

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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COULTER VENTURES, LLC,  
d/b/a ROGUE FITNESS,  
Petitioner,

v.

JUMP ROPE SYSTEMS, LLC,  
Patent Owner.

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IPR2019-00586  
Patent 7,789,809 B2

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Before LINDA E. HORNER, BARRY L. GROSSMAN, and  
RICHARD J. SMITH, *Administrative Patent Judges*.

HORNER, *Administrative Patent Judge*.

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

## I. INTRODUCTION

### A. Background and Summary

Coulter Ventures, LLC d/b/a Rogue Fitness (“Petitioner”), filed a petition to institute an *inter partes* review of claims 1–10 (“the challenged claims”), of U.S. Patent No. 7,789,809 B2 (the “’809 patent”). Paper 1 (“Pet.”). On August 1, 2019, we instituted *inter partes* review of all challenged claims under all asserted grounds. Paper 5 (“Inst. Dec.” or “Institution Decision”). Patent Owner, Jump Rope Systems, LLC (“Patent Owner” or “JRS”) filed a Response (Paper 7, “PO Resp.” or “Response”), Petitioner filed a Reply (Paper 9, “Reply”), and Patent Owner filed a Sur-reply (Paper 15, “Sur-reply”).<sup>1</sup>

Petitioner and Patent Owner requested an oral hearing. Papers 16, 17. We granted their requests and held an oral argument on May 1, 2020. Paper 18. A transcript of that hearing has been entered into the record. Paper 21 (Transcript, “Tr.”).

We have jurisdiction to conduct this *inter partes* review under 35 U.S.C. § 6(b). This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. Having reviewed the arguments of the parties and the supporting evidence, and for the reasons discussed herein, we determine that Petitioner has shown, by a preponderance of the evidence, that claims 1–10 of the ’809 patent are unpatentable.

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<sup>1</sup> Petitioner objected to Patent Owner’s submission of a declaration in support of its original sur-reply, which was subsequently withdrawn by Patent Owner with our approval, giving rise to a “corrected” Sur-reply. *See* Papers 10–15.

*B. Real Parties in Interest*

Petitioner identifies itself as the real party in interest. Pet. 1. Patent Owner identifies itself as the real party in interest. Paper 4, 2.

*C. Related Matters*

Petitioner identifies *Jump Rope Systems, LLC v. Coulter Ventures, LLC*, Case No. 2:18-cv-00731 (S.D. Ohio) as a matter involving or related to the '809 patent. Pet. 1. Patent Owner identifies IPR2019-00587 as a matter involving or related to the '809 patent.<sup>2</sup> Paper 4, 2.

*D. The '809 Patent*

The '809 patent is titled “Jump Rope System.” Ex. 1001, code (54). The disclosed jump rope system addresses problems with conventional jump rope construction that limits the rate at which the rope or cable element can be spun. *Id.* at 1:16–46. These problems include resistance to rotation of the cable element within the handle, attachment of the cable element too close to or too far from the handle, and attachment of the cable element to the handle so that the cable element is not allowed to swivel on the cable axis or pivot relative to the handle. *Id.*

According to the Specification, an object of the invention is “to provide a pair of handles each handle providing a shaft coaxially rotatably engaged to a first bearing element and a second bearing element each shaft correspondingly attached to one of the opposed ends of a cable element.” *Id.*

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<sup>2</sup> Petitioner filed a petition in IPR2019-00587 challenging US 8,136,208 B2, which also is owned by Patent Owner. The '208 patent relates to subject matter similar to the '809 patent. During the oral hearing, the parties agreed that the present petition and the petition in IPR2019-00587 rise or fall together. Tr. 20:5–21:7, 33:10–34:7. A Final Written Decision relating to the '208 patent is being entered contemporaneously herewith.

at 1:50–54. Another object of the invention described in the '809 patent is “to provide a first shaft end configured to provide a cable pivot element which provides a swivel range and a pivot range through which the handle can travel in relation to the cable element or which the cable element can travel in relation to the handle.” *Id.* at 1:60–64.

Figure 1 of the '809 patent is reproduced below.

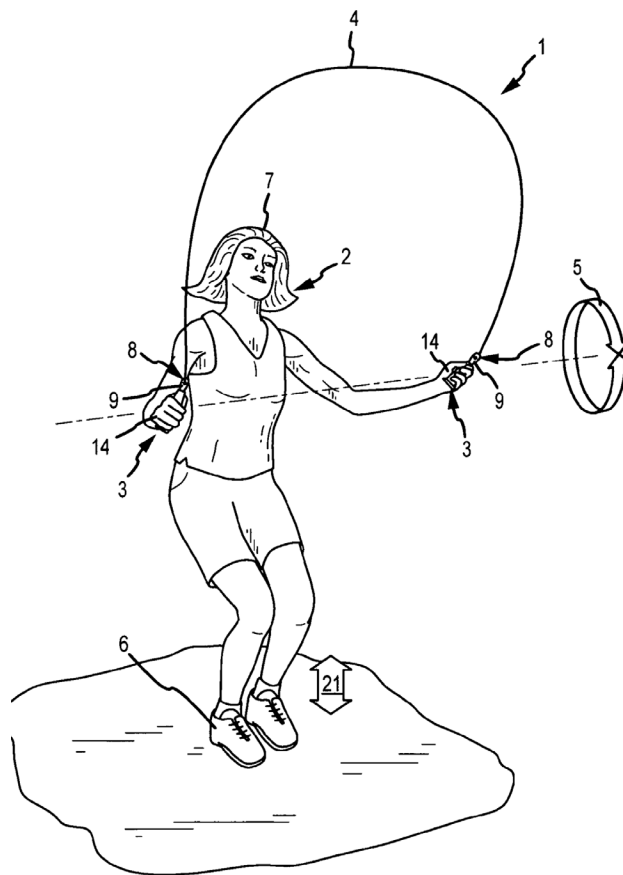


FIG.1

Figure 1 shows a jumper using the jump rope system of the invention. *Id.* at 2:34–35. Specifically, jumper 2 is depicted using jump rope 1 by grasping each of a pair of handles 3 to cause cable element 4 to turn as illustrated by arrows 5. *Id.* at 2:35–38. Attachment of cable element 4 to handles 3 is shown in more detail in Figure 5, reproduced below.

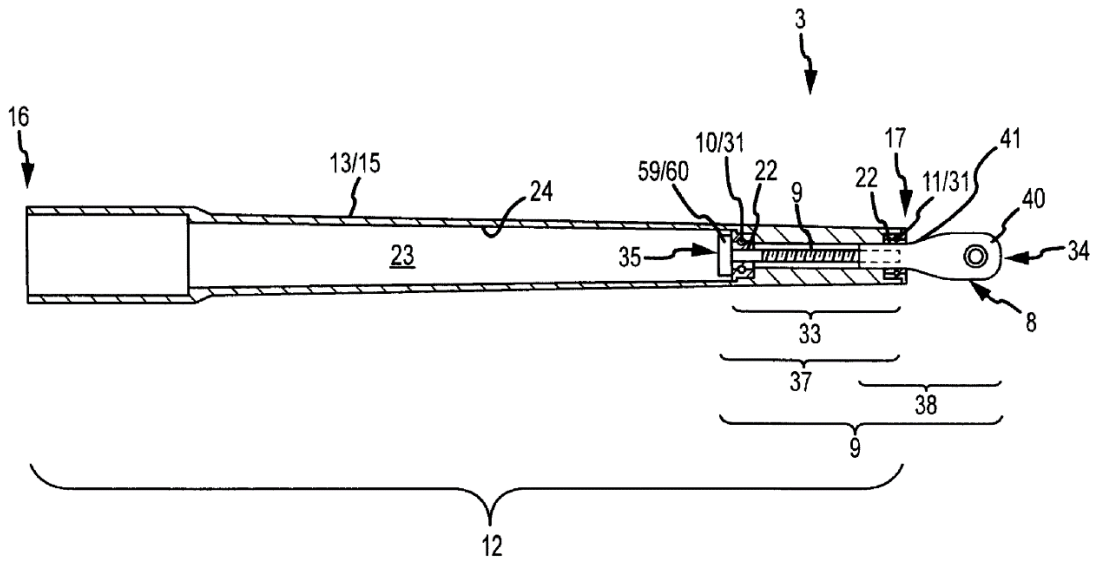


FIG.5

Figure 5 is a cross section of one of the pair of handles of an embodiment of jump rope 1. *Id.* at 2:12–13. As shown above, shaft 9 is coaxially rotatably engaged to first bearing element 10 and second bearing element 11 retained in handle 3. *Id.* at 2:43–45, 3:45–49. Shaft 9 includes intermediate shaft portion 33 between first shaft end 34 and second shaft end 35. *Id.* at 4:27–29. Intermediate shaft portion 33 includes first shaft piece 37 coupled to second shaft piece 38. *Id.* at 4:35–40. For example, a socket head screw can be used as first shaft piece 37, which is rotatably inserted into a closed end conduit provided by a ball link. *Id.* at 4:42–48. Head 60 of the socket head screw can axially limit travel of shaft 9. *Id.* at 7:17–26. First shaft end 34 can be adapted to couple to a first of the pair of opposed cable ends 8. *Id.* at 4:62–64.



handles 3. *Id.* at 5:63–6:1. The '809 patent defines “pivot” as including “any direction of travel by one of the pair of handles (3) within a swivel range (51) and a pivot range (50) defined by the configuration of cable pivot element (45) included in a particular embodiment of any one of the pair of [f] handles (3).” *Id.* at 6:1–6. As shown in Figure 11, cable pivot element 45 is ball 54 pivotally coupled to first shaft end 34 and having aperture element 44 in ball 54, through which one of the cable ends 8 can pass for attachment to handle 3. *Id.* at 6:44–49. In one example, ball 54 pivotally coupled to first end shaft 34 can be provided by a commercially available ball link. *Id.* at 6:50–53.

#### *E. Illustrative Claims*

Claim 1 is the sole independent claim of the '809 patent. Claim 1 recites:

1. A jump rope, comprising:
  - a) a pair of handles each comprising:
    - i) a shaft rotatably journaled in at least one bearing element;
    - ii) a handle adapted to retain said shaft rotatably journaled in said at least one bearing element;
    - iii) a blade element coupled to said shaft, said blade element extending axially from said shaft a distance outward from said handle;
    - iv) a ball element pivotally coupled within an aperture of said blade element a distance from said handle; and
  - b) a cable element having one of a pair opposed ends coupled to said ball element.

Ex. 1001, 9:24–36.

*F. Evidence*

Petitioner relies on the following prior art references in the asserted grounds of unpatentability:

<b>Reference</b>	<b>Exhibit No.</b>
German Published Patent Application DE 26 41 383 A1, published March 16, 1978 to Gerhard Wolf (“Wolf”)	Ex. 1005 (German) Ex. 1006 (translated to English)
U.S. Patent No. 4,248,486, issued February 3, 1981 to Charles D. Bradley, Jr. (“Bradley”)	Ex. 1009
French Published Patent Application 2 408 362, published June 8, 1979 to Roger Max Terper (“Terper”)	Ex. 1010 (French) Ex. 1011 (translated to English)

The Petition further cites Exhibits 1007, 1008, and 1012–1017 as evidence of the background knowledge of one having ordinary skill in the art at the time of the invention.

Petitioner also relies on a Declaration by Steven M. Lenz, P.E. (Ex. 1003 (“Lenz Dec.”)) and a supplemental Declaration by Steven M. Lenz, P.E. (Ex. 1025 (“Supp. Lenz Dec.”)) in support of its arguments. The Lenz Declaration provides additional documents, attached as Exhibits A and C through I, as evidence of the background knowledge of one having ordinary skill in the art at the time of the invention. Ex. 1003.

Patent Owner relies on the Declaration of Dr. Kim Blair (Ex. 2001) and the Declaration of Mary L. Metz (Ex. 2003) in support of its arguments. The parties rely on other exhibits as discussed below.



*G. Asserted Grounds of Unpatentability*

Petitioner challenges the patentability of claims 1–10 of the ’809 patent on each of the following grounds (Pet. 6):

<b>Claims Challenged</b>	<b>35 U.S.C. §</b>	<b>Reference(s)/Basis</b>
1–10	103(a) <sup>3</sup>	Wolf, Terper
1–10	103(a)	Wolf, Bradley

II. ANALYSIS

*A. Legal Standards*

A patent claim is unpatentable under 35 U.S.C. § 103 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). “When a patent claims a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result.” *Id.* at 416 (citing *United States v. Adams*, 383 U.S. 39, 50–51 (1966)). The question of obviousness is resolved based on 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

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<sup>3</sup> The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 287–88 (2011), amended 35 U.S.C. § 103. Because the ’809 patent was filed before the effective date of the relevant amendment, the pre-AIA version of § 103 applies.

of ordinary skill in the art; and (4) objective evidence of non-obviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

In an *inter partes* review, a petition must identify “with particularity, each claim challenged, the grounds on which the challenge to each claim is based, and the evidence that supports the grounds for the challenge to each claim.” 35 U.S.C. § 312(a)(3) (2018); *see also* 37 C.F.R. § 42.104(b) (2018) (requiring a petition for *inter partes* review to identify how the challenged claim is to be construed and where each element of the claim is found in the prior art patents or printed publications relied upon).

#### *B. Level of Ordinary Skill in the Art*

In determining the level of ordinary skill in the art, various factors may be considered, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (internal quotation marks and citation omitted).

Petitioner contends that a person having ordinary skill in this art “would have had a bachelor’s degree in mechanical engineering and/or a related field and at least one to three years of experience or familiarity with jump rope systems and/or mechanically constructed fitness equipment” or “equivalent experience either in industry or research, such as designing, [] developing, evaluating, or such systems or equipment.” Pet. 12 (citing Ex. 1003 ¶ 25–27).

Although Patent Owner did not contest Petitioner’s proffered level of ordinary skill in its Response, Patent Owner’s declarant, Dr. Kim Blair, based his testimony on a slightly different level of skill. Ex. 2001 ¶ 33.

Specifically, Dr. Blair opined that a person having ordinary skill in the art “would have had a bachelor’s degree in mechanical engineering and/or a related field, or one or more years of experience in the design or development of jump rope systems and/or mechanically constructed fitness equipment.” *Id.* Patent Owner’s expert, thus, defines the level of ordinary skill in the art as a person have a technical degree or experience, whereas, Petitioner’s expert defines the level of ordinary skill in the art as a person having a technical degree and experience, or equivalent experience.

When questioned at the hearing about Patent Owner’s position on the level of ordinary skill in art, Patent Owner’s counsel conceded that Patent Owner does not contest Petitioner’s proposed level of ordinary skill in the art. Paper 21, 38:4–39:5 (asserting that Dr. Blair’s testimony is the same regardless of which level of ordinary skill is applied); *see also* Ex. 2001 ¶ 34 (stating same).

