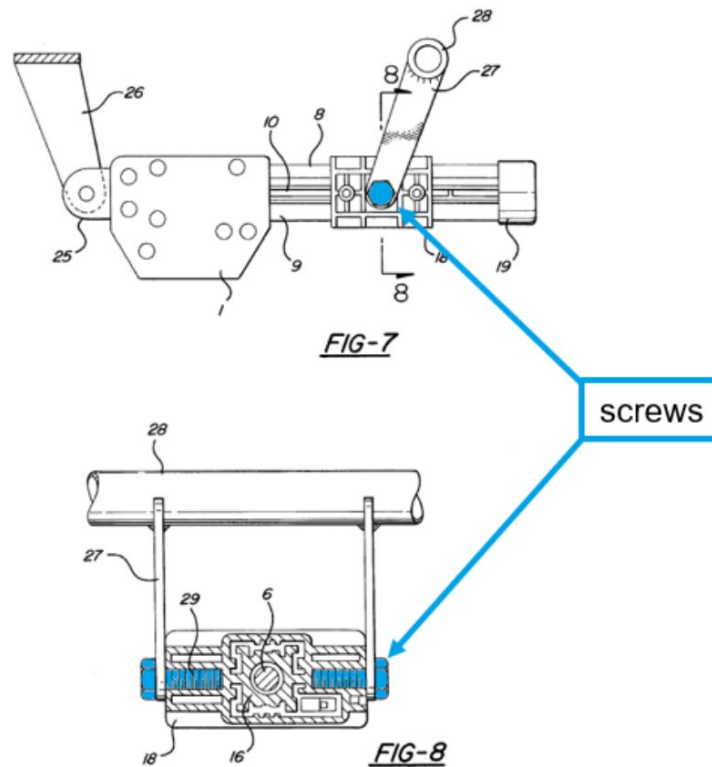
Therefore, *Koch* as modified by *Lipinski* discloses “pivotally connecting a first end of a linkage [*e.g.*, *Koch*’s fork 27 (and *Lipinski*’s coupling member 17), green above] within a linkage channel [*e.g.*, *Lipinski*’s channel, red above] of an attachment projection [*e.g.*, *Lipinski*’s channel, red above] of the pusher block [*e.g.*, *Lipinski*’s guide yoke portion 16, purple above] wherein the attachment projection extends outwardly from an outer surface of the pusher block.” Ex-1004, ¶¶ 234-235.

Id. (alterations in original). Relying in part on the testimony of Dr. Cameron, Petitioner further contends “[t]here was ample motivation to make this change to *Koch*’s system,” including that (1) both references relate to designs for linear actuators; (2) “modifying *Koch*’s system as discussed above would have allowed for improved stability of the actuator and a reduction in manufacturing cost, and *Koch* explicitly motivates a [person having ordinary skill in the art] to seek to improve ‘mechanical stability’ and to achieve ‘low-cost manufacture of the drive’”; and (3) “modifying *Koch*’s slider 18 or plate 30 to form an outwardly-extending attachment projection defining a linkage channel was a routine matter for the skilled person, and would have been done with a reasonable expectation of success” and

“without requiring any undue experimentation.” *Id.* at 79–80 (citing Ex. 1004 ¶¶ 236–240; Ex. 1009, 1:1–2, 3:35–38, 4:62–67; Ex. 1015, 1:5–7, 4:2–5). Petitioner’s contentions are supported by Dr. Cameron based on the same explanation of the rationale supporting the asserted combination provided in the Petition. *See* Pet. 80 (citing Ex. 1004 ¶¶ 236–240).

Patent Owner raises two principal arguments in response to Petitioner’s contentions. First, Patent Owner argues that “[n]either Koch nor Lipinski teaches pivotally connecting a linkage within a linkage channel of an attachment projection of a pusher block,” as recited in the challenged independent claims. PO Resp. 50–54. Second, Patent Owner contends that a person of ordinary skill in the art would not have combined the disclosures of Koch and Lipinski. *Id.* at 54–61. We address these arguments in turn below.

Versions of Koch’s Figures 7 and 8, annotated by Patent Owner, are reproduced below.

