

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.

IPR2023-00407
Patent 9,354,015

EXPERT DECLARATION OF JONATHAN TEATER

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I, Jonathan Teater, declare as follows:

1. I am over twenty-one (21) years of age and have personal knowledge of the facts stated herein. I have been retained by Foley & Lardner LLP on behalf of Ravin Crossbows, LLC (“Patent Owner”) to provide my opinion on the issues raised by Hunter’s Manufacturing Company, Inc., d/b/a TenPoint Crossbow Technologies (“Petitioner”), in a petition for *inter partes* review (“Petition”) of Claim 1 of U.S. Patent No. 9,354,015 (“the ’015 Patent”) and the accompanying declaration of Stephen Batzer (EX1016).

I. QUALIFICATIONS AND EXPERIENCE

2. I am the founder and owner of Whitetail Landscapes, LLC, where I work with landowners to enhance properties and support implementation efforts for specific ecological changes to drive animal interest and facilitate hunting, particularly bow and crossbow hunting.

3. As described in further detail in my accompanying C.V. (EX2034), from 2007 until 2021, I also worked as an outdoor writer, specializing in the evaluation and testing of compound bows and crossbows. During this time, I evaluated more than 100 crossbows from various manufacturers, providing in-depth performance and technical assessments and publishing articles in various industry publications, including ArrowTrade Magazine, Bow and Arrow Magazine, Crossbow Revolution, and online publications. My published assessments covered

many functional aspects of the tested bows and crossbows, including evaluations of sound, vibration, trigger, efficiency, energy output, functionality, and overall design.

4. As part of my writing work, I helped to develop and published standards for crossbow testing and evaluation in 2009.

5. Through my writing, I came to be recognized as an expert in the field of compound bow and crossbow design. As a result, I also worked independently with various manufacturers in the compound bow and crossbow markets to support development and production efforts, namely by reviewing their product designs, evaluating product features, and providing recommendations and input on ways to enhance or change the designs technologically.

6. During this same period, I have also participated in the crossbow technical committee for standards and guidelines under the Archery Trade Association.

7. Because of my extensive history and experience working in the archery industry, and particularly working with crossbows, I am very familiar with the terminology used in the industry, and I consider myself an expert on crossbow functionality and design.

II. MATERIALS CONSIDERED

8. All of the opinions contained in this declaration are based on the documents I have reviewed and my professional judgment, as well as my education,

experience, and professional knowledge. I am not an attorney, and I am not offering any legal opinions in this declaration.

9. In forming the opinions expressed in this declaration, I relied upon my education, knowledge, and experience in the relevant field of the art, and have considered the viewpoint of a person having ordinary skill in the relevant art (“POSA”). I have considered the materials referenced herein, including the ’015 Patent (EX1001), the file history of the ’015 Patent (EX1002), and the prior art references and other documents listed in the table below. Each of these documents is a type of document that an expert in my field would have reasonably relied upon when forming his/her opinion.

Exhibit	Description
1007	U.S. Patent Pub. No. 2012/0125302 to Stanziale (“Stanziale ’302”)
1009	U.S. Patent Pub. No. 2012/0312287 to Park (“Park”)
1010	U.S. Patent No. 7,578,289 to Norkus (“Norkus”)
1011	International Patent Application Publication No. WO 2011/158062 to Stanziale (“Stanziale ’062”)
1012	International Patent Application Publication No. WO 2011/141771 to Stanziale (“Stanziale ’771”)
1013	U.S. Patent Pub. No. 2011/0030666 to Darlington (“Darlington”)
1014	U.S. Patent No. 7,836,871 to Kempf (“Kempf ’871”)
1015	U.S. Patent Pub. No. 2011/0308508 to Islas (“Islas”)
1016	Declaration of Stephen Batzer
1030	Transcript of the August 24, 2023 Deposition of Stephen Batzer
2030	Transcript of the October 11, 2023 Continued Deposition of Stephen Batzer

Exhibit	Description
2031	Winkle, B., “Untunable Bow? Nock Travel Could Be Your Problem,” <i>Peterson’s Bowhunting</i> , https://www.bowhuntingmag.com/editorial/untunable-bow-nock-travel-could-be-your-problem/382681 .

10. My opinions are additionally guided by my appreciation and understanding of how a POSA would have understood the claims of the ’015 Patent at the time of the alleged invention at the priority date of the patent, December 16, 2013.

III. SUMMARY OF OPINIONS

11. It is my opinion that Petitioner and Dr. Batzer fail to establish that Claim 1 of the ’015 Patent, the only claim challenged in the Petition, is anticipated or obvious in view of any of the cited prior art. As discussed in further detail below, the prior art fails to disclose all elements of Claim 1, either alone or in combination, and a POSA further would not have been motivated to combine or modify the cited prior art to result in the crossbow as recited in Claim 1 as Petitioner and Dr. Batzer argue.

12. More specifically, for at least the reasons discussed in further detail below, each ground in the Petition is deficient as follows:

Ground	Deficiencies
Ground 1: Alleged Anticipation by Stanziale ’302	Stanziale ’302 does not disclose “a first string guide mounted to the first bow limb” or “a

Ground	Deficiencies
	second string guide mounted to the second bow limb.” <i>See</i> §IX(A)(1)(a), <i>infra</i>. • Neither Petitioner nor Dr. Batzer identify any disclosures in Stanziale ’302 of a crossbow in which “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.” Rather, Stanziale ’302 expressly discloses that the structures Petitioner and Dr. Batzer identify as power cables are displaced toward the first and second planes of rotation of the structures Petitioner and Dr. Batzer identify as the first and second draw string journals. <i>See</i> §IX(A)(1)(b), <i>infra</i>.
Ground 2: Alleged Obviousness over Stanziale ’302	• Stanziale ’302 does not disclose “a first string guide mounted to the first bow limb” or “a second string guide mounted to the second bow limb.” <i>See</i> §IX(A)(1)(a), <i>infra</i>. • A POSA would not have been motivated to modify Stanziale ’302 to meet the limitation requiring that “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.” Petitioner and Dr. Batzer do not offer any explanation as to why they contend a POSA would have been so motivated, and in fact, a POSA would readily understand that modifying the direction that the power cables are displaced or allowing for displacement where none previously existed