Our Decision here would be the same regardless of whether we adopted Petitioner’s position as to the level of ordinary skill in the art or that of Dr. Blair. Given that Patent Owner does not contest Petitioner’s proposed level of ordinary skill in the art and did not proffer Dr. Blair’s level of ordinary skill in the art in its Response, we adopt Petitioner’s position as to the level of ordinary skill in the art for the purposes of this Decision. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001); *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995 (explaining that specific findings regarding ordinary skill level are not required “where the prior art itself reflects an appropriate level and a need for testimony is not shown” (quoting *Litton Indus. Prods., Inc. v. Solid State Sys. Corp.*, 755 F.2d 158, 163 (Fed. Cir. 1985))).

### C. Claim Construction

For *inter partes* reviews filed on or after November 13, 2018, we apply the same claim construction standard used by Article III federal courts and the ITC, both of which follow *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc), and its progeny. 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)). Because the instant Petition was filed on January 17, 2019, we apply that standard here. Claim terms generally are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. See *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). The specification may impose a specialized meaning, departing from the ordinary and customary meaning, by defining a term with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). Only those claim terms that are in controversy need to be construed, and 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); see also *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).

Petitioner proposes claim constructions for “blade element” and “pivotally coupled.” Pet. 7–12. Petitioner proposes that “blade element” should be construed to mean “a flat element providing a pair of planar surfaces disposed in substantially opposed parallel relation.” *Id.* at 7

(emphasis omitted). Petitioner’s proposed construction for “blade element” is taken from the description and depiction of the blade element provided in the ’809 patent and is informed by the discussion about the scope and meaning of “blade element” made during prosecution of the ’809 patent. Pet. 7–9 (citing Ex. 1001, 5:12–19, Figs. 5, 6, 10, 11; Ex. 1002, 20, 46).

Petitioner proposes that “pivotally coupled” should be construed to mean “coupled to allow at least some swiveling and pivoting movement.” Pet. 10 (emphasis omitted) (citing Ex. 1003 ¶ 50). Petitioner’s proposed construction for “pivotally coupled” is based on an express definition of the term “pivot” provided in the ’809 patent and descriptions of movement “within a swivel range” and movement within “a pivot range” discussed and depicted in the ’809 patent. *Id.* at 10–12 (citing Ex. 1001, 6:1–24, Fig. 11; Ex. 1003 ¶¶ 38, 39, 50, 51).

Patent Owner responds that Petitioner’s proposed constructions “align with the definitions provided by the specification of the ’809 patent.” PO Resp. 8. Patent Owner argues that “Petitioner’s proposed construction of ‘blade element’ comes directly from the ’809 Patent specification,” and that “the ’809 Patent adequately defines the term ‘pivotally coupled’ and no further construction is necessary.” *Id.* at 8–10.

We agree that Petitioner’s proposed constructions are consistent with the express definitions of these terms provided in the ’809 patent. Thus, we adopt these definitions for “blade element” and “pivotally coupled.” No further construction of these terms is necessary. We now examine the grounds asserted in the Petition.

*D. Obviousness over Wolf and Terper*

We begin our analysis with an overview of the prior art relied on in the first ground asserted by Petitioner.

*1. Wolf*

According to Petitioner's translation, Wolf discloses jump rope cord 12 fastened to handle 14 in an articulating fashion so as to prevent the cord from striking the handle during use. Ex. 1006, 18–19.<sup>4</sup> Figure 2, reproduced below, depicts the handle with the cord.

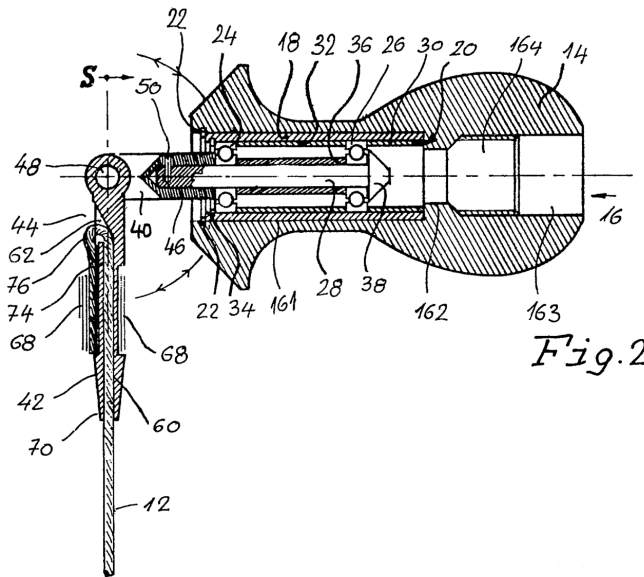


Figure 2 of Wolf shows a cross-section view through handle 14 and cord 12. Ex. 1006, 18. Handle 14 has through opening 16 which accommodates bearing sleeve 18. *Id.* at 19. Bearing sleeve 18 rests against shoulder 20 in opening 16 and is secured by snap ring 22 within opening 16. *Id.* Bearing sleeve 18 supports the outer shells of ball bearings 24 and 26. *Id.* The inner

<sup>4</sup> Citations to Exhibit 1006 refer to the page numbers added by Petitioner at the bottom right hand corner of each page of the exhibit.

shells of ball bearings 24 and 26 enclose shaft 28. *Id.* First spacer sleeve 32 keeps ball bearings 24 and 26 spaced apart from each other, and second spacer sleeve 30 keeps ball bearings 24 and 26 and shaft 28 spaced from shoulder 20. *Id.* Snap ring 34 retains ball bearings 24 and 26 and spacer sleeves 30 and 32 within handle 14. *Id.*

Inner end of shaft 28 has widened section 38, which secures shaft 28 within handle 14. *Id.* at 20. Shaft 28 is prevented from sliding inward by first arm 40 of articulation part 44. *Id.* In the assembled state, the outward-protruding end of shaft 28 is slid into inner bore 46 of first arm 40 and connected to it by cotter pin 50. *Id.* at 20–21.

Articulation part 44 includes first arm 40 and second arm 42, which are connected to each other by articulation pin 48. *Id.* at 21. Second arm 42 has longitudinal bore 60, which continues in the form of expansion 62. *Id.* Second arm 42 also has recess 64 and groove 66. *Id.* at 22. To attach the jump rope cord 12 to second arm 42, the cord is slid into bore 60 from the outside and the end of the cord is bent and inserted into groove 66 and wrapped with tape 68. *Id.*

## 2. Terper

According to Petitioner’s translation, Terper discloses a jump rope having handles equipped with swivel joints inside of which the ends of the cord are crimped. Ex. 1011, 3:5–7.<sup>5</sup> Terper describes that “[t]he invention allows the rope to easily rotate inside the handle, and to externally oscillate, because of the swivel joint, thus avoiding shearing.” *Id.* at 3:11–12. The

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<sup>5</sup> Citations to Exhibit 1011 refer to the page numbers added by Petitioner at the bottom right hand corner of each page of the exhibit.

motion of the cord 4 is depicted in Figures 1a and 1b of Terper, reproduced below.

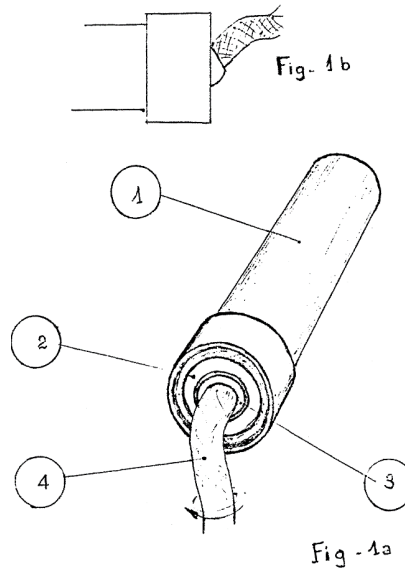
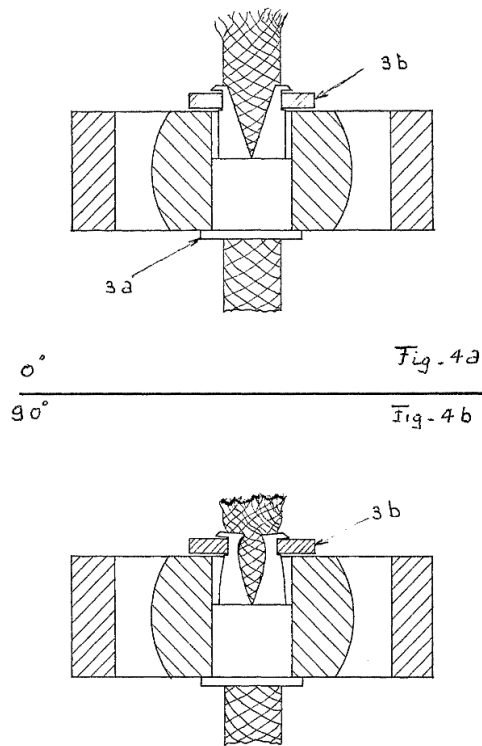


Figure 1a shows handle sleeve body 1, swivel joint 2, crimping assembly 3, and cord 4. *Id.* at 3:19–21. Figure 1a shows rotating motion, indicated by an arrow, and Figure 1b shows oscillating motion of the cord. *Id.* at 3:13–14.

Figures 4a and 4b, reproduced below, show a more detailed view of the device.





Figures 4a and 4b show cross-sectional views during assembly of the device. *Id.* at 4. As described in Terper and shown above, during assembly, plastic bushing 3a is slid onto the cord and these parts are heated and then inserted into the bore of the swivel bearing until it is in contact with the flange of the bushing. *Id.* at 4:3–7. Crimping washer 3b is inserted under the flange of the bushing (Fig. 4a) and pivoted by 90 degrees (Fig. 4b) to bring the flat sides of the washer into contact with the flat sides of the bushing to immobilize the cord. *Id.* at 4:8–10. The end of the cord is burned, the part of the sleeve body on the bearing side is heated, and then the assembly is pressed into the housing. *Id.* at 4:11–14.

### 3. Claim 1

Petitioner sets forth how the combination of Wolf and Terper discloses each limitation in claim 1. Pet. 22–28. Petitioner also provides

reasons to combine Wolf and Terper and asserts that the combination is within the capability of a person having ordinary skill in the art. *Id.* at 28–33.

Patent Owner argues that Petitioner has failed to show obviousness because the combination would decrease the functionality of Wolf, the combination is not according to known methods, there is no motivation to combine Wolf with Terper, the combination is not a simple substitution, and the combination does not disclose all of the limitations of claim 1. PO Resp. 14–30. Patent Owner also presents evidence that it contends establishes objective indicia of non-obviousness. PO Resp. 54–59.

We first analyze the scope and content of the prior art and the differences between the art and the claimed subject matter. We then consider the reasons to combine, taking into consideration the level of ordinary skill in the art and evidence of a reasonable expectation of success, and the proffered evidence of objective indicia of non-obviousness.

*a. Limitations 1.a, 1.a.i, and 1.a.ii*

Petitioner contends that Wolf discloses limitations 1.a, 1.a.i, and 1.a.ii of claim 1.<sup>6</sup> Pet. 22–24. Patent Owner does not contest Petitioner’s assertions that Wolf discloses these limitations. PO Resp. 29 (PO arguing only that Wolf does not disclose limitations 1.a.iii, 1.a.iv, and 1.b).

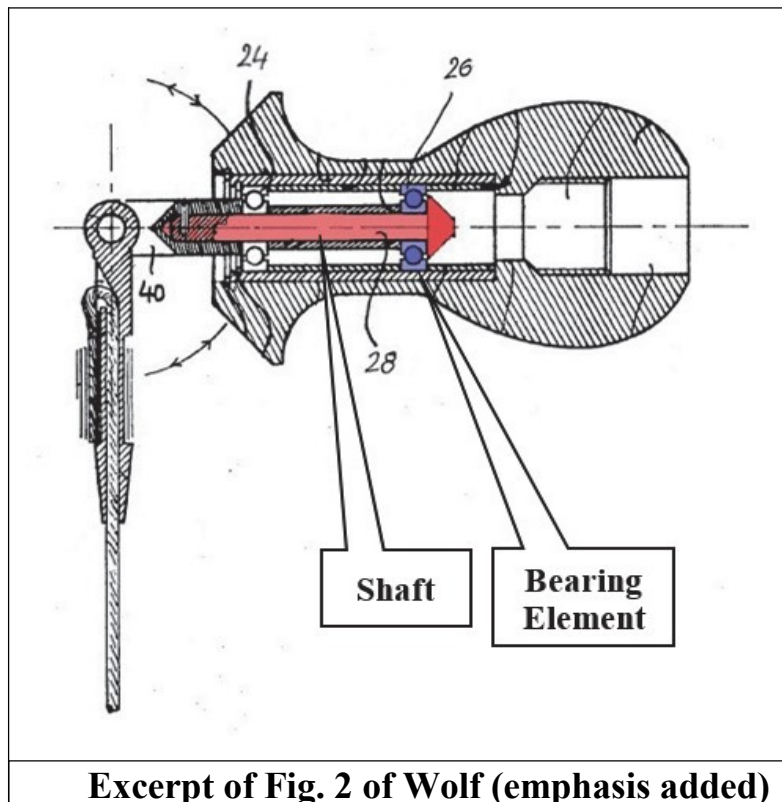
Specifically, Petitioner contends, and we agree with the following: Wolf discloses a jump rope having a pair of handles (handle 14 on each end

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<sup>6</sup> These limitations recite, “A jump rope, comprising: a) a pair of handles each comprising: i) a shaft rotatably journaled in at least one bearing element; ii) a handle adapted to retain said shaft rotatably journaled in said at least one bearing element.” Ex. 1001, 9:24–29.

of rope 12) [limitation 1.a].<sup>7</sup> Pet. 22 (citing Ex. 1006, 11; Ex. 1003 ¶¶ 58–59). Wolf also discloses a shaft rotatably journaled in at least one bearing element (pin 28 embodied as a shaft that is rotatably supported in handle 14 by bearings 24, 26) [limitation 1a.i]. *Id.* at 23 (citing Ex. 1006, 3, 15, Fig. 2; Ex. 1003 ¶¶ 60–62). Petitioner’s expert testifies that Wolf’s shaft 28 is rotatably journaled in at least one bearing element based on the ordinary meaning of “journal.” Ex. 1003 ¶¶ 60–62.