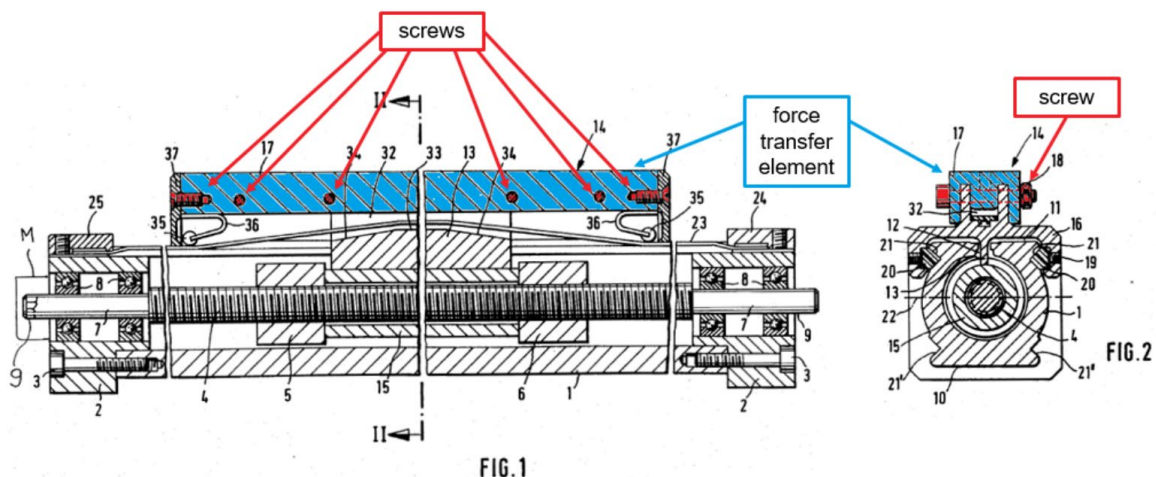


Ex. 1009 (Koch), Figs. 7 and 8 (annotated)

In the annotated figures reproduced above, depicting side and front views, respectively, of a version of Koch’s drive with fork 27 coupled to slider 18, Patent Owner highlights fastening devices 29 in blue, labeling them as “screws.” PO Resp. 51; Ex. 1009, 3:61–64, 5:42–49. With reference to annotated Figures 7 and 8, Patent Owner argues that, contrary to Petitioner’s assertions, Koch does not teach “pivotally connecting a linkage within a linkage channel,” but instead “teaches the old prior art method of screwing a linkage to a pusher block to create a pivotal connection.” PO Resp. 50–51. More specifically, according to Patent Owner, “Koch describes and depicts a traditional linear actuator in which a linkage called a ‘fork 27’ is screwed to a slider 18 (Fig. 7) or to a plate 30 attached to the slider 18 (Fig. 9),” and “Koch describes connecting a ‘slider 18’ to an ‘operating device . . . for adjustable parts of seating and reclining furniture’ via a ‘fork,’” where “[t]he

fork is ‘fastened to slider 18 by a fastening device 29—via screws laterally screwed into slider 18, for example,’ or ‘via a plate 30 screwed or welded to the slider.’” *Id.* at 51 (citing Ex. 1009, 5:45–58, Figs. 7–13). According to Patent Owner, however, “[t]he claims require pivotally connecting an end of a linkage *within a linkage channel of an attachment projection* of the pusher block,” which, Patent Owner contends, is “more than a simple pivotal connection between a linkage and the pusher block.” *Id.* at 50.

Patent Owner also contends that “[t]he Petition includes an annotated drawing that purports to label the screws of Koch as a ‘linkage channel,’” but that “Koch does not disclose any linkage channel, such as a clevis, for connecting a linkage to the slider.” PO Resp. 52. Moreover, Patent Owner contends, “Lipinski also fails to teach pivotally connecting a linkage within a linkage channel,” but instead “teaches an elongated force transfer element 14 . . . that is *fixed* in place at both ends and unable to rotate upon movement of the spindle nuts.” *Id.* Patent Owner illustrates this argument with annotated versions of Figures 1 and 2 of Lipinski, reproduced below.



