

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HUNTER'S MANUFACTURING COMPANY, INC.
d/b/a TENPOINT CROSSBOW TECHNOLOGIES,
Petitioner,

v.

RAVIN CROSSBOWS, LLC,
Patent Owner.

Case No. **IPR2023-**

Patent No. 9,354,015

PETITION FOR *INTER PARTES* REVIEW OF
CLAIM 1 OF U.S. PATENT NO. 9,354,015

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TABLE OF CONTENTS

	<u>Page</u>
I. <u>MANDATORY NOTICES</u>	3
A. <u>Real Party-In-Interest</u>	3
B. <u>Related Matters</u>	3
1. <i>Fintiv</i> Overview	4
2. <i>Fintiv</i> Analysis	5
C. <u>Lead and Backup Counsel</u>	8
D. <u>Service Information</u>	8
II. <u>SERVICE</u>	8
III. <u>FEES</u>	9
IV. <u>SUMMARY OF THE ‘015 PATENT</u>	9
A. <u>The Specification</u>	9
B. <u>The Challenged Claim</u>	14
C. <u>The Prosecution History</u>	16
1. December 11, 2015 Office Action	16
2. New Claims 24-43 and the Subsequent Notice of Allowance..	16
V. <u>REQUIREMENTS FOR IPR UNDER 37 C.F.R. § 42.104</u>	17
A. <u>Grounds for Standing</u>	17
B. <u>Introduction to the Challenge and Relief Requested</u>	17

	<u>Page</u>
C. <u>Prior Art Relied Upon</u>	19
1. 35 U.S.C. § 325(d)	21
D. <u>Claim Construction</u>	25
1. “helical power cable take-up journal”	25
2. “mounted to”	26
E. <u>Level of Ordinary Skill in the Art</u>	28
VI. <u>THERE IS A REASONABLE LIKELIHOOD THAT CLAIM</u> <u>1 IS UNPATENTABLE.</u>	28
A. <u>Ground 1: Claim 1 is Anticipated by Stanziale ‘302.</u>	28
B. <u>Ground 2: Claim 1 is Rendered Obvious by Stanziale ‘302.</u>	36
C. <u>Ground 3: Claim 1 is Anticipated by Stanziale ‘062.</u>	37
D. <u>Ground 4: Claim 1 is Rendered Obvious by Stanziale ‘062.</u>	40
E. <u>Ground 5: Claim 1 is Anticipated by Stanziale ‘771.</u>	41
F. <u>Ground 6: Claim 1 is Rendered Obvious by Stanziale ‘771.</u>	44
G. <u>Ground 7: Claim 1 is Obvious over Darlington and Norkus.</u>	45
H. <u>Ground 8: Claim 1 is Obvious over Darlington and Park.</u>	50
I. <u>Ground 9: Claim 1 is Obvious over Kempf ‘871 and Norkus.</u>	52
J. <u>Ground 10: Claim 1 is Obvious over Kempf ‘871 and Park.</u>	55
K. <u>Ground 11: Claim 1 is Obvious over Kempf ‘871 and Stanziale</u> <u>‘302.</u>	56

Page

L.	<u>Ground 12: Claim 1 is Obvious over Islas, Darlington, and Park.</u>	58
VII.	<u>CONCLUSION.....</u>	62

EXHIBITS

Ex. 1001	U.S. Patent No. 9,354,015 (“the ‘015 Patent”)
Ex. 1002	Prosecution History of U.S. Patent 9,354,015
Ex. 1003	LPR 1-15 Joint Claim Construction and Prehearing Statement
Ex. 1004	Defendant’s (Petitioner) LPR 1-14 Proposed Constructions
Ex. 1005	Plaintiff’s (Patent Owner) LPR 1-14 Preliminary Claim Constructions and Extrinsic Evidence
Ex. 1006	U.S. Patent No. 9,494,379
Ex. 1007	U.S. Patent App. Pub. No. 2012/0125302 (“Stanziale ‘302”)
Ex. 1008	U.S. Patent No. 7,708,001 (“Kempf ‘001”)
Ex. 1009	U.S. Patent App. Pub. No. 2012/0312287 (“Park”)
Ex. 1010	U.S. Patent No. 7,578,289 (“Norkus”)
Ex. 1011	WIPO Int’l Pub. No. WO 2011/158062 (“Stanziale ‘062”)
Ex. 1012	WIPO Int’l Pub. No. WO 2011/141771 (“Stanziale ‘771”)
Ex. 1013	U.S. Patent App. Pub. No. 2011/0030666 (“Darlington”)
Ex. 1014	U.S. Patent No. 7,836,871 (“Kempf ‘871”)
Ex. 1015	U.S. Patent App. Pub. No. 2011/0308508 (“Islas”)
Ex. 1016	Declaration of Stephen A. Batzer, Ph.D.
Ex. 1017	United States District Courts - National Judicial Caseload Profile

Ex. 1018	U.S. Patent No. 6,474,324 (“Despart”)
Ex. 1019	U.S. Patent No. 5,024,206 (“Lester”)
Ex. 1020	Curriculum vitae of Stephen A. Batzer, Ph.D., P.E.
Ex. 1021	Defendant’s (Petitioner) Motion to Stay Claim Construction

Hunter's Manufacturing Company, Inc. d/b/a TenPoint Crossbow Technologies ("Petitioner") petitions for *inter partes* review ("IPR") under 35 U.S.C. §§ 311-319 and 37 C.F.R. §§ 42.1 *et seq.* of claim 1 of U.S. Patent No. 9,354,015 ("the '015 Patent"). Review should be instituted because this Petition demonstrates that there is a reasonable likelihood that the challenged claim is unpatentable.

I. MANDATORY NOTICES

Petitioner submits the following mandatory notices pursuant to 37 C.F.R. § 42.8(b).

A. Real Party-In-Interest

The real party in interest is Petitioner Hunter's Manufacturing Company, Inc. d/b/a TenPoint Crossbow Technologies, 1325 Waterloo Road, Mogadore, Ohio 44260. Petitioner is a corporation organized under the laws of the state of Nevada.

B. Related Matters

On December 17, 2021, Patent Owner Ravin Crossbows, LLC filed suit against Petitioner for infringement of the '015 Patent and related U.S. Patent Nos. 9,494,379; 9,878,936; 10,254,073; 10,712,118 and 11,085,728. That suit is captioned *Ravin Crossbows, LLC v. Hunter's Manufacturing Company, Inc. d/b/a TenPoint Crossbow Technologies*, No. 2:21-cv-02213-APG-EJY (D. Nev.).

1. *Fintiv* Overview

Patent Owner may argue that, in light of that parallel suit, the Board should not institute this IPR in light of the *Fintiv* factors. However, those factors do not favor denying institution, as explained below in light of the Director's June 21, 2022 Memorandum regarding the Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation ("Memorandum").¹

The Memorandum (p. 2) summarizes the *Fintiv* factors:

(1) whether the court granted a stay or evidence exists that one may be granted if a proceeding is instituted;

(2) proximity of the court's trial date to the Board's projected statutory deadline for a final written decision;

(3) investment in the parallel proceeding by the court and the parties;

(4) overlap between issues raised in the petition and in the parallel proceeding;

(5) whether the petitioner and the defendant in the parallel proceeding are the same party; and

(6) other circumstances that impact the Board's exercise of discretion, including the merits.

¹ The Memorandum can be found at:

https://www.uspto.gov/sites/default/files/documents/interim_proc_discretionary_denials_aia_parallel_district_court_litigation_memo_20220621_.pdf

2. *Fintiv* Analysis

In this case, as to *Fintiv* factor (1), the Nevada District Court has not granted a stay as of yet, although Petitioner has moved for one (Ex. 1021), so this factor weighs in favor of institution (or, at worst, is neutral).

As to *Fintiv* factor (2), there is no trial date set in the district court case, and any trial would be *after* a decision in this IPR. The Board is to consider when the 12-month statutory deadline for the IPR's final decision falls in relation to the court's trial date. The Board now looks at the "median time-to-trial for civil actions in the district court in which the parallel litigation resides." Memorandum, pp. 3, 8-9. Based on the filing date of this Petition, Patent Owner will have until late March 2023 to respond, and the Board will have until late June 2023 to decide whether to institute, which means its final decision would be due late June 2024. The latest median time-to-trial statistics to trial for the Federal District Court for the District of Nevada is 50.4 months, which would place a trial date in early 2026 – much later than the Board's deadline in this IPR. (Ex. 1018, p. 73.) There is a pending Motion to Transfer the case from Nevada to the Northern District of Ohio; if the case gets transferred to Ohio, the median time-to-trial statistics for N.D. Ohio are 36.2 months (*id.* at p. 42), which would place the trial around December 2024 (even if the count begins from the original filing in Nevada), which is still considerably after the

deadline in this IPR. So this factor also supports not denying institution based upon *Fintiv*.

As to *Fintiv* factor (3), the litigation is in its infancy. The parties are currently in the beginning stages of discovery, and claim construction briefing is completed, but a claim construction hearing has not, and cannot, be scheduled. In fact, no claim construction hearing can be scheduled until the Nevada District Court rules on Petitioner's Motion to Transfer. (See Ex. 1003, p. 3.) Petitioner has not served any discovery. Patent Owner has only submitted one set of document requests and one set of requests for admission, no interrogatories. No depositions have been taken by either party. The Court has not issued any substantive orders related to the '015 Patent. Hence, this third factor also weighs in favor of Petitioner.

As to *Fintiv* factor (4), Patent Owner has asserted infringement of six (6) patents and one hundred three (103) claims under those six patents. While Patent Owner has asserted claim 1 of the '015 Patent as being infringed, the overlap, when considered in light of the claims asserted, is not even 1% of the claims asserted.

Furthermore, the Memorandum confirms (pp. 3, 7) that the Board "will not discretionarily deny institution in view of parallel district court litigation where a petitioner presents a stipulation not to pursue in a parallel proceeding the same grounds or any grounds that could have reasonably been raised before the PTAB." Petitioner hereby stipulates that it will not pursue in the parallel district court

proceeding the same grounds as in this Petition or any grounds that could have reasonably been raised as to claim 1 in this Petition. As such, this fourth factor weighs in favor of Petitioner, and the Board should not discretionarily deny institution of this IPR.

As to *Fintiv* factor (5), the parties are the same in the district court case as in this IPR.

Finally, as to *Fintiv* factor (6), the Memorandum states (p. 5) that the Board “will not deny institution based on *Fintiv* if there is compelling evidence of unpatentability.” A “compelling, meritorious challenge” is one “in which the evidence, if unrebutted at trial, would plainly lead to a conclusion that one or more claims are unpatentable by a preponderance of the evidence.” (*Id.* at p. 4.) This Petition presents a “compelling unpatentability challenge” as set forth *infra*. No prior art was cited by the Examiner or the Patent Owner during prosecution of the ‘015 Patent that disclosed any helical power cable take-up journal, and this Petition presents several such references disclosing this element. The Examiner found all other elements in the prior art. Thus, the multiple independent grounds for invalidity presented herein demonstrate a textbook “compelling unpatentability challenge,” which determination alone shows that the Board should not discretionarily deny institution under *Fintiv*.

As such, the Board should not deny institution solely upon *Fintiv*.

C. Lead and Backup Counsel

Petitioner's counsel are:

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Pursuant to 37 C.F.R. § 42.10(a), a Power of Attorney is submitted with this Petition.

D. Service Information

Please address all correspondence and service to both lead and backup counsel listed above. Service may be made electronically via email to lead and backup counsel at the email addresses provided above, as well as to iplaw@etblaw.com.

II. SERVICE

Petitioner is serving the Petition, Power of Attorney, and supporting evidence on the correspondent attorney of record of Patent Owner as listed on USPTO Patent Center for the '015 Patent. Petitioner is also electronically serving the same on the

attorneys of record in the pending district court case identified above as a courtesy. A certificate of service is attached at the end of this Petition, pursuant to 37 C.F.R. § 42.6(e)(4).

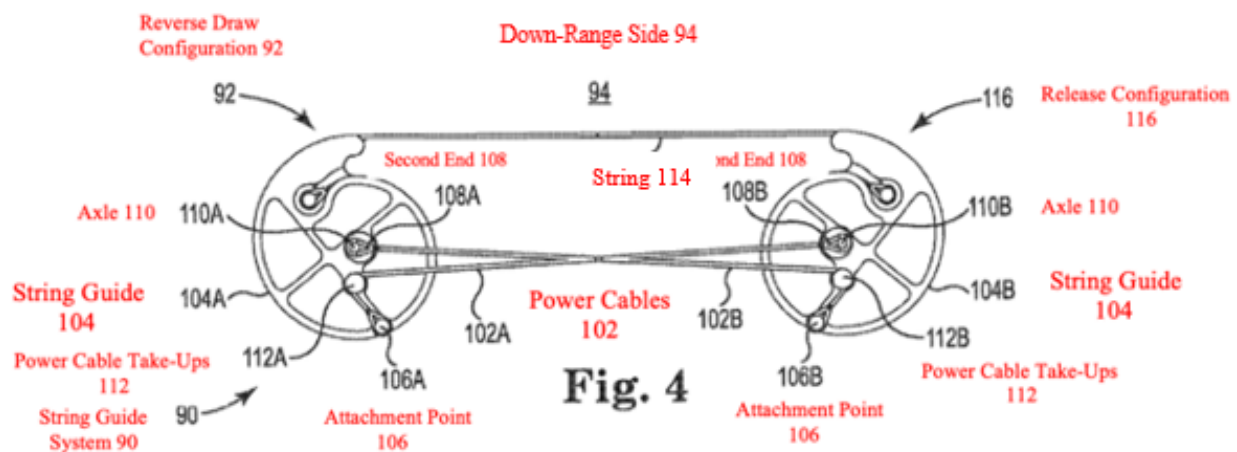
III. FEES

Pursuant to 37 C.F.R. § 42.15(a), Petitioner encloses the associated fee of \$41,500.00 with this Petition (a request fee of \$19,000 and a post-institution fee of \$22,500).