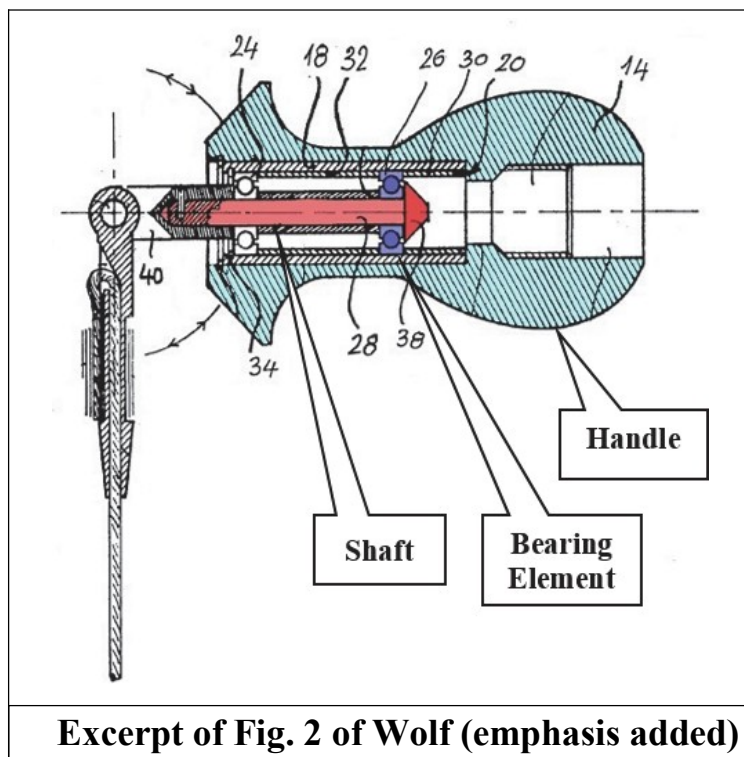
Petitioner provides an annotated Figure 2 of Wolf, reproduced below. Pet. 23.



Annotated Figure 2 depicts shaft 28 in red supported by bearing element 26, shown in blue. *Id.*

<sup>7</sup> Regardless of whether the preamble is limiting, Petitioner has shown that the recitation in the preamble is satisfied by the prior art.

Petitioner also shows, and we agree, that Wolf discloses each handle adapted to retain the shaft rotatably journaled in the at least one bearing element (each handle 14 is configured to hold bearings 24, 26 within the handle, where the bearings support shaft 28) [limitation 1.a.ii]. *Id.* at 24–25 (citing Ex. 1006, 19–20, Fig. 2; Ex. 1003 ¶¶ 63–68). As noted by Petitioner, the '809 patent provides an explicit definition of “adapted to retain” as used in the patent to refer to a configuration which fixes the location of first and second bearing elements in coaxial relation a distance apart. *Id.* (citing Ex. 1001, 4:21–26). Petitioner again provides an annotated Figure 2 of Wolf, reproduced below. *Id.*



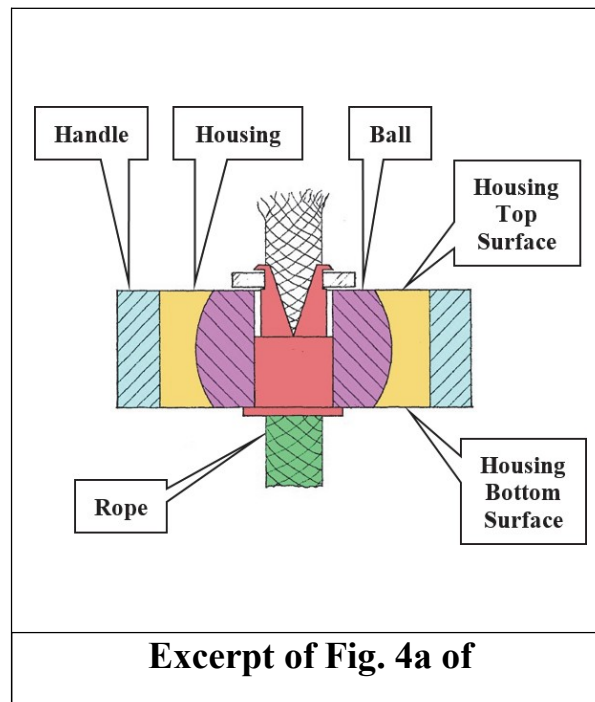
Annotated Figure 2 depicts handle 14, shown in light blue, configured with shaft 28, shown in red, and bearing 26, shown in dark blue, retained within it. Petitioner shows, by reference to the description in Wolf and annotated Figure 2 above, how handle 14 is configured with shoulder 20 and

snap ring 34 to hold bearing sleeve 18, spacer sleeves 30, 32, and bearings 24, 26 within the handle, and how spacer sleeves 30, 32 maintain bearings 24, 26 spaced from each other. Pet. 24 (citing Ex. 1006, 19–20). Petitioner also notes that Wolf discloses an alternative configuration where the bearings are in direct contact with handle 14. *Id.* As noted by Petitioner, in each example provided in Wolf, “bearings 24, 26 support the shaft 28 and allow for rotation of the shaft in a single, coaxial axis.” *Id.* (citing Ex. 1003 ¶ 67).

Based on our review of the evidence of record, Petitioner has shown that Wolf discloses limitations 1.a, 1.a.i, and 1.a.ii of claim 1. As discussed below, Petitioner contends that the combination of Wolf and Terper yields the remaining limitations of claim 1. *Id.* at 25.

*b. Limitation 1.a.iii*

Petitioner contends that the combination of Wolf and Terper yields “a blade element coupled to said shaft, said blade element extending axially from said shaft a distance outward from said handle” (limitation 1.a.iii). Pet. 25. Petitioner contends that Terper discloses a spherical bearing used to attach each end of a rope to handles of a jump rope. *Id.* at 25 (citing Ex. 1011, 3:18–22, Figs. 1a–1b, 4a; Ex. 1003 ¶ 70). In support, Petitioner provides an annotated version of Figure 4a of Terper, reproduced below. *Id.*



Annotated Figure 4a of Terper shows a rope (in green) fixed within a ball (in purple) that is seated in an aperture of a ball housing (in yellow). According to Petitioner’s expert, Mr. Lenz, Terper discloses a swivel joint having a ball and a ball housing, which is in the form of a flat disk with planar top and bottom surfaces disposed in opposed parallel relation. *Id.* (citing Ex. 1011, 3:18–22, Figs. 1a–1b, 4a and Ex. 1003 ¶ 70).

Petitioner explains that “[a]t the time of the ’809 [p]atent, it was known in the art of jump ropes to couple a rope to a flat element (including a flat disk) on the end of a rotary shaft in a handle where the flat element extends axially away from the shaft a distance outward from the handle.” Pet. 26 (citing Ex. 1003 ¶ 71; Ex. 1015 (JP S59-012912 Y2, published Apr. 18, 1984, to Katsumi Suzuki (English Translation) (“Suzuki”)), 2, Fig. 2; Ex. 1017 (JP S47-36558 U, published Dec. 22, 1972, to Masao Yamaguchi (English Translation) (“Yamaguchi”), Fig. 2). Figure 2 of Suzuki is reproduced below.

FIG. 2

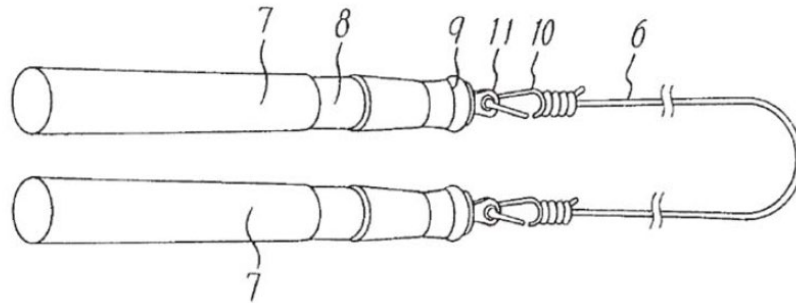


Figure 2 above is a perspective view of a jump rope. Ex. 1015, 2:6–7. Suzuki discloses grip 7 having engaging portion 9. *Id.* at 2:17–22. Portion 9 is “fitted into the tip of the grip and secured to the tip while rotatably holding an engaging terminal 11 for wire 10” to which cord 6 is attached. *Id.*

Figure 2 of Yamaguchi is reproduced below.

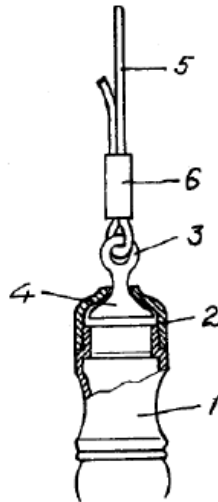


FIG. 2

Figure 2 above shows a jump rope handle connected to a rope. Ex. 1017, 1. Yamaguchi discloses jump rope grip 1 having cap 2 screwed thereon. *Id.* Connector 4 is fitted into the cap 2 so that annular portion 3 protrudes from the cap. *Id.* Rope 5 is attached to connector 4 through annular portion 3. *Id.*

Petitioner explains that it also “was known to couple a spherical bearing on the end of a shaft so that the housing extends axially from the shaft,” which was known as a “common rod end.” Pet. 26. (citing Ex. 1003 ¶ 72; Ex. 1009 (Bradley), 3:6–7, 16–18). Figure 1 of Bradley is reproduced below.

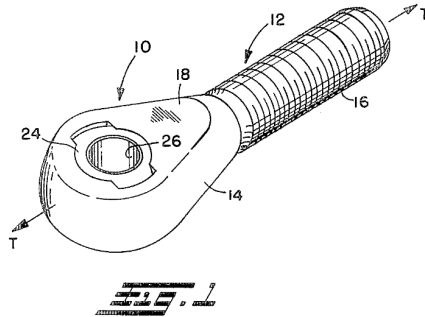
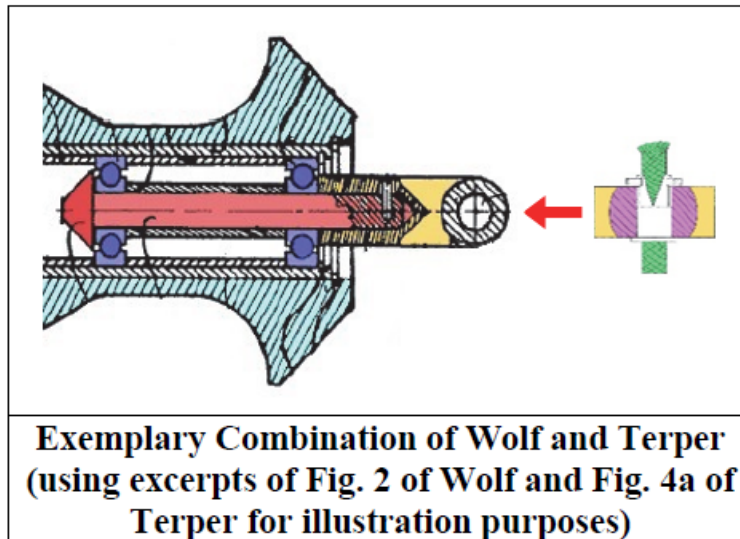


Figure 1 is a perspective view of a spherical bearing used in a rod end assembly. Ex. 1009, 2:52–54.

Petitioner contends that “coupling the spherical bearing of Terper on the end of the first arm of Wolf results in the housing of Terper extending axially from the first arm a distance outward from the handle,” thereby yielding “a flat element—providing planar top and bottom surfaces disposed in opposed parallel relation—coupled to the shaft of Wolf.” *Id.* at 27 (citing Ex. 1003 ¶¶ 71–74). Petitioner provides a depiction of an exemplary combination of Wolf and Terper, as reproduced below. *Id.* at 27.





The figure shown above depicts the handle, shaft, bearings, and first arm of Figure 2 of Wolf in combination with the swivel joint of Figure 4a of Terper.

We address in this section whether the modification to Wolf with the teaching of Terper, as proposed by Petitioner, would result in the claimed “blade element.” We address below Petitioner’s proposed reasons for the modification and evidence of reasonable expectation of success, and Patent Owner’s evidence of non-obviousness.

We agree with Petitioner that the modification to Wolf with the teaching of Terper, as proposed by Petitioner, yields the claimed “blade element.” Specifically, by removing articulation pin 48 and second arm 42 of Wolf’s assembly, as proposed by Petitioner, one is left with Wolf’s handle 14, shaft 28, and first arm 40 extending axially from the shaft. Ex. 1006, 20–21, Fig. 2. Terper’s spherical bearing includes a ball within a ball housing, where the ball housing has opposed planar surfaces. Ex. 1011, Fig. 4a. Thus, by coupling Terper’s spherical bearing to the end of Wolf’s first arm 40 in place of Wolf’s second arm 42, as proposed by Petitioner, the resulting assembly would result in the opposed planar surfaces of Terper’s

bearing on the end of Wolf's first arm 40. Accordingly, the proposed combination would result in "a blade element coupled to said shaft, said blade element extending axially from said shaft a distance outward from said handle," as recited in claim 1.

Patent Owner argues that the "blade element" is "not present in either the Wolf or Terper reference." PO Resp. 28; *see also id.* at 29 (arguing that neither reference discloses a blade element). As to Terper, the Patent Owner argues that "[t]he creation of the blade element from Terper is rather arbitrary and involves cutting a specific section of the handle (T-1) in order to meet the definition of a 'blade element.'" *Id.* at 28 n.9.

Patent Owner's arguments address each reference individually. We do not understand Petitioner's challenge to be based on an assertion that Terper, taken alone, discloses a blade element. Rather, Petitioner's challenge is based on use of Terper's spherical bearing coupled on the axially extending end of Wolf's first arm 40, which results in the claimed blade element. The combination achieves this result because, as explained by Petitioner, the top and bottom surfaces of Terper's bearing housing are planar, so that when the bearing housing is coupled to Wolf's first arm 40, the end of first arm 40 takes the form of a blade element with planar top and bottom surfaces. Pet. 27. Further, as noted by Petitioner in the Reply, Terper identifies the swivel joint assembly as a discrete component apart from the jump rope handle and shows a cross-section of the handle in Figure 2 without the swivel joint installed. Reply 3 (citing Ex. 1011, 3:20, Fig. 2; Ex. 1025 ¶¶ 11-13). Terper discloses assembly of the jump rope, which includes pre-assembly of the rope, bushing, swivel bearing (i.e., ball and ball housing), and washer, and then press fitting this pre-assembly into the

handle sleeve body. Ex. 1011, 4:2–15, Figs. 1a, 4a. Thus, we agree with Petitioner that Terper’s swivel joint assembly is separable from Terper’s handles. Reply 3 (citing Ex. 1011, 4:13–15, 3:15–17).

Based on our review of the evidence of record, we find that Petitioner has shown that Wolf, modified as proposed with the spherical bearing of Terper, would result in the claimed “blade element.”