Ex. 1015 (Lipinski), Figs. 1 and 2 (annotated)

In the annotated figures reproduced above, depicting a longitudinal sectional view of Lipinski's rotary-to-linear motion conversion element and a section along a line thereof, Patent Owner highlights force transfer element 16 in blue and screws 18 in red. PO Resp. 52; Ex. 1015, 2:55–57. With reference to annotated Figures 1 and 2, Patent Owner argues:

The Petition states that the Lipinski device has an attachment projection “defining a linkage channel . . . that is used to pivotally connect a first end of a coupling member 17 (i.e., claimed linkage, . . .) with the pusher block.” Pet. at 78. The Petition is again wrong. Lipinski explains that the force transfer element (shown in blue) is attached at both ends to “two holding fingers 37” by screws (shown in red). Ex. 1015 at 4:40–42. The force transfer element is also attached by a series of screws in the transverse direction (also shown in red). Ex. 1015, Figs. 1 and 2, 3:28–32. It is apparent from the figures that the elongated force transfer element including the coupling member 17 is fixed in place and unable to rotate. Indeed, Lipinski expressly states that force transfer element 14 is “held securely and *non-rotatably*.” Ex. 1015 at 3:53–54 (emphasis added).

PO Resp. 53 (ellipses in original).

Patent Owner acknowledges that we preliminarily found in the Institution Decision that Koch teaches “pivotally connecting” a first end of a linkage to a pusher block and that Lipinski teaches an “attachment projection” that defines a “linkage channel.” PO Resp. 53 (citing Inst. Dec. 52). According to Patent Owner, however, “even if the Board maintains these findings, neither reference teaches ‘pivotally connecting a first end of a linkage within a linkage channel.’” *Id.* And, Patent Owner contends, “[t]his is a single limitation recited by the claims—not two independent limitations—and should not be parsed into separate elements to be located independently in Koch and Lipinski.” *Id.*

Patent Owner argues further that Petitioner fails to establish that a person of ordinary skill in the art would have been motivated to combine the teachings of Lipinski with Koch to arrive at the claimed invention. PO Resp. 54. First, according to Patent Owner, Petitioner’s purported motivations are conclusory, unsupported, and legally insufficient. *Id.* For example, Patent Owner contends, the portions of Koch’s disclosure cited by Petitioner in support of its argument suggest that Koch already provides the specific benefits that Petitioner alleges would have motivated the combination, and Petitioner’s argument that the proposed modification would have been a simple process without requiring undue experimentation is unsupported attorney argument. *Id.* at 54–57 (citing Pet. 79–80; Ex. 1009, 3:33–38, 4:62–69). Second, Patent Owner further contends Dr. Cameron’s original declaration should not be given weight because it “parrots the attorney argument in the Petition . . . nearly verbatim.” *Id.* at 57–58 (citing Ex. 1004 ¶¶ 236–240). Third, Patent Owner contends, there is “no plausible reason that a person of ordinary skill in the art would have been motivated to modify the linear actuator of Koch in view of Lipinski—a patent issued in 1985, nearly 15 years before Koch, and nearly 30 years before the invention of the ’717 Patent,” and “Petitioner’s argument otherwise is nothing more than an example of impermissible hindsight.” *Id.* at 58. According to Patent Owner, Koch is fundamentally different from Lipinski, and Lipinski “is an example of the kind of drive that Koch explained *cannot* be used in adjustable furniture.” *Id.* at 58–59. Moreover, Patent Owner argues, modifying Koch with Lipinski would render Koch unsatisfactory for its intended purpose. *Id.* at 60–61.

In the Reply, Petitioner argues that Patent Owner mischaracterizes and fails to rebut the Koch-Lipinski combination that was presented in the Petition. Pet. Reply 23. First, Petitioner contends that, contrary to Patent Owner's contention, the Petition argued that Koch teaches pivotally connecting a linkage within a linkage channel of an attachment projection. *Id.* (citing Pet. 77). Moreover, according to Petitioner, "Patent Owner misunderstands the location of Koch's linkage channel, which is not 'the screws' in Figure 9 [of Koch], but instead the space behind fastener 29 and plate 30," as labeled as "linkage channel" in Petitioner's annotated version of Figure 9, reproduced above. *Id.* at 23–24 (citing PO Resp. 52; Ex. 1030 ¶¶ 76–77). Nevertheless, Petitioner explains, "because Koch 'does not explicitly disclose that its attachment projection of the pusher block both extends outwardly from the pusher block **and defines** a linkage channel,' due to Koch failing to explicitly depict a cross-sectional view of its linkage channel," Petitioner instead relied in the Petition on Lipinski's disclosure of an upwardly extending attachment projection. *Id.* at 24 (quoting Pet. 79–80). Second, Petitioner contends, Patent Owner mischaracterizes Koch's Figure 9 as showing that linkage 27 is connected to plate 30 via screws. *Id.* at 24. Rather, Petitioner points out, fastener 29 is depicted in Koch as either a bolt (i.e., in Koch's Figures 7 and 8) or an unthreaded pin (in Koch's Figures 9 and 10), and in either case, neither has threads on the portion that engages with fork 27, allowing the fork to pivot in relation to slider 18. *Id.* at 24–26. Third, Petitioner contends, Patent Owner's arguments (1) that Lipinski fails to teach pivotally connecting a linkage (PO Resp. 52–54) and (2) that Koch would have been rendered unsatisfactory for its intended purpose if Lipinski's purportedly non-pivotal connection were