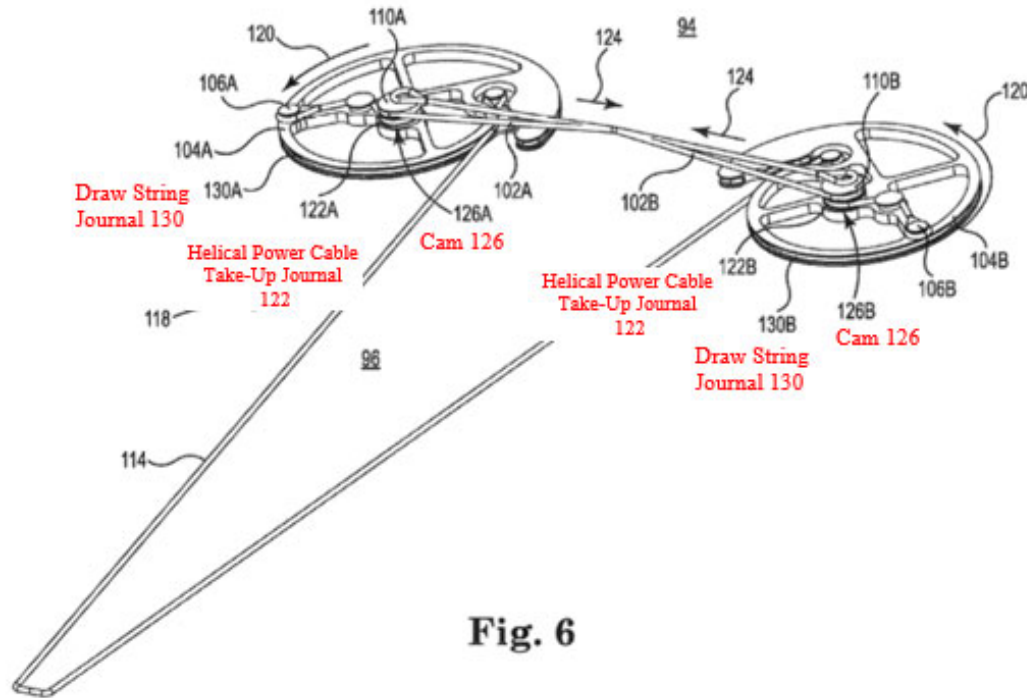
IV. SUMMARY OF THE '015 PATENT

A. The Specification

The '015 Patent is entitled "String Guide System for a Bow." A preferred embodiment of the disclosed string guide system is shown in FIGs. 4 and 6, duplicated below:



The '015 Patent - FIG. 4

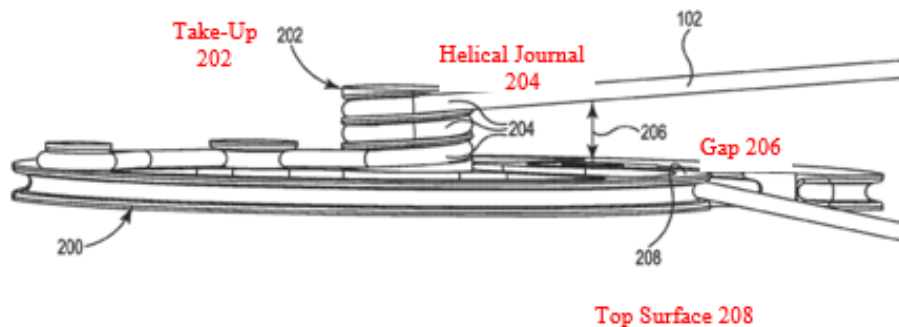


The '015 Patent - FIG. 6

FIG. 4 is a bottom view showing string guide system 90 in a released configuration, and FIG. 6 is a perspective view showing the string guide system in a drawn configuration. (Ex. 1001 3:13-19.) The string guide system includes a pair of rotatable string guides 104A, 104B (“104”), a draw string 114, and a pair of power cables 102A, 102B (“102”). (*Id.* at 3:46-59.) One end of the draw string is attached to string guide 104A and the opposite end is attached to string guide 104B. The draw string is received in draw string journals 130A, 130B formed in the string guides 104. (*Id.* at 3:65-4:5.) Each power cable 102 has one end attached to a string guide 104 at an attachment point 106A, 106B (“106”) and an opposite end attached to an axle 110A, 110B (“110”) on the other string guide 104. (*Id.* at 3:48-53.) Each power

cable 102 is received in a power cable take-up journal 122A, 122B (“122”). (*Id.* at 4:18-28.)

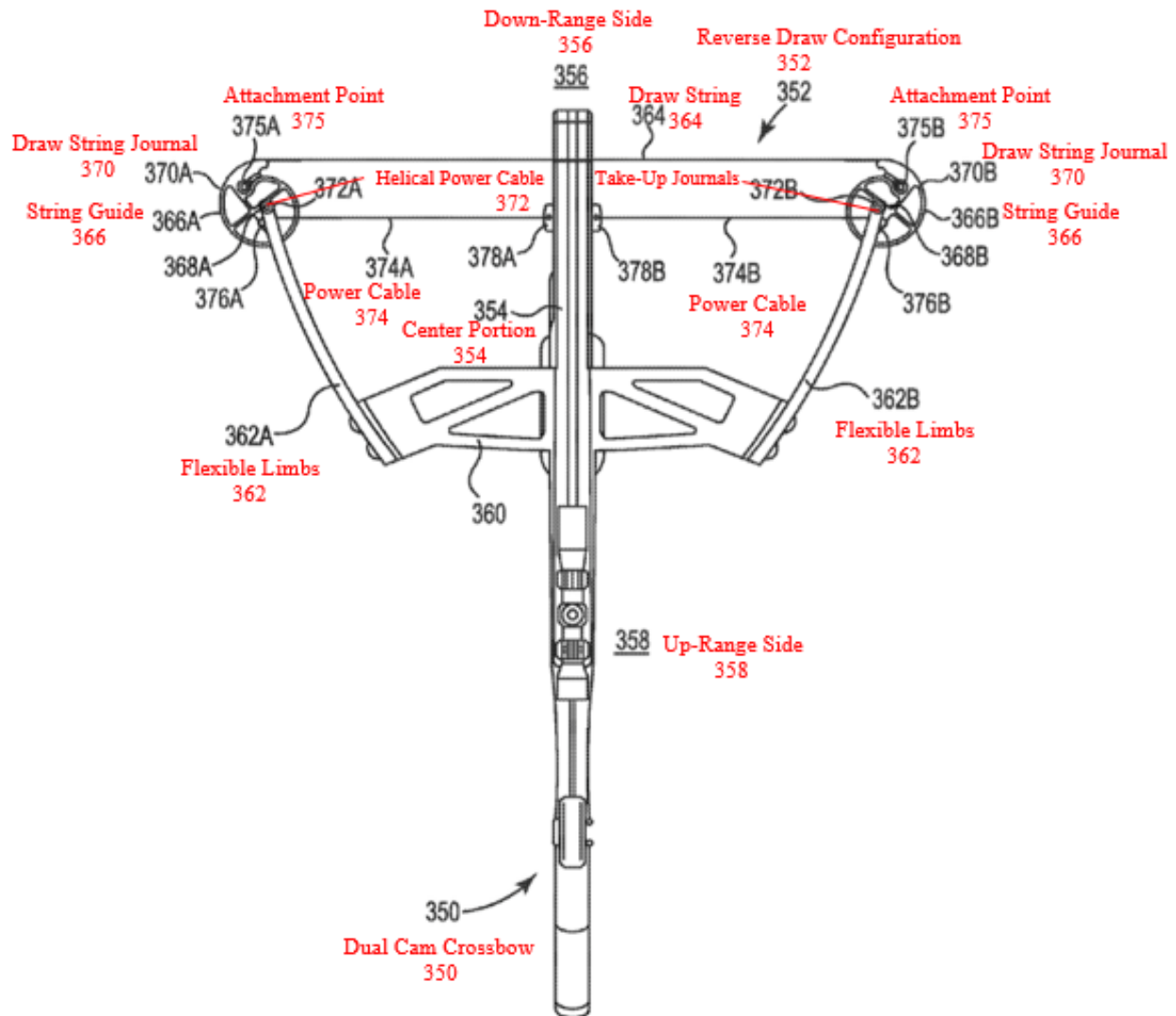
An enlarged side view of a string guide is shown in FIG. 9A, which is duplicated below:



The ‘015 Patent - FIG. 9A

FIG. 9A shows a power cable 102 received in a take-up 202 having a helical journal 204. The helical journal 204 permits the power cable 102 “to wrap around about two full turns or about 720 degrees. The extended power cable take-up 202 increases the gap 206 between the power cables 102 and top surface 208 of the string guide 200 and provides excess capacity to accommodate more than 360 degrees of rotation of the string guides 200.” (*Id.* at 4:62 - 5:3.)

The disclosed string guide system can be used on a crossbow as shown in FIG. 12 duplicated below:



The '015 Patent - FIG. 12

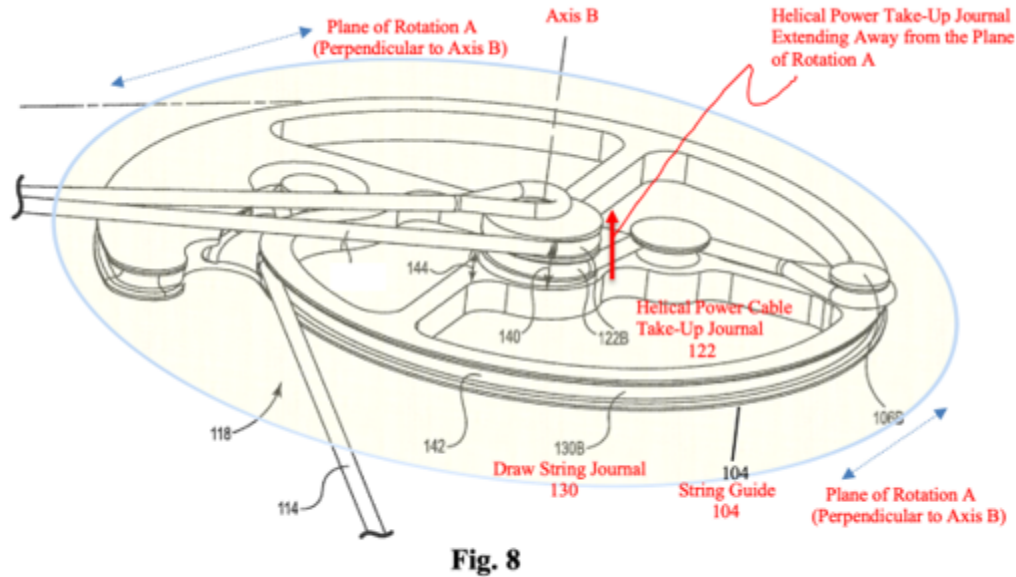
FIG. 12 discloses a dual-cam crossbow 350 with a reverse draw configuration 352. The crossbow 350 includes a center portion 354 with down-range side 356 and up-range side 358. First and second flexible limbs 362A, 362B (“362”) are attached to riser 360 and extend from opposite sides of the center portion 354. Draw string 364 extends between first- and second-string guides 366A, 366B (“366”). The string

guides 366 are substantially the same as the string guides shown in FIG. 4. (*Id.* at 6:24-33.)

The string guides 366 are mounted to the bow limbs 362 and are rotatable around first and second axes 368A, 368B (“368”), respectively. The string guides 366 include first and second draw string journals 370A, 370B (“370”) and first and second power cable take-up journals 372A, 372B (“372”), both of which are oriented generally perpendicular to the axes 368, respectively. The draw string 364 is received in the draw string journals 370 and is secured to the string guides 316 at first and second attachment points 375A, 375B (“375”). Power cables 374A, 374B (“374”) are attached to the string guides 316 at attachment points 376A, 376B (“376”). (*Id.* at 6:34-47, FIG. 4.)

In the illustrated embodiment, each power cable 374 wraps onto a power cable take-up journal 372 and translates along the power cable take-up journal 372 away from the draw string journals 370 as the bow 350 is drawn from the released configuration to the drawn configuration. (*Id.* at 6:52-56.)

An enlarged side view of a string guide is shown in FIG. 8 duplicated below:



The '015 Patent - FIG. 8

FIG. 8 discloses a string guide 104 having a draw string journal 130 with a plane of rotation A perpendicular to the axis B, and a helical power cable take-up journal 122 extending in a direction perpendicular to the plane of rotation A of the draw string journal. FIG. 8 also shows the power cable displaced along the axes away from the planes of rotation on the helical power cable take-up journal 122. (*Id.* at 4:43-53.)

B. The Challenged Claim

Only claim 1 is challenged in this Petition. It reads as follows:

Element A: A crossbow, comprising:

Element B: a central portion comprising a down-range side and an up-range side;

Element C: first and second flexible limbs attached to the central portion;

Element D: a first string guide mounted to the first bow limb and rotatable around a first axis, the first string guide comprising a first draw string journal having a first plane of rotation perpendicular to the first axis, and

Element E: a first helical power cable take-up journal extending in a direction perpendicular to the first plane of rotation of the first draw string journal;

Element F: a second string guide mounted to the second bow limb and rotatable around a second axis, the second string guide comprising a second draw string journal having a second plane of rotation perpendicular to the second axis, and

Element G: a second helical power cable take-up journal extending in a direction perpendicular to the second plane of rotation of the second draw string journal;

Element H: a draw string received in the first and second draw string journals and secured to the crossbow in a reverse draw configuration with the draw string adjacent the down-range side of the string guides in a released configuration, wherein the draw string translates from the down-range side toward the up-range side and unwinds between the first and second string, [sic] guides to a drawn configuration;

Element I: a first power cable received in the first helical power cable take-up journal; and a second power cable received in the second helical power cable take-up journal,

Element J: wherein as the bow is drawn from the released configuration to the drawn configuration the first and second power cables wrap onto the first and second helical, [sic] power cable take-up journals and are displaced along the first and second axes away from the first and second planes of rotation of the first and second draw string journals, respectively.