*c. Limitation 1.a.iv*

Petitioner also contends that coupling Terper’s spherical bearing on the end of Wolf’s first arm would result in “a ball element pivotally coupled within an aperture of said blade element a distance from said handle” (limitation 1.a.iv). Pet. 28 (addressing limitation 1.a.iv of claim 1). Specifically, Petitioner argues that Wolf teaches the rope is coupled via a hinge joint, which places the rope a distance from the handle to prevent the rope from “striking the handle 14 during use.” Ex. 1006, 18–19; Ex. 1003 ¶ 69. Petitioner contends that because Terper’s ball is seated in an aperture of the housing, when it is coupled to the end of Wolf’s first arm, the aperture in the spherical bearing would be positioned a distance from the handle. *Id.* (citing Ex. 1003 ¶¶ 76–77). Petitioner contends that the rope coupled to Terper’s ball pivots relative to the handle and swivels around the rope’s own axis, so that when Terper’s swivel joint is added to the end of Wolf’s first arm, the ball element would be pivotally coupled within an aperture of the blade element. *Id.* (citing Ex. 1011, 3:13–14, Figs. 1a, 1b; Ex. 1003 ¶¶ 75–77, 101–103).

Patent Owner argues that neither Wolf nor Terper discloses “a ball element pivotally coupled within an aperture of said blade element a distance from said handle.” PO Resp. 29–30. Patent Owner’s arguments

address each reference individually. Petitioner's challenge is based on coupling Terper's spherical bearing on the axially extending end of Wolf's first arm 40, which results, as discussed above, in the claimed ball element pivotally coupled within an aperture of the blade element a distance from the handle. To the extent Patent Owner's argument as to each reference individually lacking this limitation is further to Patent Owner's arguments against Petitioner's reasons for the proposed combination, we address the reasons to combine below.

Based on our review of the evidence of record, we find that Petitioner has shown that Wolf, modified as proposed with the spherical bearing of Terper, would result in the claimed "ball element pivotally coupled within an aperture of said blade element a distance from said handle."

*d. Limitation 1.b*

Petitioner also contends that coupling Terper's spherical bearing on the end of Wolf's first arm would result in "a cable element having one of a pair of opposed ends coupled to said ball element." Pet. 28 (addressing limitation 1.b of claim 1). Specifically, Petitioner contends that Wolf, as modified by Terper, would result in the rope coupled to the ball of the spherical bearing. *Id.*

Patent Owner argues that neither Wolf nor Terper discloses "a cable element having one of a pair opposed ends coupled to said ball element." PO Resp. 29–30. Patent Owner's arguments address each reference individually. Petitioner's challenge, however, is based on coupling Terper's spherical bearing on the axially extending end of Wolf's first arm 40 in place of Wolf's hinged second arm 42, such that Wolf's cable is attached to the spherical bearing. Pet. 28. Thus, the combination, as proposed by Patent

Owner, results in the claimed cable element, with each end of the cable coupled to the ball disposed in Wolf's first arm 40 on each of Wolf's handles. To the extent Patent Owner's argument as to each reference individually lacking this limitation is further to Patent Owner's arguments against Petitioner's reasons for the proposed combination, we address the reasons to combine below.

Based on our review of the evidence of record, we find that Petitioner has shown that Wolf, modified as proposed with the spherical bearing of Terper, would result in the claimed "cable element having one of a pair opposed ends coupled to said ball element."

*e. Reason to Combine*

Petitioner presents several reasons why one having ordinary skill in the art would have been led to combine the teachings of Wolf and Terper in the manner claimed. Pet. 28–32. We discuss several of these reasons below.

*i. According to known methods to yield predictable results*

Petitioner asserts that the proposed combination of the elements of Wolf and Terper "is according to known methods and yields predictable results." Pet. 28 (citing Ex. 1003 ¶ 79). Petitioner explains that Wolf's first arm remains coupled to the pin to form a spinning shaft and positions the joint to which the rope is attached a distance outward from the handle. *Id.* at 29 (citing Ex. 1003 ¶¶ 79–80). Petitioner further explains that in the combination, Terper's spherical bearing remains the joint to which the rope is attached. *Id.* Thus, according to Petitioner, the combination yields the "predictable result of introducing a swivel joint to Wolf that allows the rope of Wolf to pivot relative to the handle and to swivel about the rope's own axis—instead of simply pivoting alone." *Id.* (citing Ex. 1003 ¶¶ 79–84).

Patent Owner responds only that Petitioner’s argument was “rejected by the Board” in the Institution Decision. PO Resp. 19 (citing Inst. Dec. at 21–22). In the Institution Decision, we questioned whether the Petition “address[es] adequately the fact that the purpose of Wolf’s first arm 40 is to form the first half of a hinge joint.” Inst. Dec. 22. We observed that “[b]y removing the hinge pin and second arm of Wolf in the modification, the remaining first arm 40 is no longer part of a hinge joint.” *Id.*

Petitioner, in reply, acknowledges that the Institution Decision questioned Petitioner’s position that the first arm of Wolf and the swivel joint of Terper perform the same functions in combination that they do separately. Reply 14. Petitioner argues, however, that “changing the *type* of joint on the end of the first arm of Wolf does not create a change in function that defeats this rationale.” *Id.* at 14–15 (arguing that the first arm of Wolf includes a type of joint structure that provides pivoting movement for the rope, and combining the swivel joint with Wolf may involve a different joint structure, but it maintains the function of providing pivoting movement of the rope, while also adding a swiveling function).<sup>8</sup>

Patent Owner argues that the functions of Wolf’s hinge joint are changed by adoption of the proposed modification because the range of pivoting movement would be reduced. Sur-reply 11–12 (arguing that Wolf’s

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<sup>8</sup> Patent Owner argues that Petitioner’s Reply argument is improper. Sur-reply 1–2. Petitioner’s argument is in response to statements made in the Institution Decision. Such arguments are permitted in light of the Court’s decision in *SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1358 (2018) and in light of the opportunity for Patent Owner to respond in a sur-reply. Patent Trial and Appeal Board Consolidated Trial Practice Guide November 2019, available at <https://www.uspto.gov/TrialPracticeGuideConsolidated> (“TPG”), 73.

ability for “continuous  $\pm 360^\circ$  rotation about the handle axis” and “ $\pm 135^\circ$  articulation about an axis perpendicular to the handle axis” would be changed to “continuous  $\pm 360^\circ$  rotation about the handle axis” and “ $\pm 45^\circ$  articulation about an axis perpendicular to the handle axis”).

We find that Petitioner has addressed adequately our concern about the function of Wolf’s modified jump rope that was raised in the Institution Decision. We are persuaded by Petitioner’s argument that a change in the type of pivot joint (i.e., from a hinge joint to a swivel joint) does not change the function of the joint. Both before and after the modification, Wolf’s rope is able to pivot. The proposed modification adds an additional swivel function at the joint where the rope connects to the end of first arm 40, but it does not amount to a change in the pivoting movement of the rope at this location. Further, we are not persuaded by Patent Owner that an asserted change in the degree of the pivoting range amounts to a change in function. As discussed, both before and after the modification, Wolf’s rope is capable of pivoting movement. Thus, the modification does not change the pivoting function of the joint. We address the pivoting range argument further below.

For these reasons, Petitioner has shown that the proposed modification of Wolf with the teaching of Terper “is according to known methods and yields predictable results.” Pet. 28. We now turn to Petitioner’s additional reasoning.

*ii. Simple substitution*

Petitioner also asserts that the proposed combination is “the simple substitution of the swivel joint of Terper for the hinge joint of Wolf.” Pet. 29–30 (arguing “Wolf differs from Claim 1 only by the means for joining the rope” and “it was known that use of the swivel joint of Terper

allows the rope to pivot relative to the handle and swivel about the rope's own axis") (citing Ex. 1003 ¶¶ 76, 80, 85–88). Petitioner asserts that "the substitution of the swivel joint of Terper for the hinge joint of Wolf, yields nothing more than the predictable result of having the swivel joint of Terper extend axially from the end of the first arm of Wolf and allowing the rope attached to the ball within the housing to swivel and pivot." *Id.* at 30 (citing Ex. 1003 ¶¶ 85–88).

Patent Owner contends that the proposed modification is not a simple substitution of one joint for another in Wolf. PO Resp. 21, 24. Patent Owner argues, with reference to Dr. Blair's testimony, that the steps necessary to combine Wolf and Terper in the manner claimed "would not be readily discernable to a [person having ordinary skill in the art]" and that "substantial changes to the inventions of Wolf and Terper would be required." *Id.* at 25 (citing Ex. 2001 ¶¶ 74–76).

Patent Owner's argument incorporates Dr. Blair's step-by-step instructions as to how to combine Wolf and Terper to result in the claimed jump rope. *Id.* at 25–28. These instructions include removing Wolf's first arm 40 from the end of shaft 28, disassembly of Terper's jump rope, coupling of a newly created "blade element" to the end of Wolf's shaft 28, and bodily incorporation of Terper's swivel joint into this "blade element." *Id.*

We agree with Petitioner that Patent Owner's argument improperly focuses on bodily incorporation of Terper's swivel bearing into Wolf's jump rope, instead of properly focusing on the question of whether the teachings of the prior art would have rendered the subject matter of claim 1 obvious to a person having ordinary skill in the art at the time of the invention.



Reply 21–22. There is no requirement for bodily incorporation of Terper’s spherical bearing into Wolf. *See Allied Erecting & Dismantling Co. v. Genesis Attachments, LLC*, 825 F.3d 1373, 1381 (Fed. Cir. 2016) (“The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference....”). Instead, the question is “whether ‘a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention[.]’” *Id.* (quoting *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1361 (Fed. Cir. 2007)). Thus, Patent Owner’s argument here is not persuasive.

Patent Owner further argues that the proposed modification would require “re-orient[ing] the ball bearing or swivel joint (T-2) 90°,” which “changes the principle of operation of that element of Terper from being aligned with the handle axis to being perpendicular to the handle axis.” PO Resp. 26, 28. Petitioner argues that “moving the swivel joint from inside the handle of Terper to the end of the first arm of Wolf as proposed ‘does not destroy the overall principle of operation of [the primary reference of Wolf]’” and Terper’s swivel joint provides for pivoting and swiveling of the rope in Wolf. Reply 17 (citing Ex. 1025 ¶¶ 34–35). Patent Owner’s argument is misplaced because it is centered on an alleged change to the principle of operation of Terper. Petitioner’s challenge, however, is based on a proposed modification of Wolf (not Terper). Pet. 27. We agree with Petitioner that the relevant inquiry is whether incorporation of Terper’s swivel joint in place of Wolf’s hinge joint would change the principle of operation of *Wolf*.

As discussed above, Wolf, as modified, would continue to function in the same manner; the rotating shaft 28 would allow first arm 40 to rotate

360° relative to the handle axis, and the spherical bearing would allow the rope to pivot relative to the handle axis. Terper's spherical bearing would also add additional functionality to allow for swiveling of the rope about its own axis for improved rope movement during use. Where the device would operate on the same principles as before, the combination does not change the principle of operation. *See In re Mouttet*, 686 F.3d 1322, 1332 (Fed. Cir 2012) (noting *In re Ratti*, 270 F.2d 810, 813 (CCPA 1959) is inapplicable where the modified apparatus will operate “on the same principles as before”).

As Petitioner explains, Terper demonstrates a known technique of attaching a rope to jump rope handles using a spherical bearing. Pet. 25; Ex. 1011, 3:18–22, Figs. 1a, 1b, 4a, 4b. Petitioner also shows that it was known in the art of jump ropes at the time of the invention of the '809 patent “to couple a rope to a flat element (including a flat disk) on the end of a rotary shaft in a handle where the flat element extends axially away from the shaft a distance outward from the handle.” Pet. 26; Ex. 1003 ¶ 71; Ex. 1015, 2, Fig. 2; Ex. 1017, Fig. 2. Petitioner also shows that common rod ends having spherical bearings were known at the time of the invention of the '809 patent. Pet. 26; Ex. 1003 ¶ 72; Ex. 1009, 3:6–7, 3:16–18. Based on the explicit teachings in Wolf and Terper as to jump rope systems and based on the background knowledge of one having ordinary skill in the art at the time of the invention, we find that Petitioner has provided sufficient evidence to show that the modification of Wolf's hinge joint with Terper's spherical bearing would have been mere substitution of one element for another known in the field to yield predictable results.

*iii. Explicit teaching, suggestion, or motivation*

Petitioner also contends that one having ordinary skill in the art at the time of the invention would have been led to modify Wolf with the teaching of Terper in the manner claimed “to allow the rope of Wolf to pivot and swivel (instead of pivoting alone).” Pet. 30 (citing Ex. 1003 ¶¶ 81–84, 89–91). Petitioner contends that motivation is found in Terper, which teaches that “use of swivel joints in jump ropes allow the rope to pivot and swivel, ‘thus avoiding shearing’ forces, which can cause premature wear of the rope.” *Id.* at 30–31 (citing Ex. 1011, 3:8–12; Ex. 1003 ¶ 89). Petitioner also contends that another prior art reference, Sauleau (Ex. 1008), teaches that “use of swivel joints in jump ropes prevents ‘the danger of winding the cord onto itself.’” Pet. 31 (citing Ex. 1008, 1:1–12, 2:7–8, Fig. 10; Ex. 1003 ¶¶ 81, 89). Thus, according to Petitioner, one having ordinary skill in the art would have made the combination as proposed to “avoid[] forces that cause premature wear of the rope and the winding of the rope onto itself during use—thereby extending the life of the jump rope and making it easier to use.” *Id.* at 31 (citing Ex. 1003 ¶¶ 90–91).

As to the proposed modification based on the teaching in Terper to avoid shearing, Patent Owner contests Petitioner’s implication that Wolf does not teach swiveling. PO Resp. 19. Patent Owner asserts that Wolf teaches swiveling at the handle and pivoting at the hinge interposed between the first and second arms, and that Wolf “reduces the bending forces on the rope by adding the hinge that allows the articulation of the rope.” *Id.* (citing Ex. 1006, 21; Ex. 2001 ¶¶ 78, 79). Patent Owner argues that “Wolf and Terper have the same degrees of freedom between the end of the rope where it attaches to the handle system and the handles: (i) rotation about the

handle axis, and (ii) articulation perpendicular to the handle axis.” PO Resp. 17. Patent Owner argues that a person having ordinary skill in the art would not have been motivated to combine Wolf and Terper because “the mechanisms in each allow the same types of motion between the rope and the handle.” *Id.* (citing Ex. 2001 ¶ 67). Patent Owner argues that “[t]o combine Wolf and Terper [as proposed by] Petitioner, a [person having ordinary skill in the art] would have to substantially change the function of the spherical ball (2) from being an internal bearing element, as taught by Terper, to that of a pivot element, as taught in the ’809 Patent.” PO Resp. 18.