incorporated (*id.* at 60–61) both are irrelevant, because “Koch supplies the pivotally-connected linkage to the combination” and “the Petition only relied on Lipinski as teaching that ‘it was known to include outwardly extending attachment projections on a pusher block.’” *Id.* at 26.

Responding to Patent Owner’s contention that a person of ordinary skill in the art would not have been motivated to combine the teachings of Koch and Lipinski, Petitioner argues that Koch expressly motivates mechanical-stability improvements and lowering manufacturing costs and that the proposed modification would have been simple and routine. Pet. Reply 27 (citing Pet. 79–80). Regardless of whether Koch itself may have also described certain other features to help improve mechanical stability and lower manufacturing costs, Petitioner contends, Koch expressly motivates a person of ordinary skill to try different ways of connecting the linkage, and the proposed use of Lipinski’s upwardly-extending attachment projection with Koch’s pusher block would have advanced these goals. *Id.* at 27–28 (citing Ex. 1009, 5:51–62; Figs. 7–10; Ex. 1030 ¶¶ 78–82). According to Petitioner, “Koch also recognizes shifting ‘the hinge point on the slider backwards towards basic housing 1 or forwards’ ([Ex. 1009], 5:58–60 and 3:1–4), and using Lipinski’s upwardly-extending attachment projection would have helped advantageously move Koch’s hinge point.” *Id.* at 28 (citing Ex. 1030). Petitioner contends that, contrary to Patent Owner’s assertion, Koch does not limit use of extrusion processes to guide sections alone, but instead indicates that the “one-piece nut/slide combination 16/18 or the individual parts can be manufactured by injection moulding or extrusion.” *Id.* (emphasis omitted) (quoting Ex. 1009, 5:6–9). According to Petitioner, “[i]t is the slider 18 (or its associated plate 30) that

would have been modified in the proposed Koch-Lipinski combination, as was explained in the Petition,” and, thus, “Koch plainly demonstrates that a [person of ordinary skill in the art] knew of manufacturing techniques to allow for adding Lipinski’s upwardly-extending attachment projection to Koch.” *Id.* (citing Ex. 1030 ¶¶ 84–85). Finally, Petitioner argues that Patent Owner’s position that Koch “disparages” drives like Lipinski’s is demonstrably false because the drives mentioned in Koch are not the same as Lipinski’s drive, and Patent Owner has not met the high bar set by the Federal Circuit for a teaching away. *Id.* at 28–29 (citing PO Resp. 58–59; Ex. 1030 ¶¶ 87–93).

In the Sur-Reply, Patent Owner repeats its argument that neither Koch nor Lipinski discloses pivotally connecting a linkage within a linkage channel (PO Sur-Reply 13–17) and further contends that Petitioner impermissibly presents new arguments and evidence in its Reply (*id.* at 17–22). In particular, Patent Owner argues that, notwithstanding Petitioner’s Reply argument that “Koch teaches pivotally connecting a linkage within a linkage channel of an attachment projection” (Pet. Reply 23), “Petitioner previously conceded that Koch does **not** disclose this limitation.” PO Sur-Reply 14 (citing Pet. 77–78). According to Patent Owner, “Petitioner’s arguments with respect to Lipinski confirm Petitioner’s admission that Koch failed to disclose both (1) an attachment projection of the pusher block ‘extend[ing] outwardly from the pusher block,’ and (2) an attachment projection of the pusher block ‘defin[ing] a linkage channel,’” and “Petitioner’s shifting position regarding the purported ‘linkage channel’ of Koch is thus **impermissible new argument.**” *Id.* at 15 (citing Pet. 77–78; CTPG 73).