C. The Prosecution History

The ‘015 Patent claims issued from Application No. 14/107,058 (“the ‘058 Application”), which was filed on December 16, 2013, and did not claim the benefit or priority of any application. The relevant claim prosecution centered around the prior art of U.S. Patent No. 7,708,001 (“Kempf ‘001”). (Ex. 1002, pp. 102-113.)

1. December 11, 2015 Office Action

In the December 11, 2015 Office Action, the Examiner rejected original claims 1-6, 9, 11-13, 17-19, 22 under 35 U.S.C. § 102 as being unpatentable over Kempf ‘001. (*Id.* at pp. 105-109.) In doing so, the Examiner stated that all claim elements were found in Kempf ‘001. (*Id.* at pp. 109-113.)

The Examiner rejected original claims 7-8, 14-16, 20-21 under 35 U.S.C. § 103 as being unpatentable over Kempf ‘001 and did not include any secondary references, only relying upon information known to a person of ordinary skill in the art (“POSA”). (*Id.* at pp. 109-112.)

The Examiner rejected claims 10 and 23 under § 103 as being unpatentable over Kempf ‘001 and Applicant Admitted Prior Art. (*Id.* at pp. 112-113.)

2. New Claims 24-43 and the Subsequent Notice of Allowance

After an interview where no claims were allowed, Applicant canceled all claims and replaced them with new claims 24-43 in a January 4, 2016 response to

the December 11, 2015 Office Action. (*Id.* at pp. 68-74.) In the response, the Applicant focused its arguments on helical cable journals. (*Id.*)

The Examiner allowed the new claims for the following reasons:

The examiner agrees that such structure of the crossbow, further including first and second helical power cable take-up journals, extending in a direction perpendicular to a rotation of the first and second draw string guides, benefits the pulley mechanism in the manner of displacing the power cables (in relation to the string/main guide), as well as increasing the power of the drawn power cables (which inherently increases/adds more “draw strength/energy/power” to the bow).

(*Id.* at p. 35.)

The remaining prosecution history, at least as far as prior art rejections of claim 1, is unremarkable.

V. REQUIREMENTS FOR IPR UNDER 37 C.F.R. § 42.104

A. Grounds for Standing

Petitioner certifies that the ‘015 Patent is available for *inter partes* review and that Petitioner is not barred or estopped from requesting an *inter partes* review challenging claim 1 of the ‘015 Patent on the grounds set forth below.

B. Introduction to the Challenge and Relief Requested

Petitioner requests *inter partes* review of claim 1 of the ‘015 Patent and that claim 1 be found invalid on the following bases:

<u>GROUND</u>	<u>BASIS FOR INVALIDATION</u>
1	Anticipation under § 102 based on Stanziale ‘302
2	Obviousness under § 103 based on Stanziale ‘302
3	Anticipation under § 102 based on Stanziale ‘062
4	Obviousness under § 103 based on Stanziale ‘062
5	Anticipation under § 102 based on Stanziale ‘771
6	Obviousness under § 103 based on Stanziale ‘771
7	Obviousness under § 103 based on Darlington in view of Norkus
8	Obviousness under § 103 based on Darlington in view of Park
9	Obviousness under § 103 based on Kempf ‘871 in view of Norkus
10	Obviousness under § 103 based on Kempf ‘871 in view of Park
11	Obviousness under § 103 based on Kempf ‘871 in view of Stanziale ‘302
12	Obviousness under § 103 based on Islas in view of Darlington and Park

A detailed explanation of why claim 1 is invalid begins in Section VI, especially in light of the supporting evidentiary declaration of Stephen A. Batzer, Ph.D., P.E. (Ex. 1016).

C. Prior Art Relied Upon

Petitioner relies upon the following references, all of which are prior art to the ‘015 Patent for the reasons set forth.

- i. U.S. Patent Application Publication No. 2012/0125302 (“Stanziale ‘302,” Ex. 1007), entitled “Device For Firing A Projectile Or Another Object To Be Fired,” was published on May 24, 2012, listing Pasquale Stanziale as the inventor, making it prior art under 35 U.S.C. 102(a)(1) and (2).
- ii. WIPO International Publication No. WO 2011/158062 (“Stanziale ‘062,” Ex. 1011), entitled “Device For Launching A Projectile Or A Launch Object In General,” was published on December 22, 2011, listing Pasquale Stanziale as the inventor, making it prior art under 35 U.S.C. 102(a)(1) and (2).
- iii. WIPO International Publication No. WO 2011/141771 (“Stanziale ‘771, Ex. 1012”), entitled “Device For Launching A Projectile Or A Launch Object In General,” was published on

November 17, 2011, listing Pasquale Stanziale as the inventor, making it prior art under 35 U.S.C. 102(a)(1) and (2).

- iv. U.S. Patent Application Publication No. 2011/0030666 (“Darlington, Ex. 1013”), entitled “Compound Archery Crossbow,” was published on February 10, 2011, listing Rex Franklin Darlington as the inventor, making it prior art under 35 U.S.C. 102(a)(1) and (2).
- v. U.S. Patent No. 7,578,289 (“Norkus, Ex. 1010”), entitled “Compound Archery Bow With Extended Inverted Stroke,” was issued on August 25, 2009, listing Gregory Norkus as the inventor, making it prior art under 35 U.S.C. § 102(a)(1) and (2).
- vi. U.S. Patent Application Publication No. 2012/0312287 (“Park, Ex. 1009”), entitled “Small-Scale Crossbow,” was published on December 13, 2012, listing Kyung Sin Park as the inventor, making it prior art under 35 U.S.C. 102(a)(1) and (2).
- vii. U.S. Patent No. 7,836,871 (“Kempf ‘871,” Ex. 1014), entitled “Powerstroke Crossbow,” was issued on November 23, 2010, listing James J. Kempf as the inventor, making it prior art under 35 U.S.C. § 102(a)(1) and (2).

- viii. U.S. Patent Application Publication No. 2011/0308508 (“Islas,” Ex. 1015), entitled “Bow String Cam Arrangement For Compound Crossbow,” was published on December 22, 2011, listing John J. Islas as the inventor, making it prior art under 35 U.S.C. § 102(a)(1) and (2).

The Petition also refers to the following prior art references:

- ix. U.S. Patent No. 6,474,324 (“Despart,” Ex. 1018), entitled “Archery Bows, Archery Bow Cam Assemblies, and Archery Bow Anchors,” was issued on November 5, 2002, listing James Robert Despart and Terry G. Martin as the inventors, making it prior art under 35 U.S.C. § 102(a)(1) and (2).
- x. U.S. Patent No. 5,024,206 (“Lester,” Ex. 1019), entitled “Compound Archery Bow,” was issued on June 18, 1991, listing Wayne L. Lester as the inventor, making it prior art under 35 U.S.C. § 102(a)(1) and (2).

1. 35 U.S.C. § 325(d)

35 U.S.C. § 325(d) states that, in determining whether to institute an IPR, “the Director may take into account whether, and reject the [IPR] petition or request because, the same or substantially the same prior art or arguments previously were presented to the Office.” In *Advanced Bionics, LLC v. MED-EL*

Elektromedizinische Geräte GmbH, IPR2019-01469, Paper 6 (Feb. 13, 2020) (precedential), the Board established a two-part framework for determining whether to deny institution under § 325(d): “(1) whether the same or substantially the same art previously was presented to the Office or whether the same or substantially the same arguments previously were presented to the Office; and (2) if either condition of [the] first part of the framework is satisfied, whether the [IPR] petitioner has demonstrated that the Office erred in a manner material to the patentability of challenged claims.” *Advanced Bionics*, p. 8.

Whether previously presented art or argument is “the same or substantially the same” as that asserted in the IPR petition can be evaluated using “factors (a), (b), and (d)” from the Board’s prior precedential decision in *Becton, Dickinson & Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8 (Dec. 15, 2017), i.e., (a) the similarities and material differences between the asserted art and the prior art involved during examination; (b) the cumulative nature of the asserted art and the prior art evaluated during examination; and (d) the extent of the overlap between the arguments made during examination and the manner in which petitioner relies on the prior art. *Advanced Bionics*, p. 10.

Whether the Office materially erred can be evaluated using *Becton, Dickinson* “factors (c), (e), and (f),” i.e., (c) the extent to which the asserted art was evaluated during examination, including whether the prior art was the basis for rejection; (e)

whether petitioner has pointed out sufficiently how the examiner erred in its evaluation of the asserted prior art; and (f) the extent to which additional evidence and facts presented in the petition warrant reconsideration of the prior art or arguments. “For example, if the record of the Office's previous consideration of the art is not well developed or silent, then a petitioner may show the Office erred by overlooking something persuasive under factors (e) and (f).” *Advanced Bionics*, p. 10.

In this case, § 325(d) is potentially implicated as to the prior art of Darlington (Ex. 1013), Kempf ‘871 (Ex. 1014), and Islas (Ex. 1015), because they were cited during the prosecution of the ‘015 Patent. (*See* Ex. 1002, pp. 115, 168.) None of the other asserted references were previously presented to the Office during the ‘015 Patent’s prosecution, nor are they substantially similar to other presented references with respect to the material aspects of helical power cable journals, which was the limitation on which Patent Owner focused its arguments to overcome the prior art rejections. (*See id.* at pp. 35, 64, 73-74.)

With respect to Darlington, Kempf ‘871, and Islas, the first was merely cited by the Examiner along with a handful of other references, with no discussion or written evaluation. (*See* Ex. 1002, p. 115.) Thus, it is not clear why the Examiner cited Darlington. As for the latter two references, they were simply listed in an IDS among 78 other references. (*Id.* at p. 168.) Patent Owner did not discuss them in

any submission. Frankly, Patent Owner did not even single them out of the scores of other references that it bulk-submitted in the IDS. The Examiner did not discuss them either or apply them in any rejection. Thus, “the record of the Office’s previous consideration of [these references] is not well developed or silent.” *Advanced Bionics*, p. 10; *see also Amgen Inc. v. Alexion Pharms., Inc.*, IPR2019-00739, Paper 15 at pp. 62-63 (Aug. 30, 2019) (“The Board has consistently declined exercising its discretion under Section 325(d) when the only fact a Patent Owner can point to is that a reference was disclosed to the Examiner during the prosecution.” (citing cases)).

Furthermore, this petition does not rely on either of these three references to meet the helical power cable journals claim limitation, which was the sole limitation on which Patent Owner argued against the prior-art-based rejections. (*See* Ex. 1002, at pp. 64, 73-74.) This was also the sole limitation that the Examiner noted in his statement of reasons for allowance. (*Id.* at p. 35.) Put succinctly, the question of whether it would have been obvious to modify a primary reference (such as any of these three) to include the helical power cable take-up journals that are disclosed in other references has never been presented to and considered by the examiner because no cited prior art contained any helical power cable take up journal. This petition cures this deficiency by citing different references (not these three) for this limitation, none of which were before the Examiner. And the power cable journals

in the additional references are materially different from those in these three references, as explained in the grounds below. Had the Examiner had these additional references, he assuredly would not have allowed claim 1 but instead would have rejected it on the grounds presented herein. Thus, it is clear that the Office overlooked this additional prior art and materially erred in allowing claim 1 during prosecution, which supports not denying based on § 325(d) but rather instituting to correct this mistake.

D. Claim Construction

Petitioner submits that, for purposes of this IPR, only certain claim terms require construction based upon the parties' exchanged claim construction in the district court case and since the only claim at issue in this IPR is claim 1. (*See* Exs. 1003-1005.) The following claim terms should be given the following claim constructions.

1. “helical power cable take-up journal”

Claim 1 of the '015 Patent states that the first and second string guides have first and second helical power cable take-up journals that extend in a direction perpendicular to a plane of rotation of their respective draw string journals.

Both Patent Owner and Petitioner agree that the meaning of “power cable take-up journal means “a structure that accepts at least one power cable.” (Ex. 1003, p. 2; Ex. 1016 ¶103.) The addition of the word helical means this claim term is

construed as “a helical structure that accepts at least one power cable,” as helical should be given its plain and ordinary meaning. (Ex. 1016 ¶131.) This is fully consistent with the specification. (*Id.*)

2. “mounted to”

The phrase “mounted to” is recited within claim 1, where the first and second string guides are “mounted to” their respective first and second bow limbs. Petitioner asserts that the term “mounted to” should be given its plain and ordinary meaning, which, consistent with the specification, means “connected to, either directly or indirectly.” (Ex. 1004, p. 50; Ex. 1001 2:2-9, 5:64-65, 6:5-6, 34-36, 8:1-14, 9:6-25, 10:18-20, Figs. 4-8, 11; Ex. 1002, p. 106; Ex. 1016 ¶133.) FIG. 10 shows the string guides 158A, 158B connected to the limbs 154A, 154B through the axles 160A, 160B. (Ex. 1016 ¶134.) As such, the “first and second string guides are connected, either directly or indirectly, to their respective first and second string guides.”

Meanwhile, Patent Owner asserts that “mounted to” should be given its plain and ordinary meaning, which is “mounted to allow only rotation about a fixed axis.” (Ex. 1005, p. 5.) Patent Owner’s proposal includes a requirement (that the mounted component must allow rotation) and a prohibition (that any movement other than rotation about a fixed axis is not permitted). But the claim term “mounted to” says *nothing* about rotation at all, much less rotation about only one fixed axis. (Ex. 1016

¶137.) If “mounted to” itself included a rotation aspect, then the subsequent “rotatable around a first axis” claim term would be superfluous. (*Id.*) See *VirnetX Inc. v. Apple Inc.*, 792 F. App’x 796, 811 (Fed. Cir. 2019); *Becton, Dickinson & Co. v. Tyco Healthcare Grp., LP*, 616 F.3d 1249, 1257 (Fed. Cir. 2010).