Ground	Deficiencies
	would have significant disadvantages as it would change the forces on the limbs and harm the accuracy of the device. <i>See</i> §IX(B)(1), <i>infra</i>.
Ground 3: Alleged Anticipation by Stanziale '062	• Stanziale '062 does not disclose “a first string guide mounted to the first bow limb” or “a second string guide mounted to the second bow limb.” <i>See</i> §IX(A)(2)(a), <i>infra</i>. • Neither Petitioner nor Dr. Batzer identify any disclosures in Stanziale '062 of a crossbow in which “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.” In fact, Stanziale '302 says nothing about whether the structures Petitioner and Dr. Batzer identify as power cables are displaced toward or away from the first and second planes of rotation of the structures Petitioner and Dr. Batzer identify as the first and second draw string journals. <i>See</i> §IX(A)(1)(b), <i>infra</i>.
Ground 4: Alleged Obviousness over Stanziale '062	• Stanziale '062 does not disclose “a first string guide mounted to the first bow limb” or “a second string guide mounted to the second bow limb.” <i>See</i> §IX(A)(2)(a), <i>infra</i>. • A POSA would not have been motivated to modify Stanziale '062 to meet the limitation requiring that “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

Ground	Deficiencies
	journals, respectively.” Petitioner and Dr. Batzer do not offer any explanation as to why they contend a POSA would have been so motivated, and in fact, a POSA would readily understand that modifying the direction that the power cables are displaced or allowing for displacement where none previously existed would have significant disadvantages as it would change the forces on the limbs and harm the accuracy of the device. <i>See</i> §IX(B)(1), <i>infra</i>.
Ground 5: Alleged Anticipation by Stanziale ’771	• Stanziale ’771 does not disclose “a first string guide mounted to the first bow limb” or “a second string guide mounted to the second bow limb.” <i>See</i> §IX(A)(3)(a), <i>infra</i>.
Ground 6: Alleged Obviousness over Stanziale ’771	• Stanziale ’062 does not disclose “a first string guide mounted to the first bow limb” or “a second string guide mounted to the second bow limb.” <i>See</i> §IX(A)(3)(a), <i>infra</i>. • A POSA would not have been motivated to modify Stanziale ’771 to meet the limitation requiring that “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.” Petitioner and Dr. Batzer do not offer any explanation as to why they contend a POSA would have been so motivated, and in fact, a POSA would readily understand that modifying the direction that the power cables are displaced or allowing for displacement where none previously existed would have significant disadvantages as it

Ground	Deficiencies
	would change the forces on the limbs and harm the accuracy of the device. <i>See</i> §IX(B)(1), <i>infra</i>.
Ground 7: Alleged Obviousness over Darlington and Norkus	Darlington teaches away from displacing the power cables relative to the drawstring journals' plane of rotation and, in fact, teaches that the power cables should be kept substantially parallel to the drawstring at all times and that the orientation of the power cables and the drawstring relative to each other must remain consistent throughout the draw cycle with the orientation of the power cables and the draw string in the drawn position just as they are in the released position. Thus, a POSA would not have been motivated to modify Darlington in view of Norkus to add the structures that Petitioner and Dr. Batzer identify as helical power cable take-up journals in Norkus or to meet the limitation requiring that "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." <i>See</i> §IX(A)(4) & §IX(B)(2), <i>infra</i>. A POSA also would not have been motivated to modify Darlington in view of Norkus and change the design of the cams or pulleys as he would have understood that even relatively minor changes to the design of a crossbow's mechanical components, and especially to its pulleys or cams, would have significant effects on the crossbow's function and structural stability. <i>See</i> §IX(B)(2), <i>infra</i>.

Ground	Deficiencies
Ground 8: Alleged Obviousness over Darlington and Park	• Darlington teaches away from displacing the power cables relative to the drawstring journals' plane of rotation and, in fact, teaches that the power cables should be kept substantially parallel to the drawstring at all times and that the orientation of the power cables and the drawstring relative to each other must remain consistent throughout the draw cycle with the orientation of the power cables and the draw string in the drawn position just as they are in the released position. Thus, a POSA would not have been motivated to modify Darlington in view of Park to add the structures that Petitioner and Dr. Batzer identify as helical power cable take-up journals in Park or to meet the limitation requiring that "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." <i>See</i> §IX(A)(4) & §IX(B)(2), <i>infra</i>. • A POSA also would not have been motivated to modify Darlington in view of Park and change the design of the cams or pulleys as he would have understood that even relatively minor changes to the design of a crossbow's mechanical components, and especially to its pulleys or cams, would have significant effects on the crossbow's function and structural stability. <i>See</i> §IX(B)(2), <i>infra</i>.
Ground 9: Alleged Obviousness over Kempf '871 and Norkus	• Kempf '871 does not disclose "the second string guide comprising a second draw string journal," as identified by Petitioner and Dr.

Ground	Deficiencies
	Batzer. The structure Petitioner and Dr. Batzer identify as the second drawstring journal is found only on the pulley that Petitioner and Dr. Batzer identify as the first string guide, not on the cam that Petitioner and Dr. Batzer identify as the second string guide. <i>See</i> §IX(A)(5)(a), <i>infra</i>. • Kempf '871 does not disclose “the second string guide comprising ... a second helical power cable take-up journal,” as identified by Petitioner and Dr. Batzer. The structure Petitioner and Dr. Batzer identify as the second power cable take-up journal is found only on the pulley that Petitioner and Dr. Batzer identify as the first string guide, not on the cam that Petitioner and Dr. Batzer identify as the second string guide. <i>See</i> §IX(A)(5)(b), <i>infra</i>. • A POSA also would not have been motivated to modify Kempf '871 in view of Norkus and change the design of the cams or pulleys as he would have understood that even relatively minor changes to the design of a crossbow's mechanical components, and especially to its pulleys or cams, would have significant effects on the crossbow's function and structural stability. <i>See</i> §IX(B)(3), <i>infra</i>.
Ground 10: Alleged Obviousness over Kempf '871 and Park	• Kempf '871 does not disclose “the second string guide comprising a second draw string journal,” as identified by Petitioner and Dr. Batzer. The structure Petitioner and Dr. Batzer identify as the second drawstring journal is found only on the pulley that Petitioner and Dr. Batzer identify as the first string guide, not on the cam that Petitioner