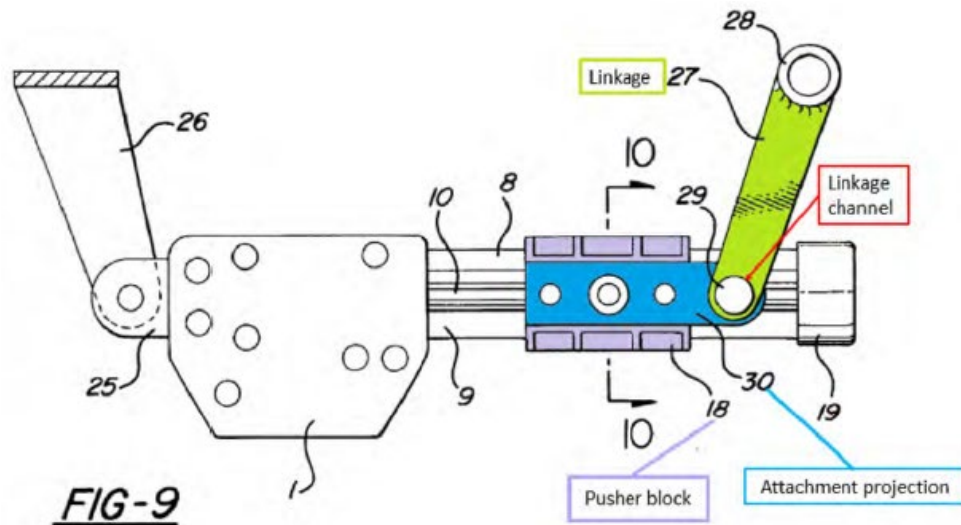
Patent Owner further contends that Petitioner’s annotated version of Figure 9 in the Petition “labels ‘fastening device 29’ of Koch (e.g., ‘screws,’ Ex. 1009, at 5:49–50) as a ‘linkage channel,’ which is clearly incorrect,” whereas “Petitioner newly argues in its Reply that ‘Koch’s linkage channel’ is not fastening device 29, ‘but instead the space behind fastener 29 and plate 30.’” PO Sur-Reply 14–15 (citing Pet. 77–78; Pet. Reply 23–24). According to Patent Owner, “this explanation and argument is *wholly absent* from the Petition,” which, Patent Owner again contends, “conceded that Koch does not disclose a linkage channel.” *Id.* at 15. Similarly, Patent Owner alleges, “Petitioner’s argument that ‘the Petition only relied on Lipinski as teaching that “it was known to include outwardly extending attachment projections on a pusher block,” which was then added to Koch in the asserted combination’ (Reply, at 26) is a misrepresentation of the Petition,” because “Petitioner admitted in the Petition that Koch did not disclose an attachment projection of a pusher block that (1) ‘extends outwardly from the pusher block’ or (2) ‘defines a linkage channel.’” *Id.* at 16 (citing Pet. 77–78).

Having considered the parties’ arguments and the full record, we are persuaded by Petitioner’s arguments and evidence that the combination of Koch and Lipinski teaches all limitations of independent claims 1 and 15. In particular, Petitioner has persuasively shown that Koch teaches an arm assembly for a linear actuator that includes a threaded spindle (i.e., Koch’s spindle 9) housed within a rigid arm (guide sections 8, 9); a spindle nut (nut 16) coupled to a pusher block (slider 18) and threadably engaged with the spindle, where the pusher block defines a rigid arm passage (internal contour of slider 18); a linkage (fork 27) pivotally connected to the pusher