Furthermore, the claims (through additional terms, rather than “mounted to”) simply require the string guide to be “rotatable around a first axis,” not that the only permitted motion be rotation, and only around a first axis. In other words, so long as the string guide is connected to the limb and can be rotated around a first axis, this claim portion is met, regardless of what additional movement is allowed. (Ex. 1016 ¶139.) See *Regeneron Pharms. v. Merus N.V.*, 864 F.3d 1343, 1352 (Fed. Cir. 2017) (claims with “comprising” transitional language are open-ended, i.e., the recited claim elements are essential, but other unrecited elements may be added and still be within the scope of the claim). Otherwise, implying such a limitation where none exists in the plain language of the claim itself would be improperly importing limitations from the specification into the claims – a cardinal sin in patent law. See *Skedco, Inc. v. Strategic Operations, Inc.*, 685 F. App’x 956, 960 (Fed. Cir. 2017) (it is the claims, not the written description, that define the patent scope, so a claim is not limited to inventions looking like those in the drawings); *Cont’l Circuits LLC v. Intel Corp.*, 915 F.3d 788, 796 (Fed. Cir. 2019) (because none of the claims actually recite an alleged limitation, then at least based on the plain language, the

claims are not limited by that alleged limitation). Because Patent Owner's proposed negative limitation (excluding all movement other than rotation about a fixed axis) finds no support either in the words of the claims or through an express disclaimer or lexicography, its proposed construction should be rejected. *See Ethicon LLC v. Intuitive Surgical, Inc.*, 847 F. App'x 901, 907-08 (Fed. Cir. 2021).

Thus, Petitioner's construction of "mounted to" is used within this Petition.

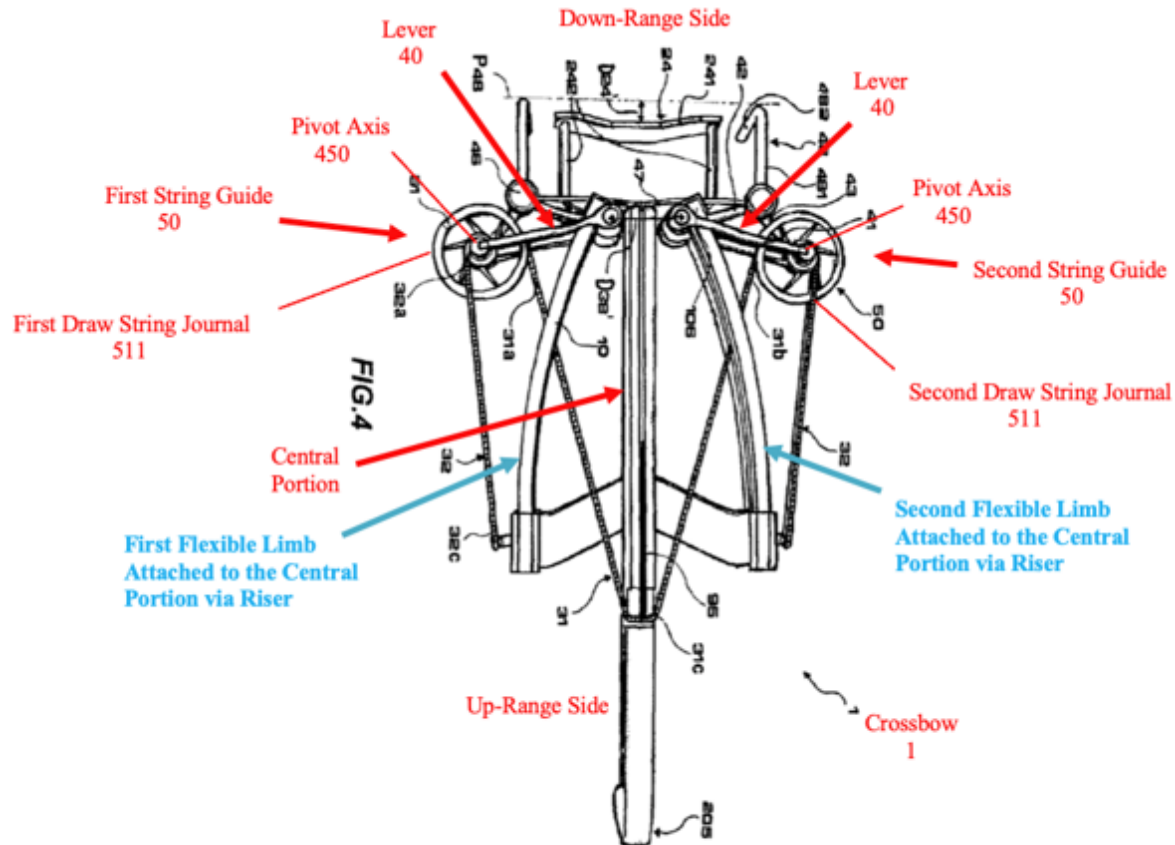
E. Level of Ordinary Skill in the Art

A hypothetical POSA to which the '015 Patent pertains would be a technical person who has at least some experience working in the field of archery, reviewing crossbows or engineering related to bows and/or crossbows, and is generally familiar with prior art crossbows. (Ex. 1016 ¶17.) Such a person would likely have at least a bachelor's degree in mechanical engineering or, alternatively, would have several years of experience in the field of archery or engineering related to bows and/or crossbows. (*Id.*)

VI. THERE IS A REASONABLE LIKELIHOOD THAT CLAIM 1 IS UNPATENTABLE.

A. Ground 1: Claim 1 is Anticipated by Stanziale '302.

Stanziale '302 renders claim 1 anticipated because it discloses all elements of claim 1 as set forth below. (Ex. 1016 ¶141.) Stanziale '302 FIG. 4 is duplicated below with descriptions added.



Stanziale '302 - FIG. 4

ELEMENTS OF CLAIM 1:

Element A: “A crossbow, comprising:”

Stanziale ‘302 discloses a crossbow. (Ex. 1016 ¶142.) “In particular, the present disclosure relates to an archery crossbow” (Ex. 1007 [0002].) Stanziale ‘302 FIG. 4, above, shows a crossbow with reference 1. (*See also id.* at [0049], [0052], FIGs. 1-3, 5-8, 12.)

Element B: “a central portion comprising a down-range side and an up-range side”

Consistent with the meaning of these terms disclosed in the ‘015 Patent as discussed above (*see* § IV.A), Stanziale ‘302 discloses a central portion comprising a down-range side and an up-range side as labeled in red above in Stanziale ‘302 - FIG. 4. (*See also* Ex. 1007 [0052]-[0055]; Ex. 1016 ¶143.)

Element C: “first and second flexible limbs attached to the central portion”

Stanziale ‘302 discloses first and second flexible limbs 10 attached to the central portion via riser 25 as labeled in blue above in Stanziale ‘302 - FIG. 4. (Ex. 1016 ¶144.) “In the embodiment shown, each pair of elastic members [limbs] 10a, 10b at a same side of the stock [central portion] 2 is associated with the stock [central portion] 2 through a respective wing [riser] 25 projecting from the lateral side 223, 224 of the stock [central portion] 2. A first end 25a of each wing [riser] 25 is fastened to the stock [central portion] 2... .” (Ex. 1007 [0065], [0066].)

Element D: “a first string guide mounted to the first bow limb and rotatable around a first axis, the first string guide comprising a first draw string journal having a first plane of rotation perpendicular to the first axis”

Element F: “a second string guide mounted to the second bow limb and rotatable around a second axis, the second string guide comprising a second draw string journal having a second plane of rotation perpendicular to the second axis”

With reference now to Stanziale ‘302 - FIG. 4 above and Stanziale ‘302 - FIG. 9 below, which is an exploded view of one side of the crossbow, Stanziale ‘302 discloses first and second pulley assemblies 50 [string guides] each attached to a lever 40, which is mounted to² a limb 10 on each side of the crossbow. (Ex. 1016 ¶145.) Each string guide 50 is rotatable about a pivot 45 having a pivot axis 450 [first and second axes, respectively]. (Ex. 1007 [0099]; Ex. 1016 ¶145.) Each string guide 50 has a pulley 51 with a perimetral track or groove 511 [first and second draw string journals, respectively] and each draw string journal 511 has a plane of rotation perpendicular to the corresponding first and second axes 450. (Ex. 1016 ¶146.) “Each pulley 51 ... has a respective perimetral track or groove 511 ... configured to wind a flexible element.” (Ex. 1007 [0105].)

² Per the claim construction discussed above, “mounted to” means connected to, directly or indirectly.

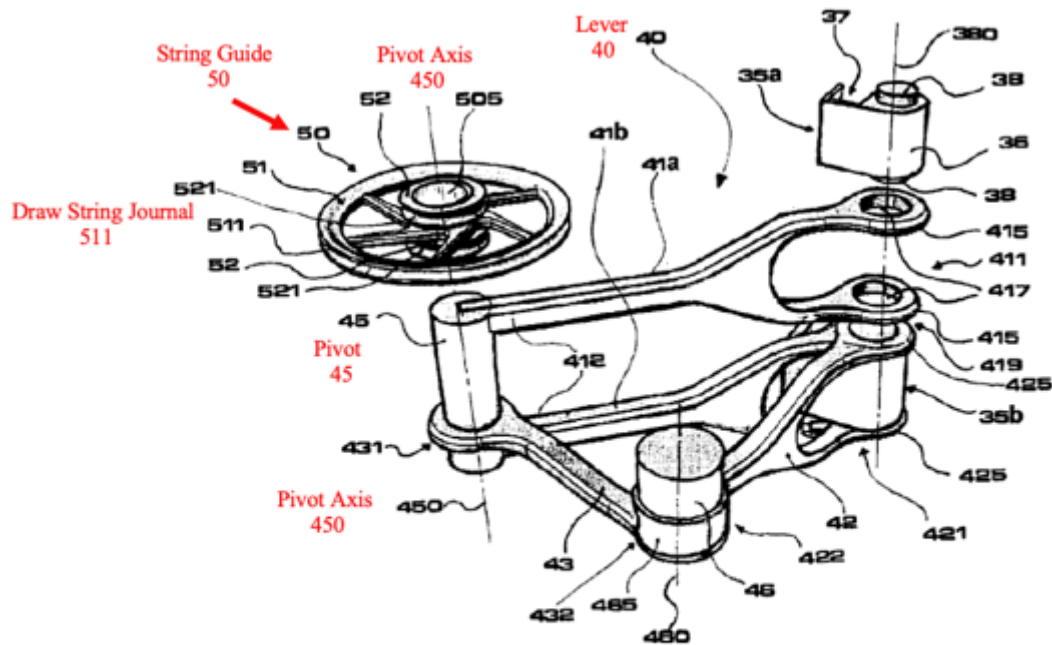


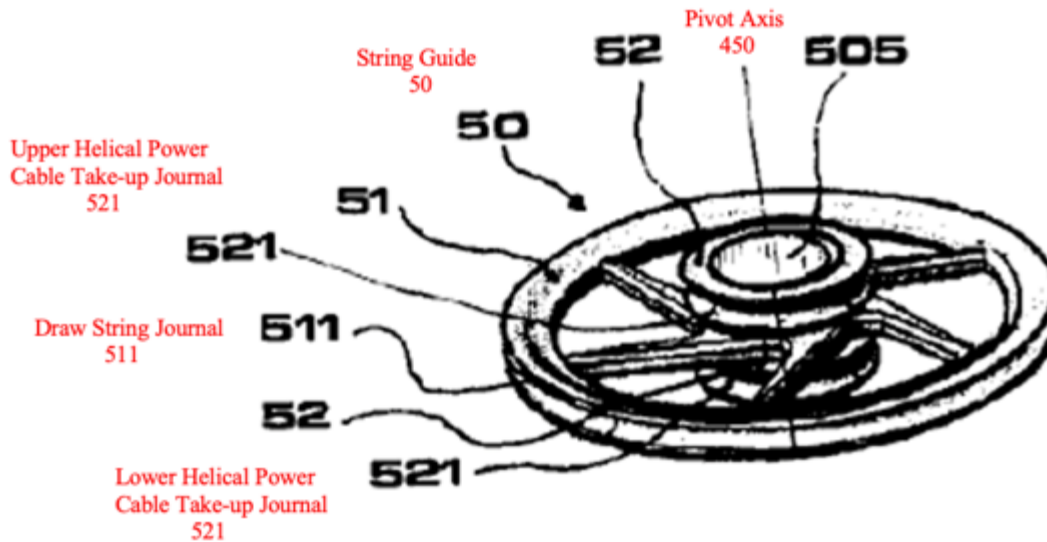
FIG.9

Stanziale '302 - FIG. 9

Element E: “a first helical power cable take-up journal extending in a direction perpendicular to the first plane of rotation of the first draw string journal”

Element G: “a second helical power cable take-up journal extending in a direction perpendicular to the second plane of rotation of the second draw string journal”

As a reminder, the Examiner allowed the '015 Patent because he could not locate any prior art that disclosed a helical power cable take-up journal. Reference is now made to Stanziale '302 - FIG. 9 above and Stanziale '302 - FIG. 9 string guide only shown below:

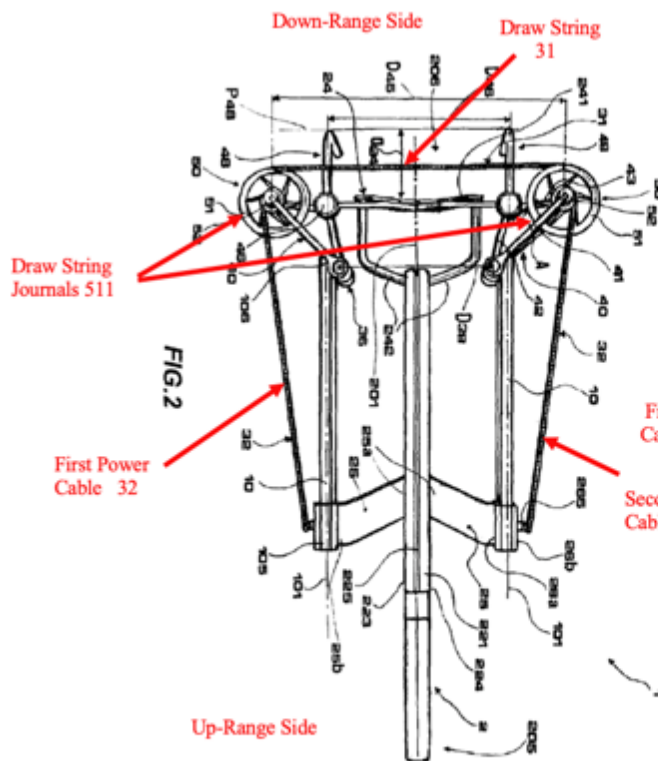


Stanziale '302 - FIG. 9
(String Guide Only)