Patent Owner’s argument fails to address Petitioner’s contention that adding Terper’s swivel joint to the end of Wolf’s first arm adds an additional degree of freedom to Wolf. In other words, Wolf’s jump rope system is improved by the addition of Terper’s swivel joint to the end of Wolf’s first arm. This improvement resulting from the combination is because Wolf’s first arm allows for a continuous 360 degree rotation about Wolf’s handle axis, and the use of Terper’s swivel joint on the end of Wolf’s first arm enables rotation of the rope about the rope’s axis and pivoting of the rope about the rope’s axis. *See* Reply 5 (noting that Patent Owner’s declarant “states only that Wolf provides ‘*swiveling at the handle*’ with a hinge interposed between the rope and the point of swiveling” [Ex. 2001 ¶ 62 (emphasis added)] and neither Patent Owner nor its declarant “explains how ‘swiveling at the handle’ of Wolf provides for swiveling of the rope about the rope’s axis, as required by the ’809 Patent.”).

Specifically, as to the teaching in Terper to avoid shearing forces, Patent Owner argues that “Petitioner eschews the teachings of Wolf which

teach avoidance of shearing forces through the use of a thickened region 78 in the second arm.”<sup>9</sup> PO Resp. 22 (citing Ex. 1006, 23). Thus, Patent Owner contends that Wolf already provides a solution against the threat of “premature wear” or “shearing forces.” *Id.* (citing Ex. 2001 ¶ 79; Ex. 1006, 23).

Petitioner has shown that Terper provides an explicit suggestion to use its spherical bearing to avoid shearing. Terper teaches its spherical bearing “allows the rope to easily rotate inside the handle, and to externally oscillate, because of the swivel joint, thus avoiding shearing.” Ex. 1011, 3:8–12. Wolf addresses, however, a different shearing problem. The portion of Wolf cited by Patent Owner discusses the propensity of the rope to break at the bending point of the cord within second arm 42. Ex. 1006, 22. Wolf uses thickened region 78 at the transition point from the longitudinal bore to expansion 62 in the second arm to “permit[] a more favorable bending, i.e. a bending with a larger radius.” *Id.* at 23. Wolf also teaches that this thickened region 78 prevents bridge piece 74 of second arm 42 from “shearing off or tearing through.” *Id.* Thus, Wolf addresses a problem with shearing of a portion of second arm 42 and does not address the same shearing problem of the rope identified in Terper. *See* Reply 13; Ex. 1025 ¶¶ 22–24) (explaining that Wolf’s thickened region 78 “does not prevent shearing forces on the *rope* that can cause, for example, winding of the rope on itself during use—and Wolf does not suggest otherwise.”).

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<sup>9</sup> Thickened region 78 is shown in Figure 6 of Wolf. Ex. 1006, Fig. 6. Wolf explains that “at the transition point from the longitudinal bore to the expansion 62 in the second arm according to Figs. 4 through 7, a thickened region 78 is left.” *Id.* at 23.

As to the issue of winding, we questioned in our Institution Decision whether winding was a problem in the configuration of Wolf's jump rope, which includes Wolf's rotating shaft 28. Inst. Dec. 23. In response, Petitioner provided annotated Figures of Wolf's handle system and described the movements of the components during use of the jump rope. Reply 6-7. Reproduced below are Figures 2 and 3 of Wolf, as annotated by Petitioner.

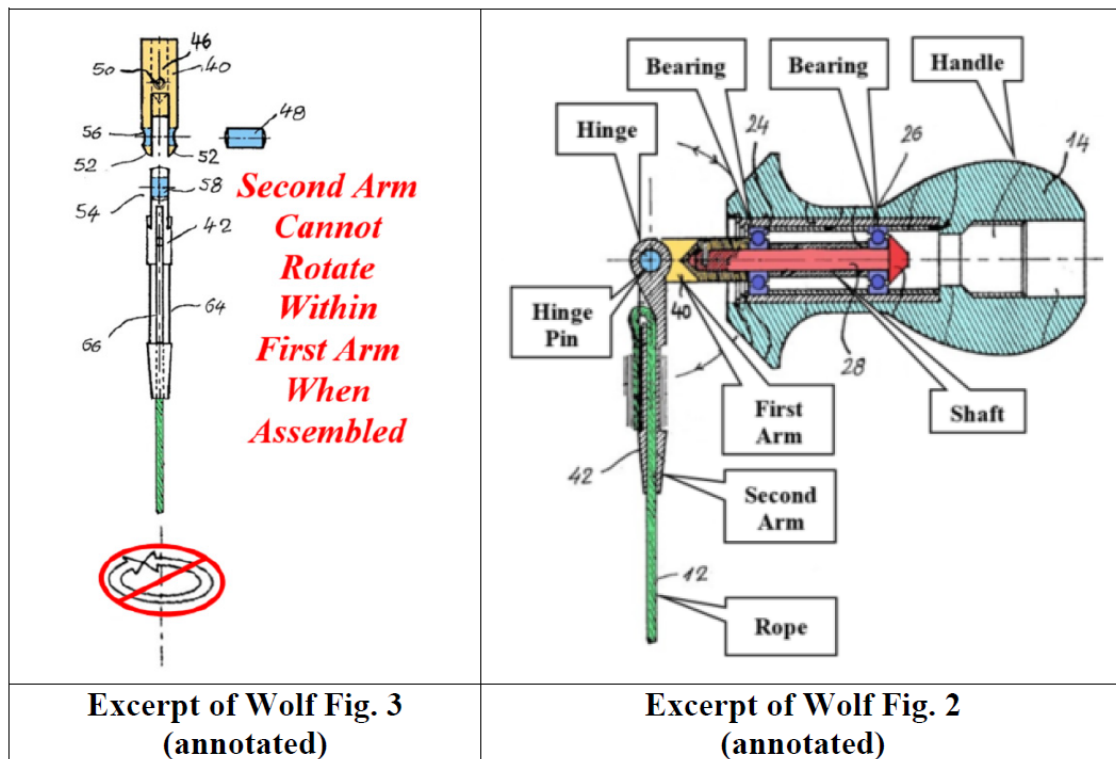


Figure 2 above right, as annotated by Petitioner, shows Wolf's handle 14 in light blue, shaft 28 in red, bearings 24, 26 in dark blue, first arm 40 in yellow, hinge pin 48 in medium blue, and rope 12 in green. Figure 3 above left, as annotated by Petitioner, shows the hinge connection of Wolf's first arm 40 and second arm 42 via forks 52 and flattened section 54. As shown above and explained by Petitioner, "[w]hen assembled, [Wolf's] second arm 42 cannot rotate about its longitudinal axis independent of the first arm 40

because the flattened section 54 is coupled within the fork 52” and “the rope is fixed in the second arm and cannot rotate about its own axis independent of the second arm (without winding on itself).” Reply 6 (citing Ex. 1006, 21; Ex. 1025 ¶¶ 16, 17).

As shown below in Figure 1, Wolf’s handle is not aligned with longitudinal axis of second arm 42 during normal use.

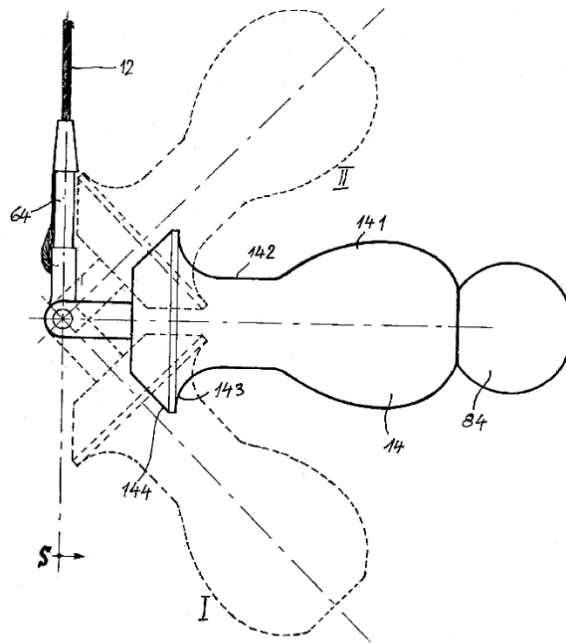


Fig. 1

Figure 1 of Wolf depicts “different positions that the jump rope cord 12 can assume relative to the handle.” Ex. 1006, 18–19, 33, Fig. 1. As shown in this figure above, second arm 42 pivots via the hinge joint to form an angle relative to the axis of first arm 40 and rotating shaft 28. But the hinge joint prevents second arm 42 from rotating about its own axis while second arm 42 pivots because flattened section 54 is coupled within fork 42. Ex. 1003 ¶¶ 82–84, 89; Ex. 1025 ¶¶ 14, 16–17. Because the rope is fixed in second arm 42, the rope cannot rotate about its own axis during use. *Id.* This understanding of Wolf’s operation was acknowledged by Patent

Owner's expert during his deposition. Ex. 1026, 43:8–21, 44:18–23, 47:6–12. Thus, as explained by Petitioner's declarant, Mr. Lenz, Wolf's rope can wind on itself because any twisting of the rope cannot be unwound by second arm 42. Ex. 1025 ¶¶ 18–20. This twisting can be caused by, for example, rotation of the jumper's wrists while jumping rope. *Id.* at ¶ 19. Wolf's rotating shaft 28 cannot, by itself, prevent winding of the rope onto itself during use. *Id.* at ¶ 21. Thus, Petitioner has established that winding of the rope on itself is a problem in the configuration of Wolf, and that a person having ordinary skill in the art would appreciate that adding the swivel bearing of Terper in place of Wolf's hinge joint would ameliorate this problem. Ex. 1008, 1:2–4 (evidence of winding problem in the art).

Patent Owner argues that a person having ordinary skill in the art would not have been led to modify Wolf with Terper because “Terper results in less articulation than Wolf.” PO Resp. 17; *see also id.* at 18 (“the modification of Wolf using Terper's spherical bearing would adversely affect the functionality of Wolf by reducing its range of motion” and “would result in an unsatisfactory product.”). Specifically, Patent Owner asserts that Wolf's range of pivoting motion of the rope relative to the centerline of rotating shaft 28 is approximately  $\pm 135^\circ$ . *Id.* at 15 (citing Ex. 2001 ¶ 63).

Petitioner contests Patent Owner's assertion that Wolf's range of pivoting movement during use is approximately  $\pm 135^\circ$  relative to the centerline of shaft 28. Reply 18. Petitioner asserts that “the actual pivot range of the second arm of Wolf during actual use . . . is about  $90^\circ$ .” *Id.* (citing Ex. 1006, 18, Fig. 1). Petitioner explains, with reference to Mr. Lenz's testimony and Figure 1 of Wolf, reproduced above, that Wolf's second arm remains on one side of the hinge as the shaft rotates within the



handle while the user jumps rope. *Id.* at 19 (citing Ex. 1025 ¶ 32). Mr. Lenz explains that “during typical use, the inertia and typical motion of the rope will keep the hinge in about the orientations shown in Figure 1 of Wolf” and “the second arm will remain on the same relative side of the hinge, as the whole hinge rotates together based on movement of the spinning shaft.” Ex. 1025 ¶ 32. Mr. Lenz’s testimony is consistent with the range of motion depicted in Figure 1 of Wolf. Thus, we agree with Petitioner that the proposed modification of Wolf’s hinge joint with Terper’s swivel joint would not change appreciably the range of pivoting movement in Wolf.

Even if the range of pivoting movement afforded by Terper’s swivel joint is less than the range of pivoting movement afforded by Wolf’s hinge joint and second arm, the lessened range of pivoting movement resulting from the combination is offset by the fact that the combination allows for a third degree of movement of the rope, i.e., rotation about the rope’s own axis, which reduces the chance shearing and winding of the rope onto itself.<sup>10</sup> Ex. 1025 ¶ 33 (Mr. Lenz testifying that a person having ordinary skill in the art would have known that the benefits of swiveling are worth any tradeoff of losing some amount of pivoting). *See Allied Erecting*, 825 F.3d at 1381 (a “course of action [with] simultaneous advantages and disadvantages” can still support a motivation to combine).

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<sup>10</sup> Petitioner also contends that a person having ordinary skill in the art would have been led to modify Wolf with Terper’s spherical bearing to eliminate Wolf’s second arm, thereby eliminating a part. Pet. 32 (citing Ex. 1003 ¶¶ 92–94). We need not reach this additional rationale.

*iv. Conclusion*

For these reasons, we find that Petitioner has articulated sufficient reasoning with rational underpinnings to support the combination. *See* Ex. 1003 ¶¶ 79–91. Thus, we conclude that a person of ordinary skill would have had reason to combine the teachings of Wolf and Terper.

*f. Reasonable Expectation of Success*

Petitioner contends that a person having ordinary skill in the art would have had a reasonable expectation of success in making the proposed modification to Wolf because the combination of Wolf and Terper “requires no more than common sense or ordinary skill” and “results in little more than a rod end, which is an off-the-shelf part well known to a [person having ordinary skill in the art]” and “used in the relevant art prior to the time of the ’809 Patent.” Pet. 33 (citing Ex. 1003 ¶¶ 71, 72, 95–100).

Patent Owner argues that it would not have been obvious to a person having ordinary skill in the art “how to scale the ball bearing or swivel joint of Terper so that it properly connects to the (missing) blade element, and is appropriately sized to accommodate the steel chord from Wolf.” PO Resp. 28.

Petitioner replies that Patent Owner fails to assert that any of the alleged steps for implementing the proposed modification would have been “outside of the skill” of a person having ordinary skill in the art.<sup>11</sup> Reply 22

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<sup>11</sup> As discussed above, the level of skill of a person having ordinary skill in the art is a person having “a bachelor’s degree in mechanical engineering and/or a related field and at least one to three years of experience or familiarity with jump rope systems and/or mechanically constructed fitness equipment” or “equivalent experience either in industry or research, such as

(citing *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1242–43 (Fed. Cir. 2010) (finding expectation of success was “clear” even though combination would require changes to orientation, size, and fit of components in prior art to yield claims)).

We agree with Petitioner that Patent Owner’s argument about no reasonable expectation of success lacks adequate explanation because Patent Owner fails to explain how the steps necessary to make the proposed modification, i.e., disconnecting, removing, discarding, sizing/scaling, and coupling parts, would require skill other than those used in ordinary mechanical design and analysis and within the level of ordinary skill. Reply 22; Ex. 1025 ¶ 37. Specifically, as noted by Petitioner, Patent Owner’s declarant, Dr. Blair, testified that spherical bearings and rod-ends are off-the-shelf parts available in many sizes and forms. Reply 3 n.3 (citing Ex. 1026, 21:5–22). Thus, Petitioner has shown that a person having ordinary skill in the art would have had a reasonable expectation of success in making the proposed modification of Wolf with the teaching of Terper.