block within a linkage channel by way of an attachment projection (plate 30); and a drive assembly (motor 2). Pet. 72–77, 80–82. Petitioner has further persuasively shown that Lipinski teaches an attachment projection extending outwardly from a pusher block (i.e., Lipinski’s guide yoke 16) and that a person of ordinary skill would have been motivated to modify Koch’s system to include an outwardly extending attachment projection as taught by Lipinski. *Id.* at 77–80. We agree with Petitioner that Patent Owner appears to have misapprehended Petitioner’s arguments with respect to Koch’s teaching of “pivotally connecting a first end of a linkage within a linkage channel.” *See id.* at 77–79; PO Resp. 50–52; Pet. Reply 23–24; PO Sur-Reply 13–17. This is evident, for example, from Patent Owner’s Sur-Reply contention that “Petitioner admitted in the Petition that Koch did not disclose an attachment projection of a pusher block that (1) ‘extends outwardly from the pusher block’ *or* (2) ‘defines a linkage channel.’” PO Sur-Reply 16 (emphasis added) (citing Pet. 77–78). Referring to the pages of the Petition cited by Patent Owner in support of that contention, we find that Petitioner actually argued that “*Koch* does not explicitly disclose that its attachment projection of the pusher block ***both*** extends outwardly from the pusher block ***and*** defines a linkage channel.” Pet. 77–78 (emphasis added). We understand from that statement, viewed in context, that Petitioner meant that although Koch discloses a pusher block having an attachment projection that defines a linkage channel, Koch does not explicitly disclose that an attachment projection *that extends outwardly from the pusher block* defines a linkage channel, and that it is *that* gap in Koch’s teaching that Petitioner seeks to fill with the teachings of Lipinski. *See id.* at 77–79. Our understanding is confirmed by the Reply. *See, e.g.,*

Pet. Reply 23–24. By replacing the above-emphasized “both . . . and” formulation in the quoted sentence from the Petition with the word “or,” Patent Owner appears to suggest that Petitioner had conceded that Koch does not disclose *either* an attachment projection that extends outwardly *or* a linkage channel, thereby changing the meaning of Petitioner’s statement.

We also agree with Petitioner that Patent Owner appears to have misapprehended Petitioner’s identification of the linkage channel in its annotated version of Koch’s Figure 9. *See* Pet. 77–78; PO Resp. 51–52; Pet. Reply 23–26; PO Sur-Reply 14. Annotated Figure 9, previously reproduced, is reproduced again below for reference. Notwithstanding Patent Owner’s contention that Petitioner identified “screw 29” or “fastening device 29” as a linkage channel, we do not find such an identification in the Petition. Rather, we understand Petitioner to have labeled as the “linkage channel” an unnumbered channel into which fastening device 29 apparently is inserted. This is apparent from Petitioner’s annotated Figure 9, previously reproduced and reproduced again for reference below:



Koch, FIG. 9

In annotated Figure 9, above, Petitioner included annotations pointing to Koch's original reference numerals where Petitioner mapped the claim elements to structures expressly numbered by Koch—in particular, Petitioner has annotated reference numeral 18 as “Pusher block,” where Petitioner maps Koch's slider 18 to the pusher block of claims 1 and 15; reference numeral 27 as “Linkage,” where Petitioner maps Koch's fork 27 to the recited linkage; and reference numeral 30 as “Attachment projection,” where Petitioner maps Koch's plate 30 to the recited attachment projection. *See* Pet. 77. For the linkage channel, however, Petitioner does not annotate reference numeral 29, corresponding to Koch's fastening device 29, but instead points directly to the unnumbered channel into which fastening device 29 is inserted.

We have considered but are unpersuaded for similar reasons by Patent Owner's remaining contentions with respect to this ground. We are persuaded that a person of ordinary skill in the art would have been motivated to combine Koch and Lipinski as Petitioner proposes. Pet. 79–80. Citing the testimony of Dr. Cameron, Petitioner argues that a person of ordinary skill in the art would have been motivated by Koch to seek to improved mechanical stability and to achieve low-cost manufacture of the drive—both qualities cited by Koch—and that modifying Koch's slider 18 to form an outwardly-extending attachment projection as taught by Lipinski would have been a routine matter for the skilled artisan person, and would have been done with a reasonable expectation of success. *Id.* (citing Ex. 1004 ¶¶ 238–239; Ex. 1009, 3:35–38, 4:62–67). Such a modification would have been simple, according to Dr. Cameron, and would not have required any undue experimentation. Ex. 1004 ¶ 239. Dr. Cameron's

testimony is credible, as it is logical and consistent with the evidence of record.