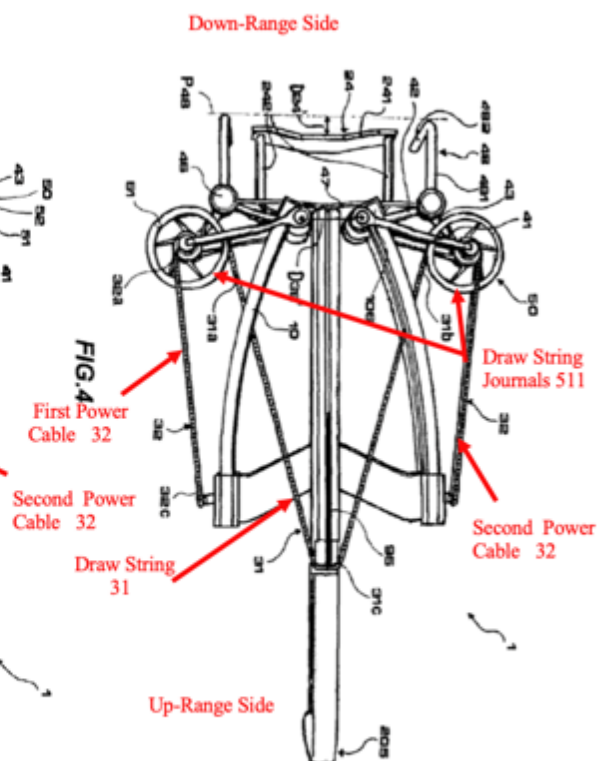
Stanziale '302 discloses that each string guide 50, one on each side of the crossbow, has upper and lower pulleys 50 having helical power cable take-up journals 521 extending perpendicular to the plane of rotation of the draw string journal 511. (Ex. 1016 ¶ 147.) “[T]he perimetral track ... 521 may ... have a spiral or helical shape so as to wind a plurality of turns of a flexible element.” (*Id.* at [0106].) The '015 Patent discloses that the helical power cable take-up journals allow the string guide to rotate more than 360 degrees. (Ex. 1001 4:63-5:3.) As just noted, Stanziale '302 discloses the same result. Because the power cable take-up journals 521 of Stanziale '302 are helical in nature, are positioned above and below the draw string journals 511, and have a common rotation axis 450, they extend perpendicular to the plane of rotation of the draw string journal 511. (Ex. 1016 ¶147.)

Element H: “a draw string received in the first and second draw string journals and secured to the crossbow in a reverse draw configuration with the draw string adjacent the down-range side of the string guides in a released configuration, wherein the draw string translates from the down-range side toward the up-range side and unwinds between the first and second string guides to a drawn configuration”

Reference is now made to Stanziale ‘302 - FIG. 9, String Guide Only above and FIG. 2 (left side) and FIG. 4 (right side) duplicated below.



Stanziale ‘302 - FIG. 2



Stanziale ‘302 - FIG. 4

Stanziale ‘302 discloses that draw string 401 is received in the first and second draw string journals 511 and is secured to the crossbow in a reverse draw

configuration with draw string 401 adjacent the down-range side in a released configuration (Ex. 1007 FIG. 2; Ex. 1016 ¶149.) Stanziale '302 also discloses that draw string 31 translates from the down-range side (FIG. 2) toward the up-range side and unwinds between the first and second string, guides to a drawn configuration (FIG. 4.) (Ex. 1007 [01021]; Ex. 1016 ¶149.)

Element I: “a first power cable received in the first helical power cable take-up journal; and a second power cable received in the second helical power cable take-up journal”

With reference again to Stanziale '302 - FIG. 9, String Guide Only and FIG. 2 (left side) and FIG. 4 (right side) duplicated above, first and second flexible force elements 32 are received respectively in the first and second helical power cable take-up journals 521. (Ex. 1007 [0126]-[0129]; Ex. 1016 ¶150.)

Element J: “wherein as the bow is drawn from the released configuration to the drawn configuration the first and second power cables wrap onto the first and second helical, power cable take-up journals and are displaced along the first and second axes away from the first and second planes of rotation of the first and second draw string journals, respectively.”

Stanziale '302 discloses that when the crossbow is drawn from the released configuration (FIGs. 1-2, 7) to the drawn configuration (Figs. 3-4, 8), the first and second power cables 32 wrap onto the first and second helical power cable take-up journals 521 and are displaced along the first and second axes away from the first

and second planes of rotation of the first and second draw string journals. (Ex. 1007 [0127]-[0129]; Ex. 1016 ¶151.) Because the helical power cable journals 521 are on opposite sides of the draw string journal 511, a POSA would immediately envisage that the helical configuration of the power cable journals 521 would need to be such that the power cables 32 extend away from (rather than towards) the draw string journal 511 to avoid interference with the draw string 31. (Ex. 1016 ¶151.)

Thus, Stanziale ‘302 anticipates claim 1. (Ex. 1016 ¶152.)

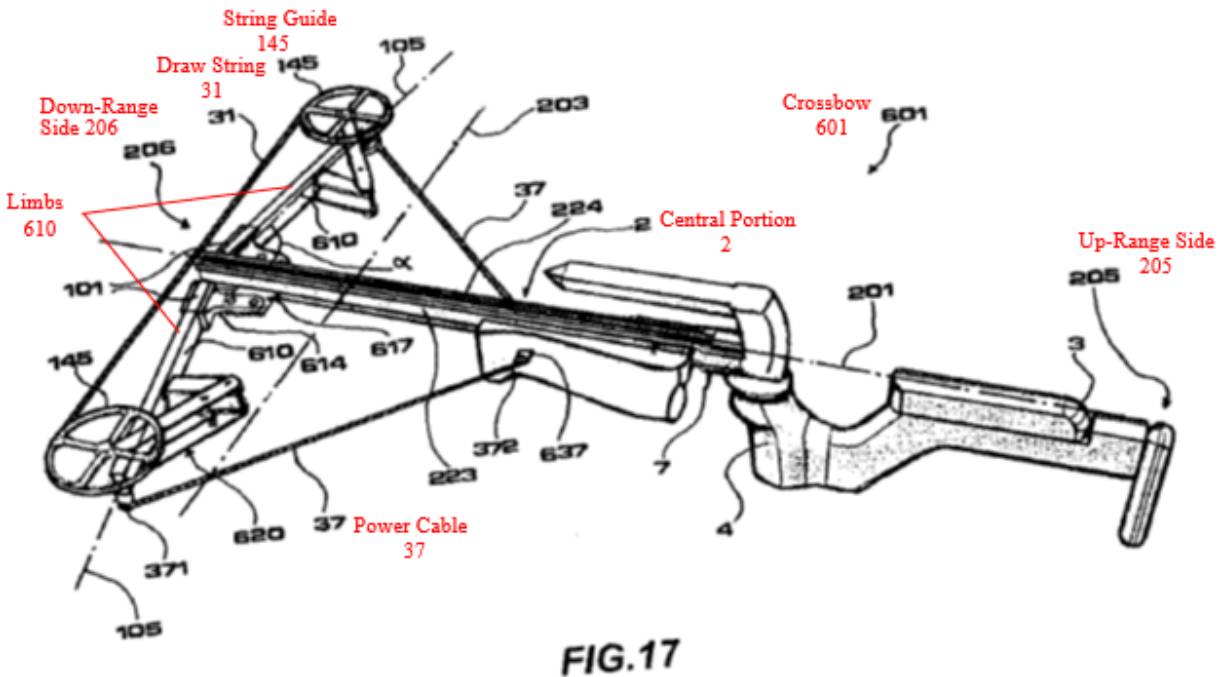
B. Ground 2: Claim 1 is Rendered Obvious by Stanziale ‘302.

The preceding section explained how Stanziale ‘302 anticipates each limitation of claim 1 (and is not repeated to avoid redundancy). If Patent Owner disputes that Stanziale ‘302 discloses that the power cables are displaced away from the draw string planes of rotation, the helical nature of the power cable take-up journals means that the cables 32 wrap onto those journals in one of two directions: toward the draw string planes of rotation or away. With only two options, it would be obvious to try each. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007). (Ex. 1016 ¶155.)

All of the other claim limitations are met as discussed in the preceding section. Thus, claim 1 is rendered obvious (if not anticipated) by Stanziale ‘302. (Ex. 1016 ¶156.)

C. Ground 3: Claim 1 is Anticipated by Stanziale '062.

Stanziale '062 anticipates claim 1 as follows. Stanziale '062 discloses a crossbow 601. (Ex. 1011 2:4-5, 27:18-21, Fig. 17; Ex. 1016 ¶158.)



Stanziale '062 - FIG. 17

This crossbow comprises a central portion (called a stock) 2 that has a down-range side (called a front end) 206 and an up-range side (called a rear end) 205. (Ex. 1011 7:33-8:6, 27:24-26, 35:2-5, Fig. 17; Ex. 1016 ¶159.) First and second flexible limbs (called elastic or bending members) 610 are attached to the central portion. (Ex. 1011 27:24-28:3, Figs. 17-18; Ex. 1016 ¶160.) Pulleys 145 are mounted to the first and second limbs, respectively, through brackets or arms 620 and are rotatable around respective axes 150. (Ex. 1011 28:27-29:7, Figs. 17-20; Ex. 1016 ¶161.)

Stanziale '062 discloses that a pivot 147 of the first pulley 145 is fastened to the second pulley 146 (16:25-29, 17:2-5, Fig. 22), thus rendering the combination 145, 146, 147 as the claimed string guide. (Ex. 1016 ¶161.)

Each string guide has a draw string journal (called track or groove) 1451 having a plane of rotation (e.g., formed by the wound string 31) perpendicular to the respective axis of rotation 150. (Ex. 1011 17:20-25, 29:8-9, Figs. 17, 22; Ex. 1016 ¶162.)

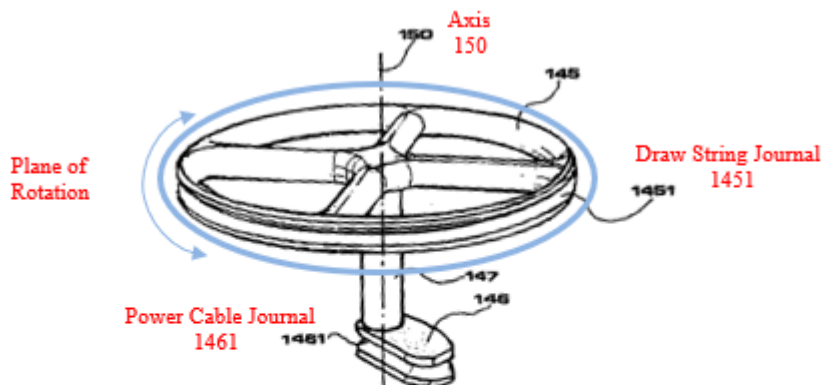


FIG. 22

Stanziale '062 - FIG. 22
(String Guide Only)

Each string guide also has a helical power cable take-up journal (called track or groove) 1461 that, due to its helical nature, wraps in a direction perpendicular to the draw string journal's plane of rotation. (Ex. 1011 18:4-9, 29:10-13, Figs. 17, 22; Ex. 1016 ¶163.) Stanziale '062 discloses several configurations of pulley grooves (annular, helical or spiral). (Ex. 1011 17:24-25, 18:8-9; Ex. 1016 ¶164.) Thus,

Stanziale '062 discloses having annular grooves 1451 for the string 31 and helical grooves 1461 for the cable 37. (Ex. 1016 ¶164.)

Stanziale '062 discloses a draw string (called flexible pushing member) 31 received in the draw string journals 1451. (Ex. 1011 10:32, 17:20-25, 28-32, 29:8-9, 31:4-6, Figs. 17-19; Ex. 1016 ¶165.) The string 31 is secured to the crossbow in a reverse draw configuration, because the string is adjacent the down-range or front side 206 of the string guides 145 when in a released configuration (*see* Figs. 17, 19). (Ex. 1011 31:3-6; Ex. 1016 ¶165.) The string 31 translates from the down-range side 206 toward the up-range or rear side 205 to a drawn configuration (*see* Fig. 18) while unwinding off the string guides 145. (Ex. 1011 31:10-16, 31:34-32:6; Ex. 1016 ¶165.)

Each of the helical journals 1461 also receives a cable (called flexible force element) 37. (Ex. 1011 17:33-17:9, 29:10-16, Figs. 17-20, 22; Ex. 1016 ¶166.) As the bow is drawn from the released configuration (*see* Figs. 17, 19) to the drawn configuration (*see* Fig. 18), the cables 37 wrap onto the helical journals 1461. (Ex. 1011 29:17-21, 31:10-16, 32:1-6; Ex. 1016 ¶167.) The helical nature of journals 1461 means that a POSA would at once envisage that the cable 37 wraps on those journals in one of two directions along the axis 150: toward the string planes of rotation or away. (Ex. 1016 ¶167.) *See Blue Calypso, LLC v. Groupon, Inc.*, 815 F.3d 1331, 1343-44 (Fed. Cir. 2016) (even if a reference does not expressly spell out

all the limitations, it can anticipate if a POSA reading it would at once envisage the claimed arrangement).

D. Ground 4: Claim 1 is Rendered Obvious by Stanziale ‘062.

The preceding section explained how Stanziale ‘062 anticipates each limitation of claim 1. If Patent Owner disagrees that the combination of pulleys 145, 146 and pivot 147 constitute the claimed string guide, it would be obvious to simply make these components integral as one piece (which would be the claimed string guide), as it has long been known to make separate components integral to, *e.g.*, reduce assembly complexity, cost, and potential points of failure. (Ex. 1016 ¶171.)