Ground	Deficiencies
	and Dr. Batzer identify as the second string guide. <i>See</i> §IX(A)(5)(a), <i>infra</i>. • Kempf '871 does not disclose “the second string guide comprising ... a second helical power cable take-up journal,” as identified by Petitioner and Dr. Batzer. The structure Petitioner and Dr. Batzer identify as the second power cable take-up journal is found only on the pulley that Petitioner and Dr. Batzer identify as the first string guide, not on the cam that Petitioner and Dr. Batzer identify as the second string guide. <i>See</i> §IX(A)(5)(b), <i>infra</i>. • A POSA also would not have been motivated to modify Kempf '871 in view of Park and change the design of the cams or pulleys as he would have understood that even relatively minor changes to the design of a crossbow's mechanical components, and especially to its pulleys or cams, would have significant effects on the crossbow's function and structural stability. <i>See</i> §IX(B)(3), <i>infra</i>.
Ground 11: Alleged Obviousness over Kempf '871 and Stanziale '302	• Kempf '871 does not disclose “the second string guide comprising a second draw string journal,” as identified by Petitioner and Dr. Batzer. The structure Petitioner and Dr. Batzer identify as the second drawstring journal is found only on the pulley that Petitioner and Dr. Batzer identify as the first string guide, not on the cam that Petitioner and Dr. Batzer identify as the second string guide. <i>See</i> §IX(A)(5)(a), <i>infra</i>. • Kempf '871 does not disclose “the second string guide comprising ... a second helical power cable take-up journal,” as identified by

Ground	Deficiencies
	Petitioner and Dr. Batzer. The structure Petitioner and Dr. Batzer identify as the second power cable take-up journal is found only on the pulley that Petitioner and Dr. Batzer identify as the first string guide, not on the cam that Petitioner and Dr. Batzer identify as the second string guide. <i>See</i> §IX(A)(5)(b), <i>infra</i>. • Neither Petitioner nor Dr. Batzer identify any disclosures in Stanziale '302 of a crossbow in which “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.” Rather, Stanziale '302 expressly discloses that the structures Petitioner and Dr. Batzer identify as power cables are displaced toward the first and second planes of rotation of the structures Petitioner and Dr. Batzer identify as the first and second draw string journals. <i>See</i> §IX(A)(1)(b), <i>infra</i>. • A POSA also would not have been motivated to modify Kempf '871 in view of Stanziale '302 and change the design of the cams or pulleys as he would have understood that even relatively minor changes to the design of a crossbow's mechanical components, and especially to its pulleys or cams, would have significant effects on the crossbow's function and structural stability. <i>See</i> §IX(B)(3), <i>infra</i>.
Ground 12: Alleged Obviousness over Islas, Darlington, and Park	• A POSA would not have been motivated to modify Islas in view of Darlington to have a reverse-draw configuration. The Islas device would not function if it were converted to a

Ground	Deficiencies
	reverse-draw configuration in the way Petitioner and Dr. Batzer argue because of the configuration of the power cables' attachment points relative to the drawstring's attachment points and the orientation of the cams. Any actual effort to convert a forward-draw crossbow to a reverse-draw configuration would be very complicated, involving other significant structural changes that Petitioner and Dr. Batzer ignore. <i>See</i> §IX(A)(6) & §IX(B)(4), <i>infra</i>. • Darlington teaches away from displacing the power cables relative to the drawstring journals' plane of rotation and, in fact, teaches that the power cables should be kept either substantially parallel to the drawstring at all times or, at a minimum, must not extend away from the drawstring journal. Thus, a POSA would not have been motivated to further modify a device that incorporates the reverse-drawn configurations of Darlington in view of Park to add the structures that Petitioner and Dr. Batzer identify as helical power cable take-up journal in Park or to meet the limitation requiring that "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." <i>See</i> §IX(A)(4), §IX(B)(2), & §IX(B)(4), <i>infra</i>. • A POSA also would not have been motivated to further modify a combination of Islas and Darlington and change the design of the cams or pulleys as he would have understood that even relatively minor changes to the design of

Ground	Deficiencies
	a crossbow's mechanical components, and especially to its pulleys or cams, would have significant effects on the crossbow's function and structural stability. <i>See</i> §IX(B)(4), <i>infra</i> .

IV. UNDERSTANDING OF LEGAL STANDARDS

13. I am not an attorney. Counsel for Patent Owner has provided the following legal standards, which I have considered in the analysis presented in this declaration.

A. Burden of Proof

14. I understand that Petitioner has the burden of proving the unpatentability of the challenged patent claim by a preponderance of the evidence

B. Claim Construction

15. I understand that a claim must be construed under the *Phillips* standard. Under that standard, words of a claim are given their plain and ordinary meaning as understood by a POSA at the time of the earliest effective filing date of the application, in light of the specification and prosecution history, as well as pertinent evidence extrinsic to the patent. For purposes of this declaration, I applied the plain and ordinary meaning of each term as would have been understood by a POSA at the time of the alleged invention unless explicitly stated otherwise.

C. Anticipation

16. I understand that a patent claim is unpatentable as anticipated if each and every element of the claim is disclosed by a single item of prior art. I understand that an anticipation analysis involves two steps. First, the patent claims are construed to ascertain their scope. Second, each construed asserted claim is compared to the prior art reference on an element-by-element basis. If the prior art reference discloses or contains each and every element of the claimed invention, either expressly or inherently, then it anticipates the claim. If even a single element of the claim is missing from the prior art reference, the prior art reference cannot anticipate the claim.

17. I understand that anticipation by inherent disclosure is appropriate only when a prior art reference necessarily discloses the unstated claim element. I further understand that there is no requirement that a POSA would have recognized the inherent disclosure at the time of the invention.

18. For anticipation by a prior art publication or document, I understand that the reference's description must enable a POSA to practice the claimed invention without undue experimentation. I further understand that the following factors may be considered to determine whether any experimentation would have been undue:

- The quantity of experimentation necessary.

- The amount of direction or guidance presented.
- The presence or absence of working examples.
- The nature of the claimed invention.
- The state of the prior art.
- The relative skill of those in the art.
- The predictability or unpredictability of the art.
- The breadth of the claims.

D. Obviousness

19. I understand that a patent claim is unpatentable as obvious if it would have been obvious to a POSA at the time the application was filed. This means that, even if all of the elements of a claim are not found in a single prior art reference, the claim is not patentable if the differences between the subject matter in the prior art and the subject matter in the claim are such that the claimed invention as a whole would have been obvious to a POSA at the time the application was filed. When determining whether a claim is obvious, I understand that it is important to consider a prior reference as a whole, including portions that teach away from the claimed invention. For a claim to be obvious, there must be a clearly articulated reason why a POSA would have understood the claimed invention to have been obvious in view of the cited reference(s).