We are not persuaded by Patent Owner’s contention that the proposed combination of Koch and Lipinski would render Koch unsatisfactory for its intended purpose because of Lipinski’s non-pivotal connection (PO Resp. 60), for example, because we understand Petitioner to propose only to incorporate Lipinski’s teaching of outwardly extending attachment projections—and not its purportedly non-pivotal linkage—into Koch, given Koch’s own teaching of a pivotally connected linkage. *See* Pet. 78–79; *accord* Pet. Reply. 26. Similarly, we do not understand Petitioner and Dr. Cameron to have impermissibly raised new issues or to have “substantially modified” their original positions in the Reply and Reply Declaration (*see* PO Sur-Reply 17–22), but rather to have elaborated on the arguments first made in the Petition and opening Declaration in light of Patent Owner’s arguments and issues addressed in the Institution Decision, as permitted by the Board’s rules and controlling precedent. *See, e.g.*, CTPG 73–74; *Chamberlain*, 944 F.3d at 925 (explaining that parties in an *inter partes* review proceeding “are not barred from elaborating on their arguments on issues previously raised”).

b. Dependent Claims 5, 6, and 18

Petitioner points out that, after adding Lipinski’s outwardly extending attachment projection to the combined Koch-Lipinski system, the combination would include an attachment projection that further defines a securing aperture, as recited in claim 5, and that such securing aperture would extend along an axis that is vertically offset from a threaded spindle axis along which the threaded spindle extends. Pet. 83 (citing Ex. 1015,

Figs. 1, 2; Ex. 1004 ¶¶ 246–247). Petitioner further contends that the combination of Koch and Lipinski renders claims 6 and 18 obvious based on Lipinski’s disclosure of screw 18 being positioned such that it is engaged with a first end of coupling member 17 within the linkage channel, as shown in Figure 2 of Lipinski. *Id.* at 84–85 (citing Ex. 1015, Fig. 2; Ex. 1004 ¶¶ 250–251), 91 (citing Ex. 1004 ¶ 267). Patent Owner does not challenge Petitioner’s contentions with respect to these limitations. Petitioner’s contentions are supported by the cited evidence (*see id.* at 83–85, 91; Ex. 1015, Figs. 1, 2; Ex. 1004 ¶¶ 246–247, 250–251, 267), and we are persuaded that Petitioner has shown by a preponderance of the evidence that the limitations of claims 5, 6, and 18 are taught by the combination of Koch and Lipinski.

c. Dependent Claims 8 and 19

Claim 8 depends from claim 5 and further recites “wherein the securing aperture axis is above the threaded spindle axis.” Ex. 1001, 6:5–6. Claim 19 depends from claim 18 and further recites “wherein the securing aperture axis extends transversely to the threaded spindle axis, and wherein the securing aperture axis is above the threaded spindle axis.” Ex. 1001, 7:27–30. Petitioner persuasively demonstrates that the combination of Koch and Lipinski renders the limitations of claims 8 and 19 obvious based on the illustration in Lipinski’s Figures 1 and 2 of the securing aperture axis being above the threaded spindle axis, as in claims 8 and 19, and extending transversely thereto, as in claim 19. Pet. 85–86 (citing Ex. 1015, Figs. 1, 2; Ex. 1004 ¶¶ 253–254), 91–92 (citing Ex. 1015, Figs. 1, 2; Ex. 1004 ¶¶ 269–270). Patent Owner does not challenge Petitioner’s contentions with respect to these limitation, and we are persuaded that Petitioner has shown

by a preponderance of the evidence that they are taught by the combination of Koch and Lipinski.

d. Dependent Claim 11

Claim 11 depends from claim 10 and further recites:

wherein the end of the rigid arm comprises a plurality of fastener receiving channels, wherein the holder comprises a plurality of apertures, and wherein attaching the holder to the end of the rigid arm comprises:

aligning the plurality of fastener receiving channels with the plurality of apertures; and

inserting fasteners through each of the aligned fastener receiving channels and apertures.

Ex. 1001, 6:27–35. Petitioner maps end cap 19, shown in Figure 1 of Koch, to the holder of claim 10, and contends that Koch teaches or suggests each of the limitations of claim 11. Pet. 86–89 (citing Ex. 1009, 2:40–43, 5:9–11, 5:21–26, Figs. 1, 5–9; Ex. 1004 ¶¶ 256–260). Petitioner acknowledges that Koch only shows one screwed connection in Figure 6, but contends that Koch’s “text makes clear that there can be screwed connections (plural) 22 used to secure the end cap.” *Id.* at 88 (citing Ex. 1009, 2:40–43). Patent Owner does not challenge Petitioner’s contentions with respect to these limitations. Petitioner’s assertions are supported by the cited evidence (*see id.* at 86–89; Ex. 1009, 2:40–43, 5:9–11, 5:21–26, Figs. 1, 5–9; Ex. 1004 ¶¶ 256–260), and we are persuaded that Petitioner has shown by a preponderance of the evidence that the limitations of claim 11 are taught by the combination of Koch and Lipinski.