The preceding section also explained how Stanziale ‘062 discloses having annular draw string journals 1451 and helical power cable journals 1461. But if Patent Owner disagrees regarding such disclosure, that journal configuration would be obvious to try from the very small number of disclosed options (since Stanziale ‘062 discloses annular, helical or spiral pulley grooves, 17:24-25, 18:8-9). (Ex. 1016 ¶172.) *See KSR*, 550 U.S. at 421. Similarly, the preceding section explained how Stanziale ‘062 discloses the power cables 37 wrapping on the journals 1461 away from the string planes of rotation. But if Patent Owner disagrees, such wrapping direction would nevertheless be obvious to try, since there can only be two options (toward the string planes of rotation or away). (Ex. 1016 ¶173.) *See KSR*, 550 U.S. at 421.

All of the other claim limitations are met as discussed in the preceding section (which discussion is not repeated to avoid redundancy). Thus, claim 1 is rendered obvious (if not anticipated) by Stanziale '062. (Ex. 1016 ¶174.)

E. Ground 5: Claim 1 is Anticipated by Stanziale '771.

Stanziale '771 anticipates claim 1 as follows. Stanziale '771 discloses a crossbow 1. (Ex. 1012 2:4-5, 8:6-11, Fig. 1; Ex. 1016 ¶176.)

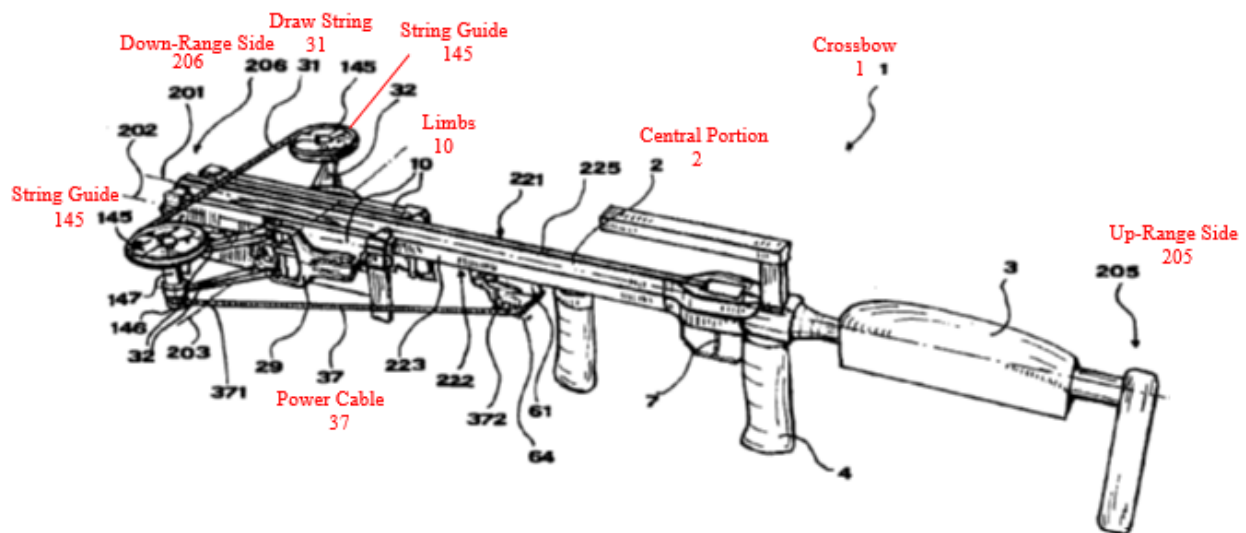


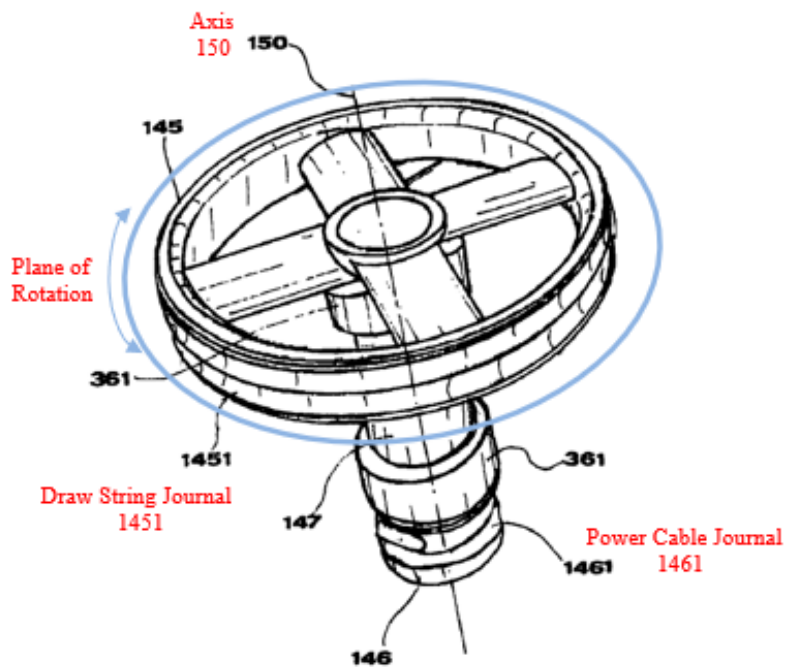
FIG. 1

Stanziale '771 - FIG. 1

This crossbow comprises a central portion (called a stock) 2 that has a down-range side (called a front end) 206 and an up-range side (called a rear end) 205. (Ex. 1012 7:9-17, Fig. 1; Ex. 1016 ¶177.) First and second flexible limbs (called elastic or bending members) 10 are attached to the central portion. (Ex. 1012 8:26-8:13, Figs. 1-2; *see also id.* at 2:6-12; Ex. 1016 ¶178.) Pulleys 145 are mounted to the first and

second limbs, respectively, through brackets or arms 32 and rotatable around respective axes 150. (Ex. 1012 11:8-9, 17:2, 15-17, 24-27, Figs. 1-7; *see also id.* at 14:18-15:22, 19:12-30, 20:32-21:16; Ex. 1016 ¶179.) Stanziale '771 discloses that a pivot 147 of the first pulley 145 is fastened to the second pulley 146, 16:24-25, 29, thus rendering the combination 145, 146, 147 as the claimed string guide. (Ex. 1016 ¶179.)

Each string guide has a draw string journal (called groove) 1451 having a plane of rotation (e.g., formed by the wound string 31) perpendicular to the respective axis of rotation 150. (Ex. 1012 26:11-23, Figs. 1-2, 18-19; Ex. 1016 ¶180.)



Stanziale '771 - FIG. 9
(String Guide Only)

Each string guide also has a helical power cable take-up journal (called track or groove) 1461 that, due to its helical nature, wraps in a direction perpendicular to the draw string journal's plane of rotation. (Ex. 1012 17:34-17:5, Figs. 1, 5, 8-10A; *see also id.* at Fig. 12; Ex. 1016 ¶181.)

Stanziale '771 discloses several configurations of pulley grooves (annular, helical or spiral; with or without cable-enclosing radial extensions 1455, 1465). Ex. 1012 17:22-23, 18:4-5, 26:11-21; Ex. 1016 ¶182.) And Stanziale '771 also discloses that the disclosed pulleys are interchangeable among the various disclosed embodiments. (Ex. 1012 26:22-23; Ex. 1016 ¶182.) Thus, Stanziale '771 discloses having annular grooves 1451 for the string 31 and helical grooves 1461 for the cable 37. (Ex. 1016 ¶182.)

Stanziale '771 discloses a draw string (called flexible pushing member) 31 received in the draw string journals 1451. (Ex. 1012 11:6-7, Figs. 1-8; Ex. 1016 ¶183.) The string 31 is secured to the crossbow in a reverse draw configuration, because the string is adjacent the down-range or front side 206 of the string guides 145 when in a released configuration (*see* Figs. 1, 4, 7-8). (Ex. 1012 18:30-34; Ex. 1016 ¶183.) The string 31 translates from the down-range side 206 toward the up-range or rear side 205 to a drawn configuration (*see* Figs. 2, 5) while unwinding off the string guides 145. (Ex. 1012 17:18-23, 30-31, 18:22-26, 18:34-19:6, 20:3-6; Ex. 1016 ¶183.)

Each of the helical journals 1461 also receives a cable (called flexible force member) 37. (Ex. 1012 17:32-18:5, Figs. 1-7; Ex. 1016 ¶184.) Stanziale ‘771 discloses that either the same cable 37 can be received in both string guide (*i.e.*, one end in each groove), or two cables may be used, *id.* at 18:13-16, thus disclosing these limitations. (Ex. 1016 ¶184.) As the bow is drawn from the released configuration (*see* Figs. 1, 4, 7-8) to the drawn configuration (*see* Figs. 2, 5), the cables 37 wrap onto the helical journals 1461. (Ex. 1012 17:34-18:5, 18:22-26, 18:34-19:6, 20:3-6; Ex. 1016 ¶185.) The cables 37 are displaced along the axes 150 away from the draw string planes of rotation as the bow is drawn. (*Compare* Ex. 1012 Figs. 4 and 5 (showing cable 37 wrap around journal 1461 and away from string 31 as the bow is drawn); *also compare* Ex. 1012 Figs. 11 and 12 (same), 23:30-24:1; *see also id.* at 19:2-6; Ex. 1016 ¶185.)

F. Ground 6: Claim 1 is Rendered Obvious by Stanziale ‘771.

The preceding section explained how Stanziale ‘771 anticipates each limitation of claim 1. If Patent Owner disagrees that the combination of pulleys 145, 146 and pivot 147 constitute the claimed string guide, it would be obvious to simply make these components integral as one piece (which would be the claimed string guide), as it has long been known to make separate components integral to, *e.g.*, reduce assembly complexity, cost, and potential points of failure. (Ex. 1016 ¶189.)

The preceding section also explained how Stanziale ‘771 discloses having annular draw string journals 1451 and helical power cable journals 1461. But if Patent Owner disagrees regarding such disclosure, that journal configuration would be obvious to try from the very small number of disclosed options (since Stanziale ‘771 discloses annular, helical or spiral grooves, with or without cable-enclosing radial extensions, 17:22-23, 18:4-5, 26:11-21). (Ex. 1016 ¶190.) *See KSR*, 550 U.S. at 421. Similarly, the preceding section explained how Stanziale ‘771 discloses the power cables 37 wrapping on the journals 1461 away from the string planes of rotation. If there were any doubt regarding the direction of displacement, the helical nature of the journals 1461 means that the cable 37 wraps on those journals in one of two directions: toward the string planes of rotation or away. (Ex. 1016 ¶191.) With only two options, it would be obvious to try each. (*Id.*) *See KSR*, 550 U.S. at 421.

All of the other claim limitations are met as discussed in the preceding section. Thus, claim 1 is rendered obvious (if not anticipated) by Stanziale ‘771. (Ex. 1016 ¶192.)

G. Ground 7: Claim 1 is Obvious over Darlington and Norkus.

In light of Patent Owner’s argument in the related district court case that the string guides allow only rotation about a fixed axis (through the construction of “mounted to”), Petitioner presents several additional grounds with base references

that meet such argument. Darlington renders claim 1 obvious in light of Norkus as follows. Darlington discloses various crossbow configurations, the features of which can be modified and combined. (Ex. 1013 [0061], Figs. 1-18; Ex. 1016 ¶195.) For simplicity, crossbow 140' shown in Figure 18 will form the basis here.

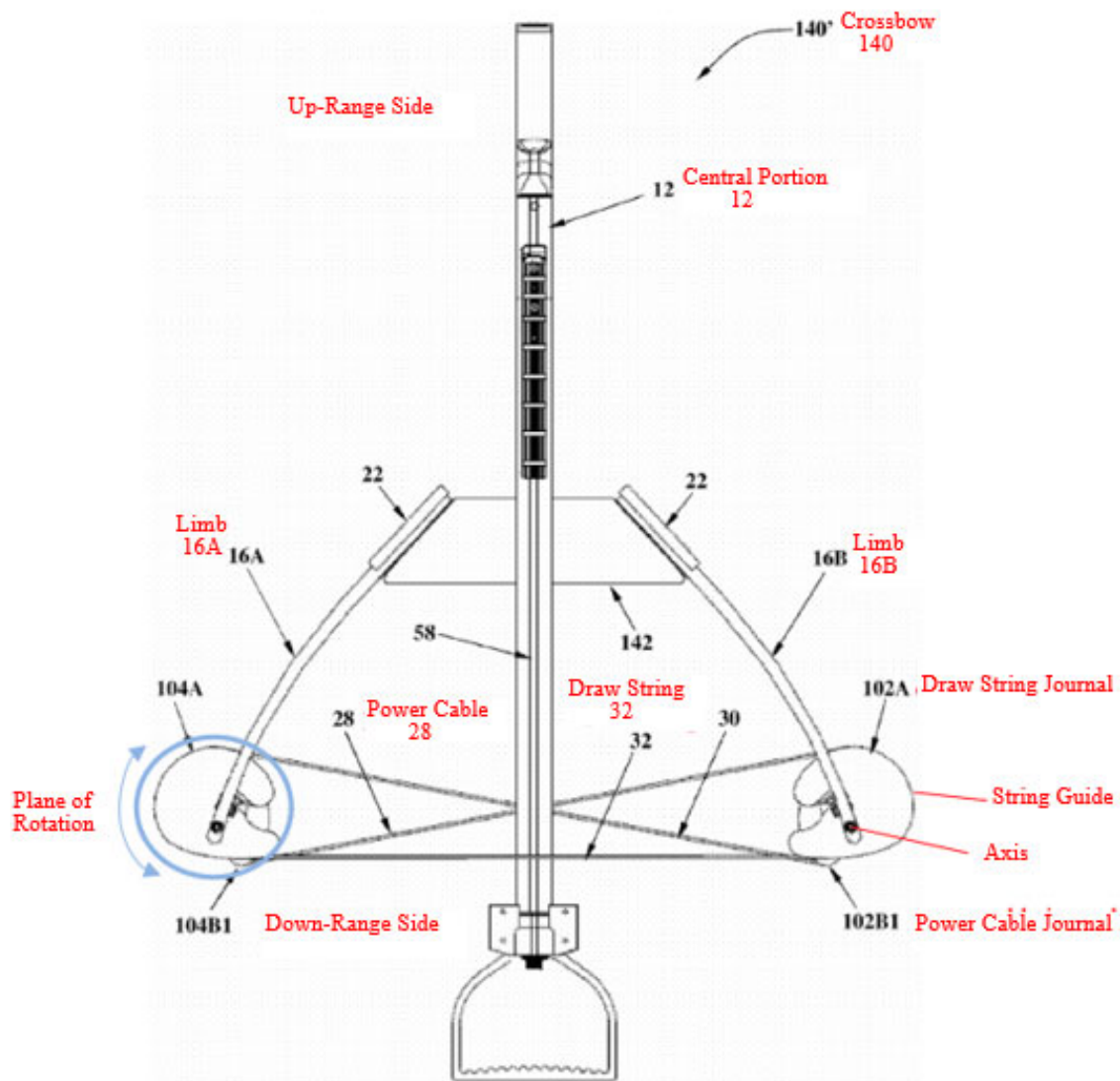


FIG. 18

Darlington - FIG. 18

This crossbow comprises a central portion (called a barrel) 12 with a down-range side (closer to the foot stirrup) and an up-range side (closer to the stock). (Ex. 1013 [0038], Fig. 18; Ex. 1016 ¶196.) First and second flexible limbs 16A&B, 18A&B are attached to the central portion. (Ex. 1013 [0002], [0038], Fig. 18; Ex. 1016 ¶197.) First and second string guides (called cams) 102, 104 are mounted to the first and second limbs, respectively, and are rotatable around respective axes going through axles 34A and 34B. (Ex. 1013 [0045], [0056], [0060], Figs. 16, 18; Ex. 1016 ¶198.)