20. I further understand that a determination of whether a claim would have been obvious must consider several factors, including, among others:

- the level of ordinary skill in the art at the time the application was filed;
- the scope and content of the prior art; and
- what differences, if any, existed between the claimed invention and the prior art.

21. I understand that the teachings of two or more references may be combined to render a claim unpatentable, if such a combination would have been obvious to a POSA. In determining whether a combination based on either a single reference or multiple references would have been obvious, it is appropriate to consider at least the following factors:

- whether the teachings of the prior art references disclose known concepts combined in familiar ways, which, when combined, would yield predictable results;
- whether a POSA could have implemented a predictable variation, and would have seen the benefit of doing so;
- whether the claimed elements represent one of a limited number of known design choices, and he would have a reasonable

expectation of success of implementing such design choices by a POSA;

- whether a POSA would have recognized a reason to combine known elements in the manner described in the claim;
- whether there is some teaching or suggestion in the prior art to make the modification or combination of elements recited in the claim; and
- whether the claimed invention applies a known technique that had been used to improve a similar device or method in a similar way.

22. I understand that a POSA has ordinary creativity and is not an automaton.

23. I understand that in considering obviousness, it is important not to determine obviousness using the benefit of hindsight derived from the patent being considered, and I have not done that in regards to my opinions expressed herein.

24. I understand that certain factors—often called “secondary considerations”—may support or rebut an assertion of obviousness of a claim. I understand that such secondary considerations include, among other things, commercial success of the alleged invention, skepticism of those having ordinary skill in the art at the time of the alleged invention, unexpected results of the alleged

invention, any long-felt but unsolved need in the art that was satisfied by the alleged invention, the failure of others to make the alleged invention, praise of the alleged invention by those having ordinary skill in the art, and copying of the alleged invention by others in the field. I further understand that there must be a nexus—a connection—between any such secondary considerations and the alleged invention. I also understand that contemporaneous and independent invention by others is a secondary consideration tending to show obviousness.

V. BACKGROUND

A. Overview of the '015 Patent

1. The '015 Patent, titled “String Guide System for a Bow,” issued from Application No. 14/107,058, filed on December 16, 2013. The '015 Patent does not claim priority to any other patent application and as such, December 16, 2013, is the earliest potential filing date.

25. The '015 Patent is “directed to a string guide system for a bow that permits greater rotation of the string guides and a longer power stroke.” EX1001 at 1:63-65. Structurally, the '015 Patent is further directed to:

an archery bow with a central portion having a down-range side and an up-range side. First and second flexible limbs attached to the central portion. A first string guide is mounted to the first bow limb and rotatable around a first axis. The first string guide includes a first draw string journal and a first power cable take-up journal, both oriented generally perpendicular to the first axis. The first power cable take-up journal includes a width measured

along the first axis at least twice a width of a first power cable. A second string guide is mounted to the second bow limb and rotatable around a second axis. The second string guide includes a second draw string journal oriented generally perpendicular to the second axis. A draw string is received in the first and second draw string journals and secured to the archery bow in a reverse draw configuration with the draw string adjacent the down-range side in a release configuration. The draw string translates from the down-range side toward the up-range side and unwinds between the first and second string guides in a drawn configuration. A first power cable is received in the first power cable take-up journal and secured to the archery bow. The first power cable wraps onto the first power cable take-up journal and translates along the first power cable take-up journal away from the first draw string journal as the bow is drawn from the released configuration to the drawn configuration.

Id. at 1:66-2:23.

26. The '015 Patent has three independent claims, only one of which is challenged in Petitioner's Petition. The sole challenged claim, Claim 1, recites as follows:

1. A crossbow, comprising:

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

first and second flexible limbs attached to the central portion;

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 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;

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 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;

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;

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,

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.

27. A key aspect of the claimed invention is its streamlined design in which the first and second string guides are each “mounted to [a] bow limb and rotatable around [an] axis.” *Id.* Past compound crossbow designs included the constructions of features that are complicated, in that numerous components are integrated to

create mechanical advantages for the archer. Other designs include multiple features, such as pulleys mounted to various components (i.e., risers, barrels, limbs) that require various cabling features. The '015 Patent is designed to provide a significant advancement, yet simplification in design and features. Creating a design concept that utilizes features integrated within a cam such as string guides and take-up journals, moving in opposing directions to synchronize movement, allowing for large degrees of rotations based on the length and guidance of the take-up journals with less cabling features increase the functionality of the cam system without overcomplicating the crossbow. The cam system's rotation and movement in combination with the limbs create a high degree of rotation, pulling features like the cams close to each other, creating a compact design.

28. Prior reverse draw crossbow configurations did not emphasize design features that were as narrow as the claimed configuration, nor did such designs including timing features allowing for multiple degrees of cam rotation near or beyond 270 degrees. Tighter or narrow cam configurations permitted better handling and usage afield which was established with the '015 Patent. Further limb configurations, due to tolerances and consideration of human factors were not typically preloaded to establish higher poundage at the start of the drawing sequence, which can be intended to establish higher crossbow efficiencies. Many designs during this period used control/power cabling connected to the limb's axles or

anchor points of the limbs to establish control of cam and cam timing; this also established and supported increased limb deflection opportunities reducing the crossbow width. The '015 Patent did not utilize either method for control, timing, or deflection as compared to other designs, and included rotation synchronization solely through cam features with indirect benefits created based on limbs and related deflection values during the drawing phase.

VI. OVERVIEW OF PRIMARY PRIOR ART REFERENCES RELIED ON BY THE PETITIONER

29. Before providing a detailed analysis of how the prior art fails to render Claim 1 of the '015 Patent unpatentable, I provide a brief summary of Petitioner's primary asserted prior art references.

A. Overview of Stanziale '302 (EX1007)

30. U.S. Patent Pub. No. 2012/0125302 to Stanziale ("Stanziale '302") was published on May 24, 2012, and describes "a device for firing a projectile." EX1007 at 1, Abstract.

31. In my opinion, the device disclosed in Stanziale '302 is a classic example of an unnecessarily overengineered design, i.e., a design that presents an overcomplicated solution to a perceived problem despite the fact that far simpler and more efficient solutions were known to exist. Stanziale '302's complications for complications' sake inherently make it unlikely to be combined with, and difficult to combine with, other more efficient solutions.