*g. Objective Evidence of Non-Obviousness*

Notwithstanding what the teachings of the prior art would have suggested to one skilled in the art, objective evidence of nonobviousness (so-called “secondary considerations”) may lead to a conclusion that the challenged claims would not have been obvious. *In re Piasecki*, 745 F.2d 1468, 1473–75 (Fed. Cir. 1984). However, “[e]vidence of objective indicia is only relevant . . . ‘if there is a nexus between the claimed invention and the objective indicia.’” *Bosch Auto. Serv. Sols., LLC v. Matal*, 878 F.3d

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designing, [] developing, evaluating, or such systems or equipment.” See *supra* Section II.B.

1027, 1036–37 (Fed. Cir. 2017) (citation omitted). That is, “there must be ‘a legally and factually sufficient connection’ between the evidence and the patented invention.” *Henny Penny Corp. v. Frymaster LLC*, 938 F.3d 1324, 1332 (Fed. Cir. 2019) (quoting *Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, 851 F.2d 1387, 1392 (Fed. Cir. 1988)). “The patentee bears the burden of showing that a nexus exists.” *WMS Gaming Inc. v. Int’l Game Tech.*, 184 F.3d 1339, 1359 (Fed. Cir. 1999).

Patent Owner argues that “two objective indicia weigh in favor of nonobviousness: unexpected results and copying.” PO Resp. 54; *see also id.* at 55–59; Sur-reply 25–28. Petitioner responds that Patent Owner has failed to establish its alleged objective indicia of nonobviousness. Reply 24–29.

*i. Unexpected Results*

Patent Owner argues that the Metz Declaration and statistics from national and international jump rope competitions “demonstrate unexpected results.” PO Resp. 55 (citing Ex. 2003; Ex. 2004). The Metz Declaration states that Exhibit 2004 lists data related to FISAC World Competitions and United States National Competitions, and data related to “the type of jump rope the athletes used” in those competitions. Ex. 2003 ¶¶ 7, 8. According to Patent Owner, “[t]his evidence indicates a better performance capability for the technology embodied in the ’809 Patent in the competitive arena.” PO Resp. 55.

Patent Owner also argues that, as a measure of the ’809 Patent’s unexpected results, “of the six individual events at the United States national level . . . over the four-year span of 2013–2016, the event champion used technology embodied in the ’809 Patent in 19 out of 24 events, or 79% of all possible wins.” PO Resp. 55. Based on data extracted from Exhibit 2004,

Patent Owner argues that “[t]his technology has been an integral part of the increase in performance at the elite jump rope level.” *Id.* at 55–56, Figure 1. Patent Owner further asserts that “the technology embodied in the ’809 Patent has been directly linked to an increase in scores in these same [competitions],” as further evidenced by data extracted from Exhibit 2004. *Id.* at 56–57, Fig. 2.

Patent Owner further argues that “[t]he nexus between the claimed invention of the ’809 Patent and the unexpected results is palpable.” PO Resp. 58. According to Patent Owner, “[t]he statistics demonstrate that the technology embodied in the ’809 Patent correlates to enhanced performance in the competitive jump rope arena,” and that “[a]s participants in competitive jump rope events began utilizing the ’809 Patent’s technology around 2008, the performance output of contestants increased and new records continued to be set.” *Id.* Patent Owner further argues that “the incredible performance capability of the ’809 Patent technology is unexpected” because “the prior art, and indeed, Petitioner’s only arguments, would indicate that the only foreseeable benefits to the ’809 Patent would have been obviously an avoidance of ‘shearing forces’ or premature wear.” *Id.*; *see also id.* at 55. Moreover, according to Patent Owner, “[t]he prior art is devoid of any teaching or indication that would suggest a jump rope system, such as that embodied by the ’809 Patent, would result in record-setting performance,” and that “[n]o such teaching is contained in the closest prior art, i.e., Wolf and Terper.” *Id.* at 58.

Petitioner responds that Patent Owner’s evidence of unexpected results is insufficient for several reasons. Reply 26–27. According to Petitioner, Exhibit 2004 “is not objective, reliable evidence—it is an opaque

collection of unauthenticated data and highlighting prepared by [Patent Owner's] self-interested owner and named inventor.” *Id.* at 26 (citing Ex. 2003 ¶¶ 2, 3, 7, 8). Petitioner contends that most of the highlighted scores in Exhibit 2004 “are for ‘scores obtained’ or ‘likely obtained’ with ‘JRS technology,’” without an explanation of what “JRS technology” encompasses, and that “[t]here are . . . missing entries and inconsistent ‘change’ values, indicating the scores may be incorrect.” Reply 26–27 (citing Ex. 2004, 1–4).

Petitioner also responds that “it is impossible to determine from Exhibit 2004 whether the scores have any probative value,” due to the absence of comparative data. Reply 27. Petitioner points out that Exhibit 2004 does not show any comparative data between top scores using “JRS Technology” in certain years and technology used by runners-up, noting that such data would show, at best, differences of degree rather than differences in kind. *Id.* According to Petitioner, “[t]he partial data even indicates there is no difference in kind: there are numerous non-JRS records and titles, and non-JRS results that are better, or are similar to, JRS results.” *Id.* (citing Ex. 2004, 1). Petitioner further asserts that Patent Owner failed to make a comparison to the closest prior art, such as a controlled comparison of one competitor using two different jump ropes. *Id.*

Patent Owner attempts to satisfy its burden of showing a nexus between the asserted unexpected results and the claimed invention by proffering evidence that it contends shows unexpectedly successful competition scores achieved by athletes that used jump ropes “using JRS technology.” *WMS Gaming*, 184 F.3d at 1359; Ex. 2004. That is, Patent Owner purports to show a “nexus” to the claims by providing competition

results (scores) from the use of jump rope(s) using JRS technology.  
Ex. 2003 ¶¶ 7, 8; Ex. 2004.

In an effort to tie the jump ropes using JRS technology to the patent claims, Patent Owner argues in its Sur-reply that its Response “informs the reader that the unexpected results were the result of [Patent Owner] implementing its patented technology (’809 and ’208 Patents) into its commercial jump rope products and thus the nexus between the ’809 Patent, [Patent Owner] jump ropes and the objective indicia is clear.” Sur-reply 25. But any such attorney argument in Patent Owner’s Response or Sur-reply is insufficient because “arguments of counsel cannot take the place of evidence lacking in the record.” *Knorr v. Pearson*, 671 F.2d 1368, 1373 (CCPA 1982).

In considering the evidence of record, we find that the portion of the Blair Declaration regarding unexpected results relies on the Metz Declaration. Ex. 2001 ¶¶ 177–180. The Metz Declaration states that Ms. Metz has “extensive knowledge of the type of jump rope the athletes used” in the referenced competitions. Ex. 2003 ¶ 8. The Metz Declaration refers to Exhibit 2004 for data supporting the assertion of unexpected results. *Id.* at ¶¶ 7, 8. Exhibit 2004 identifies scoring data with colored highlighting that “reflects scores obtained [or likely obtained] using JRS technology.” Ex. 2004, 1–4. Thus, the only *evidence* of the characteristics of the jump rope(s) purportedly providing unexpected results is the references in Exhibit 2004 to jump ropes (or scores) “using JRS technology.”

Based on the evidence presented by Patent Owner, as opposed to attorney argument, it is not clear whether the respective jump ropes “using

JRS technology,” referenced in Exhibit 2004 by year, event, and score, are the same or different models, or even whether the jump ropes are Patent Owner’s product as opposed to one of the entities that Patent Owner asserts has copied its product.<sup>12</sup> *See* Ex. 2003 ¶ 4. More importantly, there is no *evidence* indicating whether any of those jump ropes “using JRS technology” are coextensive with, or even covered by, any claim of the ’809 patent. *See* Reply 25. Patent Owner has thus failed to satisfy its “burden of proving that the evidence of secondary considerations is attributable to the claimed *combination* . . . as opposed to, for example, prior art features in isolation or unclaimed features.” *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1378 (Fed. Cir. 2019).

Even if Patent Owner had established nexus, Patent Owner also fails to submit sufficient comparative data to establish unexpected results. Patent Owner acknowledges that unexpected results “must be shown to be unexpected compared with the closest prior art.” PO Resp. 54 (citing *In re Baxter Travenol Labs.*, 952 F.2d 388, 392 (Fed. Cir. 1991)). Patent Owner also asserts that Wolf and Terper are the closest prior art. *Id.* at 58. But Patent Owner does not provide any evidence of the types of jump ropes that are purportedly compared to the jump ropes using JRS technology, whether it be Wolf and/or Terper jump ropes or some other type of jump rope. As Petitioner argues, Patent Owner provides no controlled comparisons, such as

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<sup>12</sup> In its Sur-reply, Patent Owner’s counsel refers to the introduction of Patent Owner’s jump ropes in 2008, “individuals using a JRS jump rope,” and that “a patented JRS jump rope [does not] automatically ensure world-record setting performance.” Sur-reply 26. That attorney argument does not provide any evidence clarifying the term “JRS technology” or the characteristics of the jump ropes referred to in Exhibit 2004.



scores resulting from the same jumper using two different jump ropes. Reply 27. Patent Owner replies by arguing that Petitioner “attempts to discredit [Patent Owner’s] data by pointing towards a lack of comparative data . . . [but] this type of analysis would mask the critical message: over time, [Patent Owner’s] jump ropes have catalyzed world-record setting performances across the board.” Sur-reply 26–27. But it is Patent Owner that (correctly) acknowledged that unexpected results “*must* be shown to be unexpected compared with the closest prior art.” PO Resp. 54 (citing *Baxter Travenol*, 952 F.2d at 392 (emphasis added)).

Patent Owner also argues that “the only foreseeable benefits to the ’809 Patent would have been obviously an avoidance of ‘shearing forces’ or premature wear,”<sup>13</sup> and that the “prior art is devoid of any teaching or indication that would suggest a jump rope system, such as that embodied by the ’809 Patent, would result in record-setting performance.” PO Resp. 58. That attorney argument is not evidence of unexpected results. *Knorr*, 671 F.2d at 1373. Nevertheless, we note that many of the scores shown in Exhibit 2004 are “speed” scores and that Wolf purports to address the prior art problem of jump ropes that “cannot be whipped quickly” and that “fast and extremely fast jumping and cord-turning movements cannot be executed.” Ex. 2004; Ex. 1006, 12–14. Wolf thus suggests that improved speed is a feature that could be expected from its disclosed jump rope.

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<sup>13</sup> Patent Owner asserts this is “Petitioner’s only arguments.” See PO Resp. 58. However, Petitioner had no obligation to, and in our view did not attempt to, preemptively address unexpected results in the Petition. See Reply 26 n.17.

Patent Owner also acknowledges that “[u]nexpected results that are probative of nonobviousness are those that are ‘different in kind and not merely in degree from the results of the prior art.’” PO Resp. 54–55 (citing *Galderma Labs., L.P. v. Tolmar, Inc.*, 737 F.3d 731, 739 (Fed. Cir. 2013) (citation omitted)). But, even in the light most favorable to Patent Owner, the data “indicates there is no difference in kind: there are numerous non-JRS records and titles, and non-JRS results that [are] better, or are similar to, JRS results.” Reply 27 (citing Ex. 2004, 1).

For the forgoing reasons, we find that Patent Owner has failed to establish a nexus between the claimed invention and the purported unexpected results, or probative evidence of comparative data as required to establish unexpected results. Accordingly, we find that the evidence of unexpected results that Patent Owner has provided is entitled to no weight and that Patent Owner has failed to establish unexpected results.

*ii. Copying*

Patent Owner argues that Exhibit 2005 details “over 200 instances of copying,” and that the “evidence of copying is attested to in the Metz Declaration.” PO Resp. 59 (citing Ex. 2004 [sic, Ex. 2005]; Ex. 2003 ¶ 5). The Metz Declaration states that Ms. Metz has extensive knowledge of Patent Owner’s (1) “identification of entities [listed in Exhibit 2005] that have sold without authorization jump rope products that incorporate the ’809 Patent’s and ’208 Patent’s patented technology,” and (2) “efforts to enforce [listed in Exhibit 2005] the intellectual property rights of the ’809 Patent and ’208 Patent.” Ex. 2003 ¶¶ 4, 5. According to Patent Owner, the “illustrations and pictures contained [in Exhibit 2005] demonstrate the near-to-exact replication by pirates and counterfeiters of the ’809 Patent

technology is rampant,” and that “[t]he online marketplace has lent itself to widespread (and often unregulated) piracy of patent-owner’s rights and the ’809 Patent is no exception.” PO Resp. 59.

Patent Owner also argues that, “[i]n addition to Patent Owner’s online enforcement efforts, the technology embodied in the ’809 Patent has been the subject of multiple Federal patent infringement lawsuits,” and that “Patent Owner has initiated at least one investigation of copying of the technology embodied in the ’809 Patent at the United States International Trade Commission.”<sup>14</sup> PO Resp. 59. According to Patent Owner, “[h]aving been the subject of multiple federal lawsuits and countless enforcement efforts, the ’809 Patent has been the subject of deliberate, conscientious copying.” *Id.* (citing Ex. 2003 ¶ 5).

Petitioner argues that Patent Owner “ignores the law it cited and instead submits two categories of insufficient evidence of alleged copying.” Reply 28 (citing PO Resp. 59; Ex. 2003 ¶¶ 2–5; Ex. 2005). First, Petitioner asserts that Patent Owner “relies on ‘illustrations and pictures’ from unauthenticated webpages that provide unannotated external views of jump rope products/parts,” and fails to show that the technology allegedly copied fell within the scope of the asserted claims. *Id.* (citing Ex. 2005). Moreover, according to Petitioner, even if the products shown in the illustrations and pictures of Exhibit 2005 “were infringing[,] that would still not be enough

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<sup>14</sup> Patent Owner notes four civil actions in United States District Courts, including the pending civil action against Petitioner identified above, and one ITC investigation. PO Resp. 59 n.13,14; Ex. 2005, 1; *see supra* Section I.C.

because [Patent Owner] fails to show copying of a ‘specific’ patented product—[Patent Owner] never even identifies its own product.”<sup>15</sup> *Id.* at 28.

Second, Petitioner asserts that, although Patent Owner argues that “the technology embodied in the ’809 Patent’ has been litigated,” Patent Owner “presents no evidence about the products at issue or findings/holdings, let alone whether a patented product was copied.” Reply 29 (citing PO Resp. 59).

Patent Owner replies that its “submissions were more than adequate given that they were merely secondary evidence of non-obviousness,” and that it “fulfilled its burden by proving that there is widespread replication of [Patent Owner’s] jump rope products that embody the ’809 Patent technology.” Sur-reply 27.