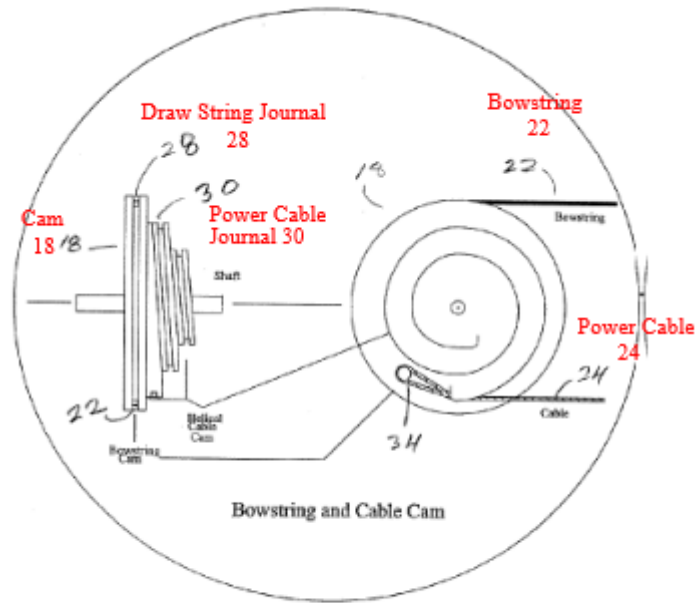
Each string guide has a draw string journal (called groove) 102A, 104A having a plane of rotation (*e.g.*, formed by the wound string 32) perpendicular to the respective axis of rotation 34A, 34B. (Ex. 1013 [0057], Figs. 14-15, 18; Ex. 1016 ¶199.) Each string guide also has a power cable take-up journal (called groove) 102B, 104B, though perhaps not helical. (Ex. 1013 [0056]-[0057], Figs. 14, 18; Ex. 1016 ¶200.)

Darlington discloses a draw string (called bowstring) 32 received in the draw string journals 102A, 104A. (Ex. 1013 [0003], [0010], [0056], Figs. 14, 18; Ex. 1016 ¶201.) The string 32 is secured to the crossbow in a reverse draw configuration, because the string is adjacent the down-range side of the string guides 102, 104 when in a released configuration. (Ex. 1013 [0021] [0029], [0033], [0035], [0042], [0054], [0059], [0061], Figs. 4, 12, 16, 18; Ex. 1016 ¶201.) The string 32 translates from

the down-range side toward the up-range side to a drawn configuration while unwinding off the string guides 102, 104. (Ex. 1013 [0010], [0042], claim 1; Ex. 1016 ¶201.)

Each of the power cable journals 102B, 104B also receives a power cable 28, 30. (Ex. 1013 [0003]-[0004], [0010], [0056]-[0057], Figs. 14, 18; Ex. 1016 ¶202.) As the bow is drawn from the released configuration to the drawn configuration, the cables 28, 30 wrap onto the power cable journals 102B, 104B. (Ex. 1013 [0057], claim 1; Ex. 1016 ¶203.)

Thus, Darlington discloses each limitation of claim 1 except that the power cable journals are helical (extending in a direction perpendicular to the draw string planes of rotation), and thus that the power cables are displaced along the respective axes away from the planes of rotation as the cables wrap onto the helical journals. (Ex. 1016 ¶204.) However, Norkus discloses these related limitations. Norkus discloses a bow cam 18 that includes a planar journal 28 for the bowstring 22 and a helical journal 30 for the power cable 24. (Ex. 1010 2:60-3:7, 3:42-48, Fig. 7; Ex. 1016 ¶205.)



A Portion of Norkus - FIG. 7

Darlington teaches the desirability of “a higher level of stored energy” and increased power stroke (*i.e.*, the distance of travel of the bowstring between the drawn and released configurations), which “results in better performance.” (Ex. 1013 [0003], [0015], [0042]; Ex. 1016 ¶206.) Norkus likewise teaches the desirability of more energy storage, which is directly impacted by increased power stroke. (Ex. 1010 1:24-49, 55-62; Ex. 1016 ¶206.) Norkus discloses that the longer power stroke is accomplished by allowing the cams (which receive the bowstring) to rotate more than once (*e.g.*, approximately 720 degrees), which is accomplished by using helical cable journals. (Ex. 1010 3:2-7; Ex. 1016 ¶206.) Thus a POSA would be motivated to further increase Darlington’s power stroke (and energy storage) and would utilize the design of Norkus’s helical cable journals to facilitate

the increased power stroke, which result would be reasonably expected from this combination. (Ex. 1016 ¶206.) Thus, claim 1 is rendered obvious by Darlington and Norkus. (Ex. 1016 ¶207.)

H. Ground 8: Claim 1 is Obvious over Darlington and Park.

The preceding section explained how Darlington discloses each limitation of claim 1 (for conciseness, that discussion is not duplicated here), except that the power cable journals are helical (extending in a direction perpendicular to the draw string planes of rotation), and thus that the power cables are displaced along the respective axes away from the planes of rotation as the cables wrap onto the helical journals. However, Park discloses these related limitations. And unlike Norkus, which shows the details of such journals in one figure, Park's figures disclose multiple embodiments of such journals.

Park discloses multiple archery string guides (cams or pulleys) having helical power cable take-up journals extending perpendicular to axes Ax. (Ex. 1009 Figs. 4B, 7-9B, 14, 15, 17A-23C; Ex. 1016 ¶211.) Park explains that a bow's draw length (also known as power stroke) is affected by the distance between the cam axles as well as the length of the string wound on such cams. (Ex. 1009 [0009], [0018]; Ex. 1016 ¶212.) So if a bow has a reduced axle-to-axle distance (which is desired to make the bow easier to shoot when around obstacles), then the amount of string wound on the cams should increase to maintain the same draw length. (Ex. 1009

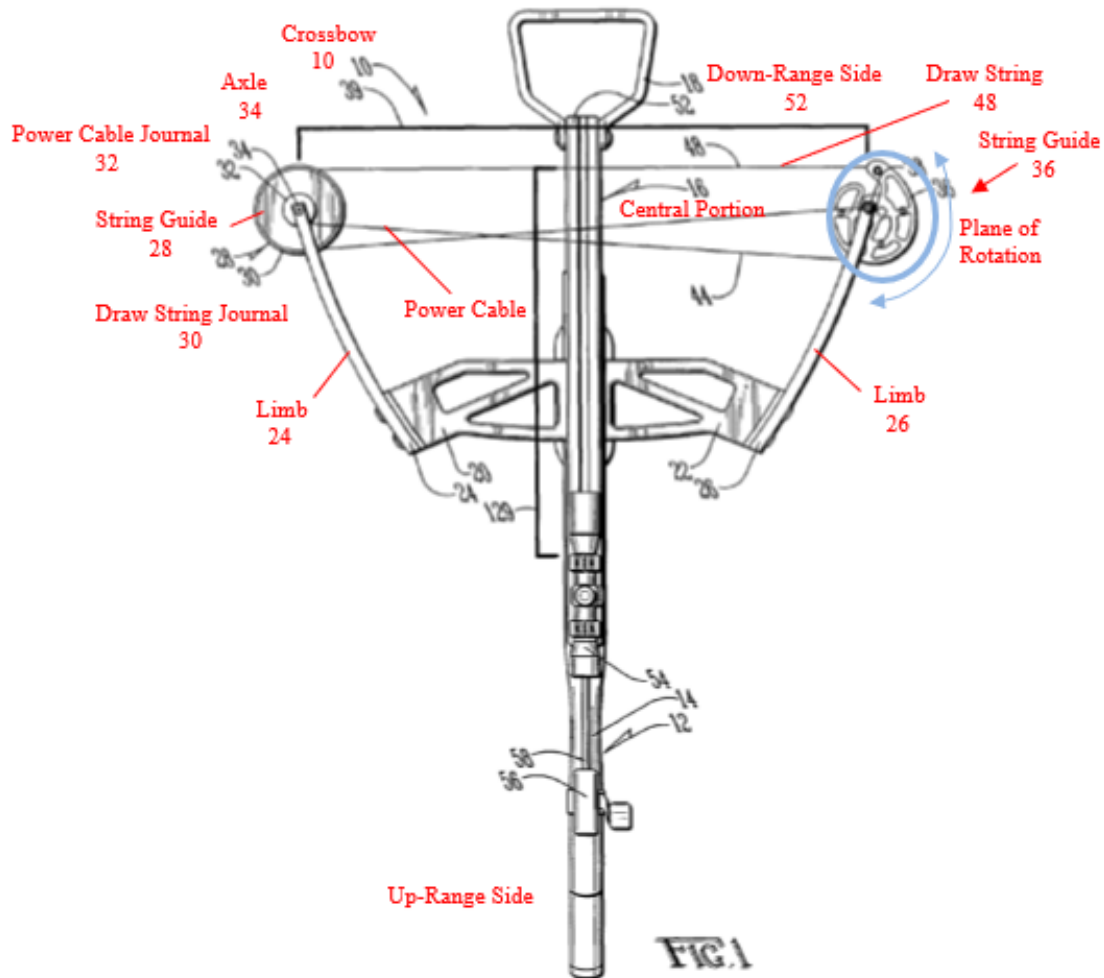
[0009], [0018], [0027]; Ex. 1016 ¶212.) But prior art cams can only accommodate 270 degrees of rotation without string overlap. (Ex. 1009 [0013], [0018]; Ex. 1016 ¶212.) Thus to increase the amount of cable wound on the cams without overlapping, Park discloses helical journals, which allow rotation of 360 degrees, 540 degrees, 650 degrees, and even up to 900 degrees. (Ex. 1009 [0025], [0031], [0035], [0098], [0112]; Ex. 1016 ¶212.) The length of the helical grooves determines the amount of cam rotation without cable overlap. (Ex. 1009 [0087].) Park confirms that such helical journals can be applied to crossbows. (Ex. 1009 [0124]; Ex. 1016 ¶212.) Thus a POSA wishing to increase a crossbow's power stroke (per Ex. 1013 [0003], [0015], [0042]) would be motivated to use helical power cable journals (per Park), which allow more cable to be wound and unwound, as would be reasonably expected from such a combination. (Ex. 1016 ¶212.)

Frankly, a POSA wishing to increase the power stroke of Darlington's crossbow, and understanding the impact of wound cable on the power stroke, would be motivated to apply the helical-journal teachings of any of various additional references, including Stanziale '062 (Ex. 1011 18:4-9), Stanziale '771 (Ex. 1012 17:34-17:5), Stanziale '302 (Ex. 1007 [0106]), Despart (Ex. 1018 8:50-9:5, Figs. 22-23), and Lester (Ex. 1019 3:59-63, Fig. 10), which would permit more cable to be wound, as would be reasonably expected from such combinations. (Ex. 1016 ¶213.) This plethora of references further reinforces the obviousness of using helical

journals on archery cams. Thus, claim 1 is rendered obvious by Darlington and Park.
(Ex. 1016 ¶214.)

I. Ground 9: Claim 1 is Obvious over Kempf ‘871 and Norkus.

Kempf ‘871 renders claim 1 obvious in light of Norkus as follows. Kempf ‘871 discloses a crossbow 10 that comprises a central portion (called a rail) 16 with a down-range side (called forward end) 52 and an up-range side (closer to the stock 14). (Ex. 1014 3:40-43, Fig. 1; Ex. 1016 ¶217.) In fact, Fig. 1 of Kempf ‘871, shown below, looks remarkably similar to Fig. 11 of the ‘015 Patent.

**Kempton '871 - FIG. 1**

First and second flexible limbs 24, 26 are attached to the central portion through the riser 20, 22. (Ex. 1014 3:50-56, Fig. 1; Ex. 1016 ¶218.) First and second string guides 28, 36 are mounted to the first and second limbs, respectively, and are rotatable around respective axes going through axles 34, 38. (Ex. 1014 3:57-66, Fig. 1; Ex. 1016 ¶219.) Figure 1 shows a pulley 28 and a cam 36 as the string guides, but two cams may also be used. (Ex. 1014 4:12-13; Ex. 1016 ¶219.)

Each string guide has a draw string journal (called outer track) 30 having a plane of rotation (*e.g.*, formed by the wound string 48) perpendicular to the respective axis of rotation 34, 38. (Ex. 1014 3:57-59, 4:13-19, Fig. 1; Ex. 1016 ¶220.) Each string guide also has a power cable take-up journal (called inner track) 32, though perhaps not helical. (Ex. 1014 3:57-59, 4:13-23, Fig. 1; Ex. 1016 ¶221.)