32. This is most evident in the overall relationship between the limbs (elastic members 10), the pulleys (pulley assemblies 50), and the intervening lever structures (levers 40). Rather than mounting the pulley assemblies to the limbs, Stanziale '302 instead inserts intervening structures in the form of multicomponent levers 40, which add unnecessary complexity and additional potential failure points. Any person of ordinary skill in the art of archery in general and crossbow design in particular would recognize that the device could only function if every component found in the device moved precisely in concert with one another, without any single component being out of time or out of alignment. It is my opinion that Stanziale '302 discloses a device with far more components than the typical crossbow – even in compound crossbow designs – which increases the risk that any one component could come out of alignment and cause the device not to function as intended.

33. Moreover, it is unclear to me, as a person of more than ordinary skill in the art, whether the Stanziale '302 device would function at all if configured as described. This is primarily due to the forces of drawing the device and the intense strain and stress of drawing the crossbow and factors that constrain movement of the limbs during the drawing sequence. For example, Stanziale '302 states that, when the device is “loaded” or drawn, “the angular displacement is in a clockwise direction for the right lever 40 (shown upper in the figures) and in an anti-clockwise direction for the left lever 40 (shown lower in the figures).” *Id.* at ¶[0145]; *compare*

Fig. 2 *with* Fig. 4. According to Stanziale '302, this, in turn, means that “the elastic members 10 are bent toward the stock 2. In other words, their distal ends 106 are closer to the stock 2 than in rest condition.” *Id.* at ¶[0141]; *compare* Fig. 2 *with* Fig. 4.

34. However, the orientation of components shown in the figures of Stanziale '302 actually suggests that the forces applied by attempting to draw the bowstring (flexible element 31) would tend to encourage rotation in a *counterclockwise* direction for the right/upper lever 40 and in an *clockwise* direction for the left/lower lever 40. This is because the drawstring is strung over the top/down-range side of the pulleys and then pulled along the midline of the stock toward the up-range side. As a result of this motion, any component directly connected to the pulleys (here, the levers 40, which are connected via a first pivot 45 (*id.* at ¶[0095])) would also have a tendency to move first in the down-range direction and then inward toward the midline of the stock. This creates a significant stress on the limbs and adds an increased workload for the archer to draw a device of this nature.

35. In Stanziale '302, the structure of the levers 40 themselves makes the full range of motion difficult and creates a significant impediment to reaching a fully drawn device. This is in part because Stanziale '302 teaches that the levers' second

pivots 46 are kept at a constant distance from each other through a “constraining bar 47.” According to Stanziale ’302:

The constraining bar 47 is a rigid and inextensible member, which constrains the two second pivots 46 to each other in order to prevent the distance D46 therebetween from being varied during rotation of the levers 40 about the rotation axes 380. In other words, the constraining bar 47 connects a lever 40 on one side of the firing device 1 to a lever 40 on the opposite side and is configured to constrain a mutual movement of the two levers 40 by preventing a mutual distance D46 from being varied.

Id. at ¶[0114]. The constraining bar 47 therefore prevents levers 40 as a whole from moving inward toward the midline of the stock as their second pivots 46 are forcibly kept at a constant distance. As a result, the first pivots 45 would have to swing out over the down-range side of the second pivots 46 if the device is to be drawn.

36. But Stanziale ’302 teaches that this movement is constrained by the structure of the lever 40 in which each “lever 40 comprises two first branches 41 (in particular, an upper first branch 41 *a* and a lower first branch 41 *b*), a second branch 42 and a third branch 43. The first, second and third branches 41, 42, 43 form a substantially triangular structure, so that the lever 40 is a basically non-deformable assembly.” *Id.* at ¶[0078], ¶[0080]. Moreover, “each lever 40 comprises a rigid triangular-shaped structure formed by lower first branch 41b, second branch 42 and third branch 43; the upper first branch 41a is parallel with the lower first branch 41b and both are fastened to the first pivot 45.” *Id.* at ¶[0095]. Each lever 40 as a whole

is then “pivoted to the respective connecting members 35a, 35b and, then, to the elastic members 10a, 10b fastened to the latter, the entire lever 40 being rotatable about the pin axis 380,” such that each lever 40 is “pivoted to the second end 106 of the elastic members 10 at the respective side of the stock 2.” *Id.* at ¶¶[0096], ¶¶[0078].

37. From this, a POSA would understand that the structure of lever 40 and its “rigid triangular-shaped structure” prevents the very motion necessary for the Stanziale ’302 device to be drawn easily or in a manner that justifies the energy input of the archer to the energy gained by the device. Just as constraining bar 47 keeps a fixed distance between the two pivots 46, second branch 42 keeps a fixed distance between each pivot 45 and the distal end of elastic member 10. *See id.* at Figs. 1-2, 10. Meanwhile, third branch 43 keeps a fixed distance between pivot 46 and pivot 45. Given the various attachment points to and within the levers 40, a POSA would recognize that, in order for the first pivots 45 to be able to swing out over the down-range side of the second pivots 46 and then move toward the midline of the stock as the device is drawn, at a minimum, second branch 42 would have to be longer than the combination of first branch 41 and third branch 43 to physically allow for such movement. However, as can be seen in at least Figures 1-4, 9, and 10, the second branch 42 is shorter than the combination of first branch 41 and third branch 43, as it must be to form the “rigid triangular shaped structure.” *Id.* at Figs. 1-4, 9-10. Thus, a POSA would readily understand that the overall structure of constraining bar 47

and lever 40 prevents pivot point 46 from swinging up and over the pivot point 45 and, by extension, prevents the device from being drawn easily; during the drawing sequence the distal ends of the elastic members are not stabilized adequately enough to reduce torque and stress on limbs, and not stabilizing elastic members during the propulsion sequence impacting the accuracy due to the immense movement of the elastic members and other features. The device itself would not uniformly draw in a manner that was easily achieved or efficient, nor would the design stabilize increase accuracy. Rather, it would appear that the device described in Stanziale '302 would function poorly for at least this reason, would be difficult to draw due to the nature of the levering and related components, and raises serious questions in my mind as to whether this device could function at all.

38. I am unaware of anyone ever offering the Stanziale '302 design commercially, nor would it have been logical for anyone to pursue such an endeavor given the POSA's understanding that the device as intended by Stanziale '302 would be extremely inefficient and difficult to draw. Moreover, even if the device could function properly, the overly complicated nature of the disclosed device would lead not only to problems with performance and durability but also result in excessive manufacturing costs, further discouraging any efforts to implement the design in practice or to use it as a reference point for an improved theoretical design.