Patent Owner acknowledges that to establish copying “requires evidence of efforts to replicate a specific product.” PO Resp. 58 (quoting *Wyers*, 616 F.3d at 1246; *see also* Sur-reply 27 (“Copying in the context of secondary considerations may be established by showing replication of a ‘product’ covered by the patent claims” (citing *Wyers*, 616 F.3d at 1246))). Patent Owner further acknowledges that efforts to replicate a specific product “may be demonstrated through internal company documents, direct

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<sup>15</sup> Petitioner cites *Wyers*, 616 F.3d at 1246 and *Cable Electric Products, Inc. v. Genmark, Inc.*, 770 F.2d 1015, 1027–28 (Fed. Cir. 1985) as support for this assertion. Reply 28. Patent Owner contests Petitioner’s interpretation that *Cable Electric* stands for the proposition that “failure to provide patent owner device precludes copying analysis.” Sur-reply 27 (citing Reply 28). We do not rely on *Cable Electric* or Petitioner’s interpretation thereof for purposes of this Decision. We do, however, rely on *Wyers*, cited by Patent Owner.

evidence such as disassembling a patented prototype, photographing [sic] its features, and using the photograph [sic] as a blueprint to build a replica, or access to the patented product combined with substantial similarity to the patented product.” PO Resp. 58 (quoting *Wyers*, 616 F.3d at 1246).

Patent Owner argues that “illustrations and pictures” shown in Exhibit 2005 (which appear to be printed copies of web pages but are not authenticated)<sup>16</sup> demonstrate near-to-exact replication “of the ’809 Patent Technology.” PO Resp. 59 (citing Ex. 2004 [sic, Ex. 2005]; Ex. 2003 ¶ 5). Arguments by Patent Owner’s counsel also refer to “the technology embodied in the ’809 Patent” and “the ’809 Patent” as having been the subject of “multiple Federal patent infringement lawsuits” and “deliberate, conscientious copying.” *Id.* (citing Ex. 2003 ¶ 5). But notably absent from the Blair Declaration,<sup>17</sup> the Metz Declaration, and Exhibit 2005 is any identification of a Patent Owner *product* allegedly copied, or evidence that any such unidentified product is covered by any claim of the ’809 patent. *See* Ex. 2006 ¶ 179; Ex. 2003; Ex. 2005).

Patent Owner also fails to provide any evidence of copying by third parties. Although the evidence submitted by Patent Owner refers to “jump rope products that incorporate the ’809 Patent’s and ’208 Patent’s patented

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<sup>16</sup> Patent Owner asserts that “[t]his evidence [Exhibit 2005] of copying is attested to in the Metz Declaration.” PO Resp. 59 (citing Ex. 2003 ¶ 5). But paragraph 5 of the Metz Declaration states in full: “I have extensive knowledge of JRS’s efforts to enforce the intellectual property rights of the ’809 Patent and ’208 Patent. These efforts are listed in Exhibit 2005.” Ex. 2003 ¶ 5; *see* FED. R. EVID. 901, 902 (13), (14).

<sup>17</sup> As with Patent Owner’s unexpected results arguments, the Blair Declaration relies on the Metz Declaration. Ex. 2006 ¶ 179 (citing Ex. 2003 ¶¶ 4–5; Ex. 2005).

technology” (Ex. 2003 ¶ 4), and Patent Owner’s “efforts to enforce the intellectual property rights of the ’809 Patent and ’208 Patent” (*id.* at ¶ 5), the law is clear that “[n]ot every competing product that arguably falls within the scope of a patent is evidence of copying. Otherwise every infringement suit would automatically confirm the nonobviousness of the patent.” *Iron Grip Barbell Co. v. USA Sports, Inc.*, 392 F.3d 1317, 1325 (Fed. Cir. 2004). Rather, as Patent Owner acknowledges, what is *required* is evidence of “efforts to replicate a specific product,” such as: (1) internal company documents of a third party alleged to have copied the product, (2) direct evidence, such as a third party disassembling a patented prototype of the product, photographing the product’s features, and using the photograph as a blueprint to build a replica, or (3) access of a third party to the patented product combined with substantial similarity of the third party’s product to the patented product. *See Wyers*, 616 F.3d at 1246; PO Resp. 59. No such required evidence is provided by Patent Owner.

Patent Owner provides no evidence of a specific product, and a sufficient connection between that product and a claim of the ’809 patent, that was copied by a third party. On this record, enforcement efforts and pictures of competitors’ products do not establish copying in the context of objective indicia of nonobviousness. *See Iron Grip*, 392 F.3d at 1325. Accordingly, we find that Patent Owner has failed to provide evidence of copying, and that the evidence it has provided is entitled to no weight.

#### *h. Conclusion as to Claim 1*

Having considered the parties’ arguments and evidence, we evaluate all of the evidence together to make a final determination of obviousness. *In re Cyclobenzaprine Hydrochloride Extended-Release Capsule Patent Litig.*,

676 F.3d 1063, 1075 (Fed. Cir. 2012) (describing the court’s precedent as “requiring that a fact finder consider all evidence relating to obviousness before finding a patent invalid”). We find that Petitioner has established that the combination of Wolf and Terper discloses all of the limitations of claim 1. We further find that the combination of Wolf and Terper would have been according to known methods to yield predictable results, the simple substitution of the swivel joint of Terper for the hinge joint of Wolf, and that the prior art provided an explicit teaching, suggestion, or motivation to combine the teachings of Wolf and Terper to arrive at the invention of claim 1. We also find that combining the teachings of Wolf and Terper to arrive at claim 1 would have been well within the skill of a person having ordinary skill in the art, and that such person would have had a reasonable expectation of success in making such combination.<sup>18</sup>

We weigh the foregoing findings with Patent Owner’s asserted evidence of unexpected results and copying. As discussed above, we find that the evidence of unexpected results and copying submitted by Patent Owner is not entitled to any weight. Thus, based on our review of the evidence of record, we are persuaded that Petitioner demonstrates by a preponderance of the evidence that claim 1 of the ’809 patent would have been unpatentable as obvious over the combined teachings of Wolf and Terper.

#### 4. *Claim 2*

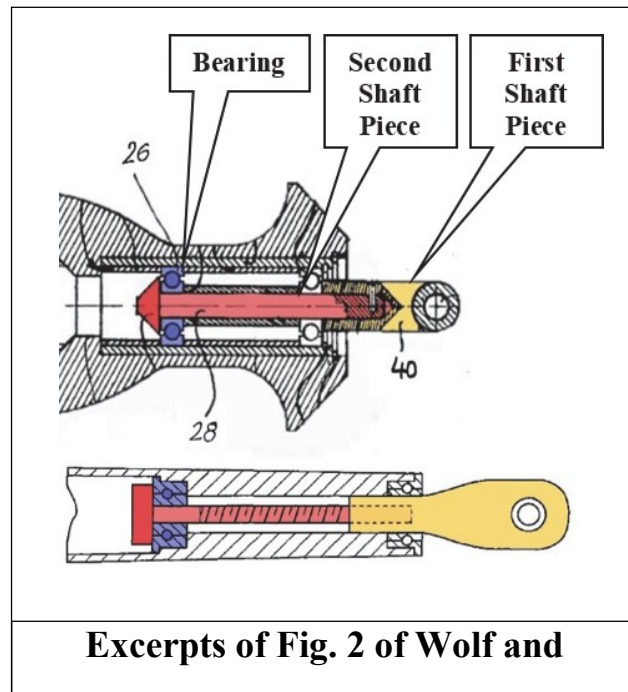
Claim 2 depends from claim 1 and recites “wherein said shaft comprises a two piece shaft wherein a first shaft piece couples to a second

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<sup>18</sup> Based on these findings, we find no merit in Patent Owner’s assertions of hindsight reasoning. *See* PO Resp. 25, 28, 60.

shaft piece, rotatably journaled in at least one bearing element.” Ex. 1001, 10:1–4.

Petitioner provides the following annotated illustration of portions of Figure 2 of Wolf and Figure 9 of the '809 patent to show limitations of claim 2:



The illustration above is an annotated illustration of portions of Figure 2 of Wolf and Figure 9 of the '809 patent showing components inside the respective handles. *See* Pet. 34.

Petitioner argues that Wolf discloses all elements of claim 2 and that the combination of Wolf and Terper renders claim 2 obvious for the same reasons as set forth with respect to claim 1. *Id.* (citing Ex. 1003 ¶¶ 105–107). Specifically, Petitioner argues that “Wolf discloses first arm 40 (‘a first shaft piece’) coupled to pin 28 (‘a second shaft piece’) to form a two-piece shaft,” and that the “pin 28 (‘second shaft piece’) is rotatably journaled in bearing 26.” *Id.* (citing Ex. 1006, 5 (claim 10), 20–21; Ex. 1003



¶¶ 105–107).

Patent Owner states in its Response that “Dr. Blair’s opinions expressed in regard to the combination of Wolf and Terper related to Claim 1 extend to Claim 2.” PO Resp. 30. Patent Owner further argues that because Wolf’s first arm 40 is connected to the end of first shaft piece 28 via cotter pin 50, “[t]he first arm of Wolf (the second shaft piece) is not rotatably journaled in at least one bearing.” *Id.* Patent Owner also argues that Terper does not disclose the limitations listed in claim 2, and that “Claim 2 of the ’809 Patent is not obvious by Wolf in view of Terper as the combination does not disclose all of the material claim limitations of Claim 2.” *Id.* at 30–31 (citing Ex. 2001 ¶¶ 86–90).

Petitioner argues in its Reply that Patent Owner fails to refute Petitioner’s position that “[u]nder a plain reading of Claim 2, the ‘second shaft piece’ can correspond to the pin 28 of Wolf (as asserted by Petitioner).” Reply 24 (*comparing* PO Resp. 30, 49 *with* Pet. 34, 51).

Patent Owner argues in its Sur-reply that “[u]sing [Petitioner’s] annotated illustration and Wolf’s part-identifications, it becomes apparent that Wolf’s ‘first arm (40)’ and the outward-protruding end of the pin (28),’ *i.e.*, the ‘second arm’ according to [Petitioner], are inapposite to the ’809 Patent’s first and second shaft piece[s],” and that Patent Owner “specifically pointed out this deficiency in its Response.” Sur-reply 23 (citing Ex. 1002, 4:42–45; Ex. 1006, 4 (claim 9); PO Resp. 30, 49). Patent Owner further states “[t]hus, the combination of Wolf and Terper . . . cannot disclose all the material limitations of Claim 2 of the ’809 Patent as the Wolf’s first arm is *not* rotatably journaled in at least one bearing.” *Id.*

As we understand Patent Owner’s argument and alleged “deficiency,” an embodiment of the handle shown in Figure 5 of the ’809 patent is described in the Specification as having a *first* shaft piece 37 that corresponds to Wolf’s *second* shaft piece (pin) 28 and a *second* shaft piece 38 that corresponds to Wolf’s *first* shaft piece (first arm) 40. *Compare* Ex. 1001, 4:36–42, *with* Ex. 1006, 4 (claim 9). We do not find this argument persuasive because the appropriate comparison is between the claims (not the Specification) and Wolf’s disclosure. Claim 2 recites that the shaft comprises a two piece shaft, but the claim does not distinguish between or designate which part of the shaft comprises the first shaft piece and which part comprises the second shaft piece in a manner that would preclude Petitioner’s position that Wolf’s pin 28, which is rotatably journaled in a bearing element, satisfies the claimed second shaft piece. Ex. 1001, 10:1–4; Ex. 1006, 19, Fig. 2. Accordingly, we find that Petitioner has established by a preponderance of evidence that claim 2 of the ’809 patent would have been obvious in view of the combined teaching of Wolf and Terper.

### 5. Claim 3

Claim 3 depends from claim 2 and recites “wherein said first shaft piece provides a closed end conduit, and wherein said second shaft piece provides an elongate body received within said closed end conduit to couple said first shaft piece to said second shaft piece.” Ex. 1001, 10:5–9.

Petitioner asserts that Wolf’s first arm 40, which corresponds to the claimed “first shaft piece” as discussed above in the analysis of claim 2, has “an inner bore 46” that terminates within first arm 40 and, thereby, provides a “closed end conduit,” as recited in claim 3. Pet. 35 (citing Ex. 1006, 20–21; Ex. 1003 ¶ 109). Petitioner further asserts that Wolf discloses inner bore

46 has an inner diameter that corresponds to the outer diameter of shaft 28, and “[i]n the assembled state, the outward-protruding end of the shaft [28] is slid into the inner bore 46 and connected to [first arm 40].” *Id.* (quoting Ex. 1006, 21). Thus, according to Petitioner, Wolf discloses the subject matter of claim 3, so that “the combination of Wolf and Terper yields all elements of Claim 3 and is obvious for the same reasons set forth in regard to Claim 1.” *Id.* (citing Ex. 1003 ¶¶ 108–111).

Patent Owner states in its Response that “Dr. Blair’s opinions expressed in regard to the combination of Wolf and Terper related to Claims 1–2 extend to Claim 3.” PO Resp. 31. Patent Owner further argues that *Terper* does not disclose “a first shaft piece that provides a closed end conduit” and “a second shaft piece that provides an elongate body received within said closed end conduit to couple said first shaft piece to said second shaft piece.” *Id.* Thus, Patent Owner concludes that “Claim 3 of the ’809 Patent is not obvious by Wolf in view of Terper as the combination does not disclose all of the material claim limitations of Claim 3.” *Id.* (citing Ex. 2001 ¶¶ 91–93).

As discussed above, Petitioner has shown that Wolf’s first arm 40 corresponds to the claimed “first shaft piece” and Wolf’s shaft or pin 28 corresponds to the claimed “second shaft piece,” as recited in claim 2. *See* § II.D.4 above. We further find, as it pertains to claim 3, that Petitioner has shown that Wolf’s first arm 40 provides a “closed end conduit” formed by inner bore 46 that terminates within first arm 40. Ex. 1006, 21. We further find that Petitioner has shown that Wolf’s shaft 28, which corresponds to the second shaft piece, provides an elongate body received within inner bore 46 (closed end conduit) of first arm 40 (first shaft piece). *Id.* Patent Owner’s

arguments that Terper fails to disclose these features of claim 3 are not persuasive as they fail to address Petitioner's assertion that Wolf discloses this claimed subject matter. Accordingly, we find that Petitioner has established by a preponderance of evidence that claim 3 of the '809 patent would have been obvious in view of the combined teaching of Wolf and Terper.

#### 6. Claim 4

Claim 4 depends from claim 3 and recites "wherein said first shaft piece, said blade element and said ball element pivotally coupled to said blade element comprise a ball link which provides said closed end conduit." Ex. 1001, 10:10–13.