Kempf '871 discloses a draw string (called bowstring) 48 received in the draw string journals 30. (Ex. 1014 4:13-23, Figs. 1, 10; Ex. 1016 ¶222.) The bowstring 48 is secured to the crossbow in a reverse draw configuration, because the string is adjacent the down-range side 52 of the string guides 28, 36 when in a released configuration. (Ex. 1014 4:16-23, Fig. 1; Ex. 1016 ¶222.) The string 48 translates from the down-range side (*see* Fig. 1) toward the up-range side (*see* Fig. 10) to a drawn configuration while unwinding off the string guides 28, 36. (Ex. 1016 ¶222.)

Each of the power cable journals 32 also receives a power cable 44. (Ex. 1014 4:13-23, Figs. 1, 10; Ex. 1016 ¶223.) As the bow is drawn from the released configuration (*see* Fig. 1) to the drawn configuration (*see* Fig. 10), the cables 44 wrap onto the rotating power cable journals 32 as the limbs bend closer together and reduce the distance between the string guides 28, 36. (Ex. 1016 ¶224.)

Thus, Kempf '871 discloses each limitation of claim 1 except that the power cable journals are helical (extending in a direction perpendicular to the draw string planes of rotation), and thus that the power cables are displaced along the respective

axes away from the planes of rotation as the cables wrap onto the helical journals. (Ex. 1016 ¶225.) However, Norkus discloses these related limitations and their benefits, as discussed above in § VI.G. (*Id.* at ¶226.) Similar to the previously discussed Darlington reference, Kempf ‘871 discloses the desirability of increasing a crossbow’s draw length or power stroke, which increases its potential power and thus speed, while minimizing its axle-to-axle distance. (Ex. 1014 1:31-40, 1:62-2:18, 2:41-55; Ex. 1016 ¶227.) So in light of these desired features, a POSA would have been motivated to apply helical power cable journals from Norkus to the crossbow of Kempf ‘001 to obtain a longer power stroke (and thus crossbow speed) while maintaining the axle-to-axle distance (or even reducing it). (Ex. 1016 ¶227.) And a POSA would have reasonably expected to achieve success from such combinations. (*Id.*) Thus, claim 1 is rendered obvious by Kempf ‘871 and Norkus. (Ex. 1016 ¶228.)

J. Ground 10: Claim 1 is Obvious over Kempf ‘871 and Park.

The preceding section explained how Kempf ‘871 discloses each limitation of claim 1 except that the power cable journals are helical (extending in a direction perpendicular to the draw string planes of rotation), and thus that the power cables are displaced along the respective axes away from the planes of rotation as the cables wrap onto the helical journals. However, Park discloses these related limitations and their benefits, as discussed above in § VI.H. (Ex. 1016 ¶231.) As discussed in the

preceding section, Kempf ‘871 discloses the desirability of increasing a crossbow’s draw length or power stroke, which increases its potential power and thus speed, while minimizing its axle-to-axle distance. (Ex. 1014 1:31-40, 1:62-2:18, 2:41-55; Ex. 1016 ¶232.) So in light of these desired features, a POSA would have been motivated to apply helical power cable journals from Park to the crossbow of Kempf ‘001 to obtain a longer power stroke (and thus crossbow speed) while maintaining the axle-to-axle distance (or even reducing it), with a reasonable expectation of success. (Ex. 1016 ¶232.) Thus, claim 1 is rendered obvious by Kempf ‘871 and Park. (Ex. 1016 ¶233.)

K. Ground 11: Claim 1 is Obvious over Kempf ‘871 and Stanziale ‘302.

Section VI.I explained how Kempf ‘871 discloses each limitation of claim 1 except that the power cable journals are helical (extending in a direction perpendicular to the draw string planes of rotation), and thus that the power cables are displaced along the respective axes away from the planes of rotation as the cables wrap onto the helical journals. However, Stanziale ‘302 discloses these related limitations, as discussed above in § VI.A. (Ex. 1016 ¶237.)

Stanziale ‘302 discloses the use of helical grooves 511, 521 on string guides 50 that permit multiple turns of the string 31 or cable 32 on the pulleys/string guides 50: “Moreover, the perimetral track 511, 521 . . . may have a spiral or helical shape, so as to wind a plurality of turns of a flexible element. To be more detailed: a spiral

has a two-dimensional development and then winds a plurality of turns which progressively crown or overlap each other; a helix has a three-dimensional development and then winds a plurality of turns which are progressively coiled adjacent to each other.” (Ex. 1007 [0106]; Ex. 1016 ¶237.) And if there is any doubt regarding the direction of displacement of the power cables, the helical nature of the first and second helical power cable take-up journals means that the cables 32 wrap on those journals in one of two directions: toward the draw string planes of rotation or away. With only two options, it would be obvious to try each. (Ex. 1016 ¶155.) *See* KSR, 550 U.S. at 421.

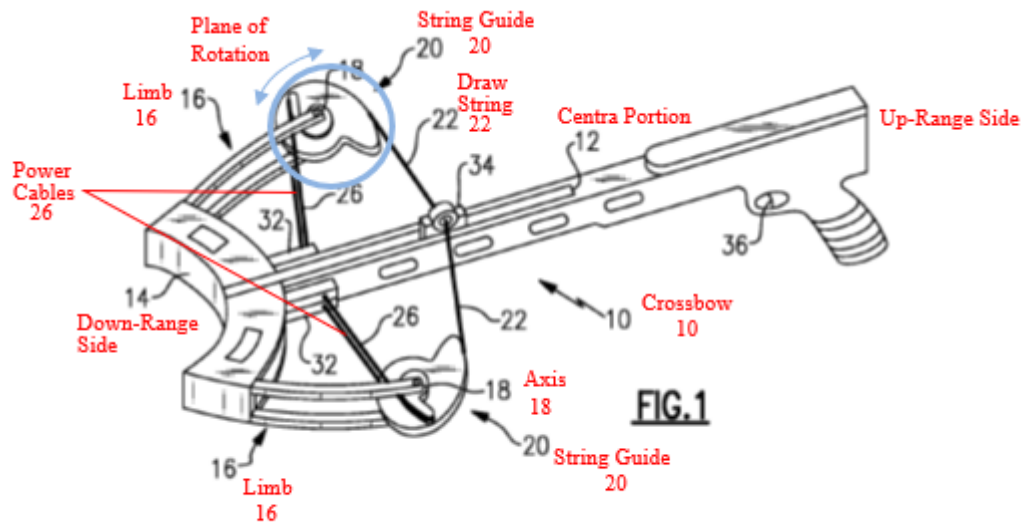
As explained above, Kempf ‘871 discloses the desirability of increasing a crossbow’s draw length or power stroke distance, which increases its potential power and thus speed, and the undesirability of increasing the draw weight. (Ex. 1014 1:31-40, 1:62-2:18, 2:41-55; Ex. 1016 ¶238.) Stanziale ‘302 also notes the benefits of decreased draw weight as follows: “The inventor has recognized that the force exerted by the user during a loading phase of the device should be as constant as possible along most of the draw length (or stroke or displacement) of said middle portion of the propulsive wire, *so as to minimize* the maximum force (commonly referred to as *draw weight*) that the user has to put in loading the device by hand.” (Ex. 1007 [0006] (emphasis added); Ex. 1016 ¶239.)

Thus, a POSA beginning with the bow of Kempf ‘871 and the desire to increase the power stroke distance and reduce draw weight, as disclosed in Kempf ‘871, would be motivated to consider Stanziale ‘302 because it also concerns crossbows and the desire to reduce draw weight. (Ex. 1016 ¶240.) A POSA would also readily understand that the benefit of increased power stroke distance could be accomplished using the helical grooves disclosed in Stanziale ‘302. (*Id.*) Therefore, a POSA would be motivated to replace the power cable take-up journals of Kempf ‘871 with the helical power cable take-up journals disclosed in Stanziale ‘302 to increase the power stroke distance, with a reasonable expectation of success. (*Id.*)

Thus, Kempf ‘871 and Stanziale ‘302 render claim 1 obvious. (Ex. 1016 ¶241.)

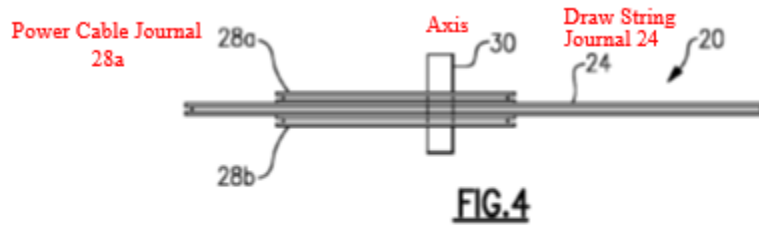
L. Ground 12: Claim 1 is Obvious over Islas, Darlington, and Park.

Islas renders claim 1 obvious in light of Darlington and Park as follows. Islas discloses a crossbow 10 that comprises a central portion (called an axial beam or stock) 12 with a down-range side (closer to the riser 14) and an up-range side (closer to the trigger 36). (Ex. 1015 [0011], Fig. 1; Ex. 1016 ¶244.)

**Islas - FIG. 1**

First and second flexible limbs 16 are attached to the central portion through the riser 14. (Ex. 1015 [0011]; Ex. 1016 ¶245.) First and second string guides (called cams) 20 are mounted to the first and second limbs, respectively, and are rotatable around respective axes going through pivots 18 or axles 30. (Ex. 1015 [0011], [0013], Figs. 1, 4; Ex. 1016 ¶246.)

Each string guide has a draw string journal (called groove or channel) 24 having a plane of rotation (*e.g.*, formed by the wound string 22) perpendicular to the respective axis of rotation 18, 30. (Ex. 1015 [0013], Figs. 1, 4; Ex. 1016 ¶247.) Each string guide also has a power cable take-up journal (called groove) 28a or 28b, though perhaps not helical. (Ex. 1015 [0006], [0013], Figs. 1, 4; Ex. 1016 ¶248.)



Islas - FIG. 4

Islas discloses a draw string (called bowstring) 22 received in the draw string journals 24 and that unwinds between the string guides to a drawn configuration. (Ex. 1015 [0006], [0013], Figs. 1, 4, claim 2; Ex. 1016 ¶249.) Islas's bowstring is not secured in a reverse draw configuration (with the string adjacent the down-range side of the string guides 20 in a released configuration, such that the string translates from the down-range side toward the up-range side while being drawn). But it would be obvious to do so in light of Darlington, which teaches that a reverse-draw configuration provides a bow with a longer power stroke and thus increased speed and better performance. (Ex. 1013 [0042]; Ex. 1016 ¶250.) Islas likewise teaches the desirability of increasing crossbow speeds, Ex. 1015 [0004], [0006], and thus a POSA would be motivated to modify Islas's crossbow to implement the reverse-draw configuration of Darlington to increase the power stroke and resulting speed, with the results being as expected. (Ex. 1016 ¶250.) Darlington shows various embodiments in forward-draw and reverse-draw configurations, indicating the simplicity of making such a modification. (Ex. 1013 [0021] (compare Figs. 1 and

4), [0029] (compare Figs. 9 and 12), [0033] (compare Figs. 13 and 16), [0035] (compare Figs. 17 and 18); Ex. 1016 ¶250.)

Each of the Islas power cable journals 28a or 28b also receives a power cable 26. (Ex. 1015 [0006], [0013], Figs. 1, 4; Ex. 1016 ¶251.) As the bow is drawn from the released configuration to the drawn configuration, the cables 26 wrap onto the rotating power cable journals 28a or 28b. (Ex. 1015 [0013], Figs. 1-3, claim 2; Ex. 1016 ¶252.)

Thus, the missing limitation is that the power cable journals are helical (extending in a direction perpendicular to the draw string planes of rotation), and thus that the power cables are displaced along the respective axes away from the planes of rotation as the cables wrap onto the helical journals. (Ex. 1016 ¶253.) However, Park discloses these related limitations and their benefits, as discussed above in § VI.H. (*Id.*) Similar to the previously discussed base references (Darlington and Kempf '871), Islas discloses the desirability of increasing a crossbow's potential power and speed. (Ex. 1015 [0004], [0006]; Ex. 1016 ¶254.) So in light of these desired characteristics, a POSA would have been motivated to apply helical power cable journals from Park to the Islas-Darlington crossbow to increase the bow's stored energy and speed by obtaining a longer power stroke through wrapping more cable length on the helical journals. (Ex. 1016 ¶254.) And a POSA would have reasonably expected to achieve success from such

combinations. (*Id.*) Thus, Islas, Darlington, and Park render claim 1 obvious. (Ex. 1016 ¶243.)

VII. CONCLUSION

In view of the grounds 1-12 set forth above, Petitioner respectfully submits that there is more than a reasonable likelihood that claim 1 of the '015 Patent is unpatentable under 35 U.S.C. §§ 102 and/or 103. Accordingly, the Board is requested to institute *inter partes* review of claim 1.

Date: December 21, 2022

Respectfully submitted,

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CERTIFICATE OF WORD COUNT COMPLIANCE

Pursuant to 37 C.F.R. §42.24(d), the undersigned certifies that this Petition complies with the type-volume limitation of 37 C.F.R. §42.24(a)(1)(i), which is 14,000 words. The word count application of the word processing program used to prepare this Petition (Microsoft Word) indicates that the Petition contains 11,407 words, excluding the parts of the Petition exempted by 37 C.F.R. §42.24(a)(1).

Respectfully submitted,

Dated: December 21, 2022

/John M. Skeriotis/
John M. Skeriotis, Lead Counsel
USPTO Reg. No. 43,129

CERTIFICATE OF SERVICE (37 C.F.R. §§42.6(e) and 42.105(a))

I hereby certify that, on the date indicated below, I caused the foregoing PETITION FOR *INTER PARTES* REVIEW OF CLAIM 1 OF U.S. PATENT NO. 9,354,015, along with the Power of Attorney and cited supporting evidence, to be served via Priority Mail Express[®] to the below address:

Patent Counsel of Record

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and via email to:

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