B. Overview of Stanziale '062 (EX1011)

39. International Patent Application Publication No. WO 2011/158062 to Stanziale (“Stanziale '062”) was published on December 22, 2011, and describes a device “for launching a projective or a launch object in general...” EX1011 at 1, Abstract.

40. Although Stanziale '062 does not necessarily present the same non-functionality concerns as Stanziale '302, in my opinion, the device disclosed in Stanziale '062 is also a classic example of an unnecessarily overengineered design, i.e., a design that presents an overcomplicated solution to a perceived problem despite the fact that far simpler and more efficient solutions were known to exist.

41. Similar to Stanziale '302, this is most evident in the overall relationship between Stanziale '062's limbs (elastic members 610), pulley assemblies (pulleys 145 and pulleys 146, connected at pivot 147), auxiliary arms 620, and stirrups 630. Rather than mounting the pulley assemblies to the limbs, Stanziale '062 instead inserts intervening structures in the form of auxiliary arms 620 and stirrups 630, which add unnecessary complexity and additional potential failure points. Any person of ordinary skill in the art of archery in general and crossbow design in particular would recognize that the device could only function if every component found in the device moved precisely in concert with one another, without any single component being out of time or out of alignment. Stanziale '062, however, discloses

a device with far more components than the typical crossbow – even in compound crossbow designs – which increases the risk that any one component could come out of alignment.

42. I am unaware of anyone ever attempting to develop the Stanziale '062 device or offer it as a commercially available design, nor would it have been logical for anyone to pursue such an endeavor. The overly complicated nature of the disclosed device would lead not only to problems with performance and durability but also excessive manufacturing costs, further discouraging any efforts to implement the design in practice or to use it as a reference point for an improved theoretical design.

C. Overview of Stanziale '771 (EX1012)

43. International Patent Application Publication No. WO 2011/141771 to Stanziale (“Stanziale '771”) was published on November 17, 2011, and describes a device “for launching a projective or a launch object in general...” EX1012 at 1, Abstract.

44. In my opinion, the device disclosed in Stanziale '771 is yet again a classic example of an unnecessarily overengineered design, i.e., a design that presents an overcomplicated solution to a perceived problem despite the fact that far simpler and more efficient solutions are known to exist.

45. Similar to Stanziale '302 and Stanziale '062, this is most evident in the overall relationship between Stanziale '771's limbs (elastic members 10), pulley assemblies (pulleys 145 and pulleys 146, connected at pivot 147), pushing arms 32, and elements 27. Rather than mounting the pulley assemblies to the limbs, Stanziale '771 instead inserts intervening structures in the form of pushing arms 32 and elements 27, which add unnecessary complexity and additional potential failure points. Any person of ordinary skill in the art of archery in general and crossbow design in particular would recognize that the device could only function if every component found in the device moved precisely in concert with one another, without any single component being out of time or out of alignment. Stanziale '771, however, discloses a device with far more components than the typical crossbow – even in compound crossbow designs – which increases the risk that any one component could come out of alignment.

46. I am unaware of anyone ever attempting to develop the Stanziale '771 device or offer it as a commercially available design, nor would it have been logical for anyone to pursue such an endeavor. The overly complicated nature of the disclosed device would lead not only to problems with performance and durability but also excessive manufacturing costs, further discouraging any efforts to implement the design in practice or to use it as a reference point for an improved design.

D. Overview of Darlington (EX1013)

47. U.S. Patent Pub. No. 2011/0030666 to Darlington (“Darlington”) was published on February 10, 2011, and “is directed to a compound archery crossbow” EX1013 at 1, Abstract.

48. Darlington teaches a much more conventional compound crossbow than any of the Stanziale references, with the purported innovations being related to certain structural features that increase accuracy and other structural features that increase power stroke. With respect to the goal of accuracy, Darlington teaches as follows:

When the bowstring 32 is drawn back to cock the crossbow 10, the first power cable 28, the second power cable 30, and the bowstring 32 remain substantially parallel to each other, just as in the “relaxed” position. And, because the first power cable 28 is anchored at the top of the first cam 24 and second cam 26, the second power cable 30 is anchored at the bottom of the first cam 24 and second cam 26, and the bowstring 32 is anchored substantially in the middle of the first cam 24 and second cam 26, the torque on the first axel assembly 34A and the second axel assembly is effectively neutralized, which substantially eliminates twisting forces on the limbs 16A & B and 18A & B of the crossbow 10. **Eliminating those twisting forces helps further improve the accuracy of the crossbow 10.**

Id. at ¶[0046] (emphasis added). That is, Darlington teaches that eliminating twisting forces on the limb to achieve the state goal of improving accuracy is achieved by configuring the crossbow so that (1) the power cables stay substantially parallel to

the drawstring and therefore parallel to each cam's plane of rotation throughout the draw cycle and (2) the orientation of the power cables and the drawstring relative to each other remain consistent throughout the draw cycle with the orientation of the power cables and the draw string in the drawn position just as they are in the released position.

49. Darlington further teaches that the power of a crossbow is increased by using a "reverse draw configuration [that] increases the distance that the bowstring 32 can be pulled away from the riser, thereby increasing the power stroke and improving the performance of the crossbow 10'."

50. Darlington discloses a "shoot-through" configuration in "the bowstring 32 [is] pulled away from the riser 20 and through the first power cable 28 and second power cable 30." *Id.* at ¶[0042]. This shoot-through configuration is one way of permitting a reverse draw configuration and also requires that the referenced power cables stay substantially parallel to the drawstring and the cams' plane of rotation throughout the draw cycle and consistently oriented relative to each other such that the power cables and the drawstring are arranged in the drawn position just as they are in the released position. *Id.* at ¶[0041], ¶[0043]; *see also id.* at ¶[0053].

51. In addition to the shoot-through configuration, Darlington also teaches a "shoot-over" configuration. Darlington explains the differences between the shoot-through and shoot-over configurations as follows:

The primary difference between [the shoot-through and shoot-over] configurations is that, unlike [the shoot-through] configurations, the first power cable 28 and the second power cable 30 are both located at the bottoms of the first cam 102 and second cam 104 and must therefore be deflected. That deflection may result in twisting forces being exerted on the limbs 16A & B and 18A & B. That twisting force, however, is significantly reduced because the let-out grooves 102A and 104A are disposed close to the hybrid grooves 102B and 104B on the first axle assembly 34A and second axle assembly 34B, respectively, thereby reducing the torque produced on the limbs 16A & B and 18A & B when the bowstring is drawn away from the riser 20....