Petitioner asserts that "coupling the spherical bearing of Terper on the end of the first arm of Wolf results in the housing of Terper (with the ball contained therein) extending axially from the first arm of Wolf." Pet. 36. Petitioner asserts that "[s]uch a configuration was known as a rod end, which is also commonly referred to as a 'ball link.'" *Id.* (citing Ex. 1003 ¶ 113). Petitioner further asserts that "the rope of Terper is connected (*i.e.*, linked) to the ball, and thereby forms a type of ball link" and that "the first arm of Wolf provides a closed end conduit." *Id.* Thus, according to Petitioner, "Wolf in view of Terper renders Claim 4 obvious for the same reasons set forth in regard to Claim 1." *Id.* (citing Ex. 1003 ¶¶ 112–114).

Patent Owner states in its Response that "Dr. Blair's opinions expressed in regard to the combination of Wolf and Terper related to Claims 1–3 extend to Claim 4." PO Resp. 31. Patent Owner further argues that neither Wolf nor Terper discloses the subject matter of claim 4, and thus the

combination does not disclose all of the material claim limitations of claim 4. *Id.* at 31–32 (citing Ex. 2001 ¶¶ 94–97).

For the same reasons discussed above in the analysis of claim 1, we find that Petitioner has shown it would have been obvious to a person having ordinary skill in the art to modify Wolf to include Terper’s spherical bearing. Based on the findings above as to Wolf’s first arm and Terper’s spherical bearing, we find that Petitioner has shown that the combination of Wolf’s first arm 40 and Terper’s spherical bearing, including the bearing housing and the ball within, would have resulted in a blade element comprising a ball link which provides a closed end conduit. Ex. 1003 ¶ 113 (explaining how the combination results in a rod end, also referred to as “ball links”).

For the reasons discussed above, we are not persuaded by Dr. Blair’s opinions as to the non-obviousness of claims 1–3 above, and, thus, also not persuaded as to non-obviousness of claim 4. Patent Owner’s and Dr. Blair’s arguments as to each reference individually lacking disclosure of the subject matter of claim 4 are not persuasive because they fail to address the blade element that would result from the combined teachings of Wolf and Terper, and fail to address the background knowledge as to common rod ends possessed by one having ordinary skill in the art.

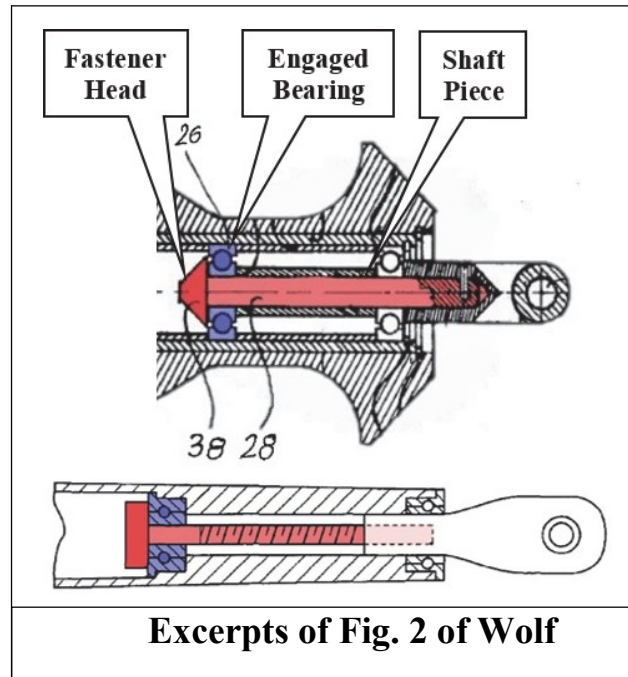
Accordingly, we find that Petitioner has established by a preponderance of evidence that claim 4 of the ’809 patent would have been obvious in view of the combined teaching of Wolf and Terper.

#### 7. Claim 5

Claim 5 depends from claim 4 and recites “wherein said second shaft piece comprises an elongate body having a fastener head which engages an external surface of said at least one bearing element to axially limit travel of

said shaft coaxially rotatably journaled in said at least one bearing element.”  
Ex. 1001, 10:14–18.

Petitioner provides the following annotated illustration of portions of Figure 2 of Wolf and Figure 9 of the '809 patent to show limitations of claim 5:



The illustration above is an annotated illustration of portions of Figure 2 of Wolf and Figure 9 of the '809 patent showing components inside the respective handles. *See* Pet. 37.

Petitioner asserts that Wolf’s pin 28 corresponds to the “second shaft piece” and that pin 28 has an elongate body and widened section 38, which corresponds to the “fastener head.” *Id.* (citing Ex. 1006, 20, Fig. 2; Ex. 1003 ¶ 115). Petitioner further asserts that ““widened section 38’ abuts bearing 26 and ‘serves to secure the shaft inside the handle[,]’ by axially limiting travel of the rotary shaft 28.” *Id.* (quoting Ex. 1006, 20; citing Ex. 1003 ¶ 115). Thus, according to Petitioner, “Wolf in view of Terper renders Claim 5

obvious for the same reasons set forth in regard to Claim 1.” *Id.* (citing Ex. 1003 ¶¶ 115–117).

Patent Owner states in its Response that “Dr. Blair’s opinions expressed in regard to the combination of Wolf and Terper related to Claims 1–4 extend to Claim 5.” PO Resp. 32. Patent Owner further argues that “Wolf does not disclose an elongate body having a fastener head” and that “Wolf discloses that “[t]he inner end of the shaft has a widened section (38), which serves to secure the shaft inside the handle.” *Id.* (citing Ex. 1006, 20). Patent Owner then argues that because neither Wolf nor Terper discloses the subject matter of claim 5, and “Claim 5 of the ’809 Patent is not obvious by Wolf in view of Terper as the combination does not disclose all of the material claim limitations of claim 5.” *Id.* at 32–33 (citing Ex. 2001 ¶¶ 98–102).

We find that Wolf discloses that pin 28 (second shaft piece) comprises an elongate body having a fastener head (38) which engages an external surface of said at least one bearing element to axially limit travel of the shaft coaxially rotatably journaled in said at least one bearing element 24, 26, as recited in claim 5 and as explained by Petitioner. Ex. 1006, 20, Fig. 2; Ex. 1003 ¶¶ 115–117. The claimed “fastener head” encompasses at least the embodiments described in the ’809 patent wherein the fastener (59) is either a separate piece attached to the shaft end (35) or an integrated feature of the shaft. Ex. 1001, 7:22–33.

We are not persuaded by Patent Owner’s argument that, although Wolf discloses that “[t]he inner end of the shaft has a widened section (38), which serves to secure the shaft inside the handle,” Wolf does not disclose “an elongate body having a fastener head.” PO Resp. 32 (citing Ex. 1006,

20); *see also* Ex. 2001 ¶ 100. Rather, we agree with Petitioner, as supported by Mr. Lenz and shown in Figure 2 of Wolf, that “widened section 38” of Wolf “abuts bearing 26 and ‘serves to secure the shaft inside the handle[,]’ by axially limiting travel of the rotary shaft 28.” Pet. 37 (citing Ex. 1006, 20, Figure 2; Ex. 1003 ¶ 115). Accordingly, we find that Petitioner has established by a preponderance of evidence that claim 5 of the ’809 patent would have been obvious in view of the combined teaching of Wolf and Terper.

#### 8. Claim 6

Claim 6 depends from claim 5 and recites “wherein said blade element has a configuration further adapted to axially limit travel of said shaft coaxially rotatably journaled in said at least one bearing element.” Ex. 1001, 10:19–22.

Petitioner asserts that “coupling the spherical bearing of Terper on the end of the first arm of Wolf results in the claimed ‘blade element.’” Pet. 37–38. Petitioner asserts that “Wolf further teaches that ‘[t]he shaft [28] is prevented from being able to slide inward by the first arm 40 of an articulation part[.]’” *Id.* at 38 (quoting Ex. 1006, 20). Thus, Petitioner concludes that the blade element resulting from the combination would likewise being configured to axially limit shaft of Wolf’s shaft 28. *Id.* (citing Ex. 1003 ¶ 121). Petitioner further asserts that “configuring a flat element on the end of a shaft of a jump rope handle to limit axial travel of the shaft was within the general knowledge available to a [person having ordinary skill in the art].” Pet. 38 (citing Ex. 1003 ¶ 120 (citing Exs. 1015, 1017 and Ex. D). Thus, according to Petitioner, “Wolf in view of Terper



renders Claim 6 obvious for the same reasons set forth in regard to Claim 1.” *Id.* (citing Ex. 1003 ¶¶ 118–122).

Patent Owner states in its Response that “Dr. Blair’s opinions expressed in regard to the combination of Wolf and Terper related to Claims 1–5 extend to Claim 6.” PO Resp. 33. Patent Owner further argues that Wolf does not disclose the “blade element” of claim 6 and Terper does not disclose either the “shaft” or the “blade element” of claim 6. *Id.* Patent Owner then argues that “Claim 6 of the ’809 Patent is not obvious by Wolf in view of Terper as the combination does not disclose all of the material claim limitations of claim 6.” *Id.* at 33 (citing Ex. 2001 ¶¶ 103–106).

For the same reasons discussed above in the analysis of claim 1, we find that Petitioner has shown it would have been obvious to a person having ordinary skill in the art to modify Wolf to include Terper’s spherical bearing. Based on the findings above as to Wolf’s first arm and Terper’s spherical bearing, we find that Petitioner has shown that the combination of Wolf’s first arm 40 and Terper’s spherical bearing, including the bearing housing and the ball within, would have resulted in a blade element. Further, Wolf teaches that first arm 40 prevents shaft 28 from being able to slide inward, such that the blade element resulting from the combination would have a configuration further adapted to axially limit travel of the shaft coaxially rotatably journaled in the at least one bearing element, as recited in claim 6 and as explained by Petitioner. Ex. 1006, 20; Ex. 1003 ¶ 120–121 (explaining how the combination would have led one having ordinary skill in the art to the claimed configuration of the blade element).

For the reasons discussed above, we are not persuaded by Dr. Blair’s opinions as to the non-obviousness of claims 1–5 above, and, thus, also not

persuaded as to non-obviousness of claim 6. Patent Owner's and Dr. Blair's arguments as to each reference individually lacking disclosure of the subject matter of claim 6 are not persuasive because they fail to address the blade element that would result from the combined teachings of Wolf and Terper and in view of the background knowledge as to common rod ends possessed by one having ordinary skill in the art. Accordingly, we find that Petitioner has established by a preponderance of evidence that claim 6 of the '809 patent would have been obvious in view of the combined teaching of Wolf and Terper.

#### 9. Claims 7–10

Claim 7 depends from claim 6 and recites “wherein said at least one bearing element comprises a first rotatable element bearing.” Ex. 1001, 10:23–25. Claim 8 depends from claim 7 and further recites “wherein said first rotatable element bearing comprises a first rolling element bearing.” *Id.* at 10:26–28. Claim 9 depends from claim 7 and recites “wherein said at least one bearing element further comprises a second rotatable element bearing.” *Id.* at 10:29–31. Claim 10 depends from claim 9 and further recites “wherein said second rotatable element bearing comprises a second rolling element bearing.” *Id.* at 10:32–34.

Petitioner asserts that Wolf discloses the claimed first and second “rotatable element bearing[s]” which are “rolling element bearing[s].” Pet. 39–41. Specifically, Petitioner asserts that Wolf teaches that “slide bearings, roller bearings, or ball bearings are provided as the bearings (24, 26) . . . .” *Id.* (citing Ex. 1006, 3 (claim 4), Fig. 2). Thus, according to Petitioner, each of claims 7–10 “is rendered obvious in view of Wolf and

Terper for the same reasons set forth in regard to Claim 1.” *Id.* (citing Ex. 1003 ¶¶ 123–134).

Patent Owner states in its Response that “Dr. Blair’s opinions expressed in regard to the combination of Wolf and Terper related to Claims 1–6 extend to Claim[s] 7[–10].” PO Resp. 34–35. Patent Owner further argues that *Terper* does not disclose the “rotatable element bearing[s]” of claims 7 and 9 and the “rolling element bearing[s]” of claims 8 and 10. *Id.* Patent Owner then argues that each of claims 7–10 of the ’809 Patent “is not obvious by Wolf in view of Terper as the combination does not disclose all of the material claim limitations of [each] claim.” *Id.* (citing Ex. 2001 ¶¶ 107–118).

Petitioner has shown that Wolf teaches first and second bearings 24, 26 that rotatably support shaft 28, and that Wolf discloses that bearings 24, 26 can be “roller bearings.” Ex. 1006, 3 (claim 4), Fig. 2. Patent Owner’s arguments as to Terper failing to disclose the claimed bearings are not persuasive, as they do not address the fact that Wolf discloses the claimed bearings. Further, as discussed above, Petitioner has shown that the combination of Wolf and Terper would have rendered obvious the subject matter of claims 1–6 to a person having ordinary skill in the art. Thus, Petitioner’s arguments and Dr. Blair’s opinions as to these claims, from which claims 7–10 depend, are not persuasive of non-obviousness of claims 7–10. Accordingly, we find that Petitioner has established by a preponderance of evidence that claims 7–10 of the ’809 patent would have been obvious in view of the combined teaching of Wolf and Terper.

*E. Petitioner's Additional Challenges*

Petitioner also presents a second asserted ground of unpatentability of claims 1–10 as obvious over Wolf and Bradley. Pet. 41–54. Because the challenge based on Wolf and Terper, discussed above, is dispositive of all the challenged claims, we need not reach Petitioner's other challenge as to these same claims. *See SAS*, 138 S. Ct. at 1359 (holding a petitioner "is entitled to a final written decision addressing all of the claims it has challenged").

III. CONCLUSION<sup>19</sup>

For the reasons discussed above, Petitioner has shown by a preponderance of the evidence that the challenged claims 1–10 of the '809 patent are unpatentable.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that Petitioner has proven by a preponderance of the evidence that claims 1–10 of U.S. Patent No. 7,789,809 are *unpatentable*; and

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<sup>19</sup> 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).

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

In summary:

<b>Claims</b>	<b>35 U.S.C. §</b>	<b>Reference(s)/Basis</b>	<b>Claims Shown Unpatentable</b>	<b>Claims Not shown Unpatentable</b>
1-10	103(a)	Wolf, Terper	1-10	
1-10	103(a)	Wolf, Bradley <sup>20</sup>		
<b>Overall Outcome</b>			<b>1-10</b>	

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<sup>20</sup> As explained above, we do not reach this ground because the challenge based on the first ground is dispositive of all the challenged claims. *See SAS*, 138 S. Ct. at 1359.

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