e. Dependent Claim 12

Claim 12 depends from claim 1 and further recites “attaching a cover to the rigid arm such that the threaded spindle is between the rigid arm and

the cover.” Ex. 1001, 6:36–38. Petitioner maps guide sections 8 and 9 shown in Figure 5 of Koch to the recited cover, arguing that Koch discloses attaching guide sections 8 and 9 to the rigid arm such that spindle 6 is between them, just as in Figure 1 of the ’717 patent. Pet. 89–90 (citing Ex. 1009, code (57), 4:24–25, Figs. 1–10). Petitioner further contends that Koch also discloses an additional cover in the form of a bellows and that Koch’s threaded spindle 6 would have been between at least part of the bellows and guide section 8. *Id.* at 90 (citing Ex. 1009, 5:34–38, claim 20; Ex. 1004 ¶¶ 261–264). Patent Owner does not challenge Petitioner’s contentions with respect to this limitation. Petitioner’s assertions are supported by the cited evidence (*see id.* at 89–90; Ex. 1009, code (57), 4:24–25, claim 20, Figs. 1–10; Ex. 1004 ¶¶ 261–264), and we are persuaded that Petitioner has shown by a preponderance of the evidence that it is taught by the combination of Koch and Lipinski.

f. Conclusion Regarding Obviousness over Koch and Lipinski

Accordingly, for the foregoing reasons, we conclude that Petitioner has shown by a preponderance of the evidence that each of claims 1, 5, 6, 8, 11, 12, 15, 18, and 19 is unpatentable over the combination of Koch and Lipinski.

E. Anticipation of Claims 1, 5–8, 10–12, 15, and 18–20 by the ’885 Publication

Petitioner additionally asserts that claims 1, 5–8, 10–12, 15, and 18–20 are anticipated by the ’885 Publication. Pet. 17–38. Because we conclude that the challenged claims are unpatentable on other grounds (*see supra* §§ II.C, II.D), we do not reach this additional ground. *See SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1359 (2018) (holding a petitioner “is entitled

to a final written decision addressing all of the claims it has challenged”); *Boston Sci. Scimed, Inc. v. Cook Grp. Inc.*, 809 F. App’x 984, 990 (Fed. Cir. 2020) (non-precedential) (recognizing that the “Board need not address issues that are not necessary to the resolution of the proceeding” and, thus, agreeing that the Board has “discretion to decline to decide additional instituted grounds once the petitioner has prevailed on all its challenged claims”).

F. Petitioner’s Motion to Exclude Evidence

Petitioner moves to exclude certain evidence relied on by Patent Owner in the Sur-Reply, specifically, certain redirect testimony of Mr. Babcock, which Petitioner alleges to have been elicited by leading questions, and Exhibit 2018, which Petitioner alleges to be new evidence filed with the Sur-Reply without prior authorization from the Board. Paper 29 (Motion to Exclude Evidence). We dismiss Petitioner’s motion as moot because even without excluding the subject testimony and exhibit, Petitioner has shown by a preponderance of the evidence that claims are unpatentable.

III. CONCLUSION¹⁶

Based on the evidence presented with the Petition, the evidence introduced during the trial, and the parties' respective arguments, Petitioner has shown by a preponderance of the evidence that the subject matter of claims 1, 5–8, 10–12, 15, and 18–20 of the '717 patent is unpatentable.

IV. ORDER

It is hereby:

ORDERED that claims 1, 5–8, 10–12, 15, and 18–20 of the '717 patent are determined to be unpatentable;

FURTHER ORDERED that Petitioner's Motion to Exclude Evidence (Paper 29) 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.

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

In summary:

Claim(s)	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1, 5–7, 10, 15, 18, 20	102	Duhamé	1, 5–7, 10, 15, 18, 20	
1, 5, 6, 8, 11, 12, 15, 18, 19	103	Koch, Lipinski	1, 5, 6, 8, 11, 12, 15, 18, 19	
1, 5–8, 10–12, 15, 18–20	102	'885 Publication ¹⁷		
Overall Outcome			1, 5–8, 10–12, 15, 18–20	

¹⁷ As explained above, we do not reach this ground. *See supra* § II.E.

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