Id. at ¶[0060].¹ Thus, while the “shoot-over” configuration does require some displacement of the power cables away from the drawstring while still being substantially parallel to one another, the orientation of the power cables and the drawstring relative to each other must be consistent throughout the draw cycle and the power cable journals (hybrid grooves 102B and 104B) must be “disposed close to” the drawstring journals (let-out grooves 102A and 104A) and, by extension, to the drawstring journals’ plane of rotation. Ignoring these teachings and allowing the

¹ Petitioner and Dr. Batzer identify let-out grooves 102A and 104A as corresponding to the first and second power cable take-up journals (albeit not helical) recited in Claim 1 of the ’015 Patent and identify hybrid grooves 102B and 104B as the first and second drawstring journals recited in Claim 1 of the ’015 Patent. Petition at 48-49; EX1016 at ¶199, ¶202.

power cable journals to extend perpendicularly away from the drawstring journals and their plane of rotation, as would be done with helical power cable take-up journals, would result in the very “twisting forces” and “torque” on the limbs that Darlington’s teaches as undermining its goal of increased accuracy. *E.g., id.* at Abstract, ¶[0046], ¶[0060].

E. Overview of Kempf ’871 (EX1014)

52. U.S. Patent No. 7,836,871 to Kempf (“Kempf ’871”) issued on November 23, 2010, from Application No. 11/654,418, which was filed on January 17, 2007. EX1014 at 1. Kempf ’871 is directed to “[a] crossbow having an increased powerstroke and reduced noise.” *Id.* at Abstract.

53. Specifically, Kempf ’871 discloses a crossbow in a reverse-draw configuration, which is described as having “a low-cost, simple manufacture,” “a compact, lightweight construction,” “a reduced ratio of the axle-to-axle distance to the powerstroke,” “reduced maintenance requirements,” “an increased power stroke,” and other identified features. *Id.* at Abstract, 2:39-55. The actual description of the disclosed crossbow, however, is relatively short. The “detailed description of the preferred embodiment” spans just over three columns in the specification. *See id.* at 3:40-6:47.

54. Kempf ’871’s limited description of its crossbow includes the following:

A crossbow according to the present invention is shown generally as (10) in FIG. 1. As shown in FIGS. 1 and 2, the crossbow (10) is provided with a frame (12) which includes a stock (14) and a rail (16). Although the stock (14) and rail (16) maybe of any type known in the art, in the preferred embodiment the stock (14) is of a composite material construction, and the rail (16) is constructed of aluminum. Alternatively, the crossbow (10) may be of a “railless” design, such as those known in the art.

The crossbow (10) is provided with a pivotable foot stirrup (18) to facilitate cocking of the crossbow (10). As shown in FIG. 1, the crossbow (10) is also provided with a pair of risers (20) and (22) secured to the rail (16). The risers (20) and (22) are preferably constructed of aluminum to reduce weight. Coupled to the risers (20) and (22) are limbs (24) and (26). The limbs (24) and (26) are constructed and coupled to the risers (20) and (22) in a manner such as that known in the art. Coupled to the first limb (24) is a first string guide, which in the preferred embodiment is a pulley (28), having an outer track (30) and an inner track (32). The pulley (28) is preferably journaled to the end of the limb (24) by an axle (34). The pulley (28) is preferably journaled to the limb (24) in a manner which positions a portion of the pulley (28) forward and outward of the space defined between the limbs (24) and (26). As shown in FIG. 1, a second string guide, which in the preferred embodiment is a cam (36), is journaled to the second limb (26) by an axle (38). The cam (36) is also journaled to the second limb (26) so that at least a portion of the cam (36) extends forward and outward of the area defined between the limbs (24) and (26). The cam (36) is preferably less than twenty centimeters, more preferably less than fifteen centimeters and most preferably ten and eight tenths (10.8) centimeters in diameter. The cam (36) is preferably constructed as shown in FIG. 3, but may be constructed in a manner known in the art.

Id. at 3:40-4:7.

55. In relevant part, this passage teaches a reverse-draw crossbow having a first string guide in the form of a pulley (28) and a second string guide in the form of a cam (36). While the pulley (28) is described as having an outer track (30) and an inner track (32), no such features are described on the cam (36) or shown in Figure 3. In fact, nothing in Kempf '871 describes or shows a cam having an outer track (30) or an inner track (32) at all. *See generally id.*

56. Kempf '871 also teaches an alternative embodiment in which “two synchronized cams (not shown) may be used in place of the cam (36) and pulley (28).” *Id.* at 4:12-13. Again, however, Kempf '871 does not describe either of these “synchronized cams” as having an outer track (30) and an inner track (32). In fact, it does not describe or show any features of these cams at all. *See generally id.*

F. Overview of Islas (EX1015)

57. U.S. Patent Pub. No. 2011/0308508 to Islas (“Islas”) was published on December 22, 2011, and describes “[a] compound bow or crossbow....” EX1015 at 1, Abstract.

58. Islas’s specification is remarkably short and lacks a significant amount of detail. In fact, the “detailed description of a preferred embodiment” section spans less than one column and provides a basic explanation of what appears to be a fairly simple and conventional crossbow. This section’s substantive description of the disclosed invention is reproduced below in its entirety:

The invention is explained in terms of a possible preferred embodiment, here a crossbow 10, in which there is an axial beam or stock 12 defining a medial plane with a riser 14 extending transversely at a front or distal end thereof. At each end of the riser 14 there is a power limb or spring limb 16, i.e., a spring limb at the right end of the riser and one at the left end. Each spring limb 16 has one end anchored to the riser and at its other end a pivot 18 in which a respective cam wheel 20 is supported. In this embodiment, the spring limbs 16 are formed of an upper portion and a lower portion, with the cam wheel 20 held in between them.

Note that in a crossbow, the riser extends horizontally or transversely, while in a long bow the riser extends vertically. The mechanics of operation are the same in either orientation.

A bow string 22 is attached to each bowstring cam 20 and rides in a peripheral bowstring groove or channel 24 in each of these cams. In this invention there are no synchronizing pulleys nor any crossover cables. At each limb there are a pair of power cables 26 are reeved to respective power cable cam grooves 28 *a* and 28 *b* that are coaxial with the associated bowstring cam groove 24, and are situated axially above and below the same. These cam grooves 24, 28 *a* and 28 *b* are shown in relation to the axle 30 of the cam wheel 20 (See FIG. 4) The other ends of the power cables 26 are affixed at anchor points, here in the form of rigid pylons 32 affixed onto the riser, and projecting proximally (toward the archer position or handle end of the crossbow). In other possible embodiments, the anchor points may be on the beam or stock 12. Importantly, the power cords 26 do not cross the medial plane of the bolt or arrow, and do not travel against one another nor travel on or against any mechanical parts such as pulleys.

Also shown here is a traveling string release 34 mounted on a track on the top of the beam 12. This release can closed over the bow string and then cranked back to a full

draw position by means of a screw or pulley mechanism (not shown). Many other cocking devices are possible. Also a finger trigger mechanism 26 is shown at a handle end of the stock.

Id. at ¶¶[0011]-[0014].

59. As this section explains and the figures show, Islas describes a basic compound crossbow or upright bow in a forward-draw configuration. *Id.* at Figs. 1-3. In the disclosed crossbow, the bow string 22 is attached to a pair of bowstring cams 20, specifically riding in a peripheral groove or channel 24 that sits between a pair of power cable cam grooves 28 *a* and 28 *b*. *Id.* at ¶[0013], Figs. 2-4. Between the two bowstring cams, the bow string 22 is releasably attached to a traveling string release 34, which is slidably attached to a track on top of the stock so that the bowstring can be pulled up-range to draw the crossbow. *Id.* at ¶[0014], Fig. 1.

60. Meanwhile, two power cables 26 are attached to and ride within the power cable cam grooves 28 *a* and 28 *b* on each bowstring cam 20, the top power cables 26 being associated with power cable cam grooves 28 *a* and the bottom power cables 26 being associated with power cable cam grooves 28 *b*. *Id.* at ¶[0013], Figs. 2-4. At their other end, each power cable is fixed either directly to the stock or to a pair of rigid pylons 32 affixed onto the riser, in either case being attached below the top surface of the stock. *Id.* at ¶[0013], Fig. 1.

61. Thus, Islas teaches a simple crossbow in a standard, forward-draw configuration in which the bow string sits between the two power cables at the

bowstring cams but above the two power cables at the stock. The power cable and related anchor points and positioning, including the spacing and related separation of power cables, eliminates similarities of other designs, particularly the '015 Patent. The Islas design teaches that cam grooves that are flared in respect to the cam axle creating an extension far beyond the central axle point and do not purport a singular groove, placed on either side of the cam limiting degrees of rotation.

VII. LEVEL OF ORDINARY SKILL IN THE ART

62. I have not been asked to provide an opinion on the level of ordinary skill in the art at the time of the invention. Instead, for purposes of this declaration only, I have been asked to apply the definition of a POSA proposed by Petitioner.

63. I understand that Petitioner and Dr. Batzer contend that a POSA at the time of invention “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” and that “[s]uch 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.” Petition at 28; EX1016 at ¶17.

64. Although my qualifications and experience exceed those of the hypothetical person having an ordinary level of skill in the art, my analysis and

conclusions herein are from the perspective of a person of ordinary skill in the art as of December 16, 2013 (the earliest effective filing date of the '015 Patent), unless otherwise noted.

VIII. CLAIM CONSTRUCTION

A. “Mounted to”

65. I understand that Petitioner asserts that the phrase “mounted to” should be construed to mean “connected to, either directly or indirectly.” I disagree with this proposed construction, which in my opinion, a POSA would find unsupported by the language of the '015 Patent and overbroad to the point of having no meaning at all.

66. Petitioner’s proposed construction of “mounted to” would not provide a POSA with any frame of reference to understand how the components of the crossbow described in Claim 1 should be arranged relative to each other. In fact, I understand that Dr. Batzer, the alleged expert retained by Petitioner in this proceeding, admitted during his deposition that, under his and Petitioner’s interpretation of “mounted to,” even a sticker placed on the stock of a crossbow for decoration would not only be “mounted directly to the stock, but indirectly to all other components.” EX1030 at 146:20-24. That is, the sticker placed on the stock would be “mounted to” each and every component of the crossbow, such as the stock, the trigger, the bowstring, the power cables, the string guides, the flexible

limbs, etc. *Id.* at 147:25-148:13. As a result, given such a proffered construction, a POSA reading Claim 1 with no way to determine what the physical relationship is between the claimed string guide and the limb.

67. Candidly, Petitioner and Dr. Batzer’s supposed understanding of the term “mounted to” is absurd. For example, Claim 1 recites a “crossbow, comprising” “first and second flexible limbs” and “a first string guide mounted to the first bow limb and rotatable around a first axis.” EX1001 at Claim 1. If Petitioner and Dr. Batzer’s proposed construction of “mounted to” is applied to this claim language, the phrase “mounted to” would be effectively read completely out the claim. The inclusion of “mounted to” would add nothing to the claim’s description of the physical relationship between different elements that is not already covered by the claim’s recitation of a crossbow comprising a series of elements since, by Dr. Batzer’s own admission, every component of a crossbow is “mounted to” every other component under his and Petitioner’s construction.

68. A POSA would not have such a broad, unbounded understanding of “mounted to,” in this context when considering the language of Claim 1 and the teachings of the ’015 Patent. Instead, I agree with Patent Owner that a POSA would understand the plain and ordinary meaning of “mounted to” in Claim 1 of the ’015 Patent to be “physically connected to allow only rotation about a fixed axis.” This interpretation is consistent with the specification and claims of the ’015 Patent;

Petitioner's and Dr. Batzer's proposed interpretation are not supported by the intrinsic record.

69. The '015 Patent itself supports Patent Owner's construction. In the '015 Patent, "mounted to" is consistently used to describe the physical connection between a string guide and a limb, as well as the resulting physical constraints on the string guide. For example, Claim 1 itself recites "a first string guide mounted to the first bow limb and rotatable around a first axis." EX1001 at Claim 1.

70. As another example, the '015 Patent specification describes the string guide as physically connected with the limb such that the string guide always moves with the limb it is mounted to, but for the ability of the string guide to rotate relative to the limb about an axis, stating that "[t]he string guides 366 are mounted to the bow limb 362 and are rotatable around first and second axis 368A, 368B ('368'), respectively." *Id.*, 6:34-36, This relationship can further be seen in Figure 12, which is provided below with my annotations with the string guides in blue and limbs in red:

'015 Patent (EX1001) at Fig. 12

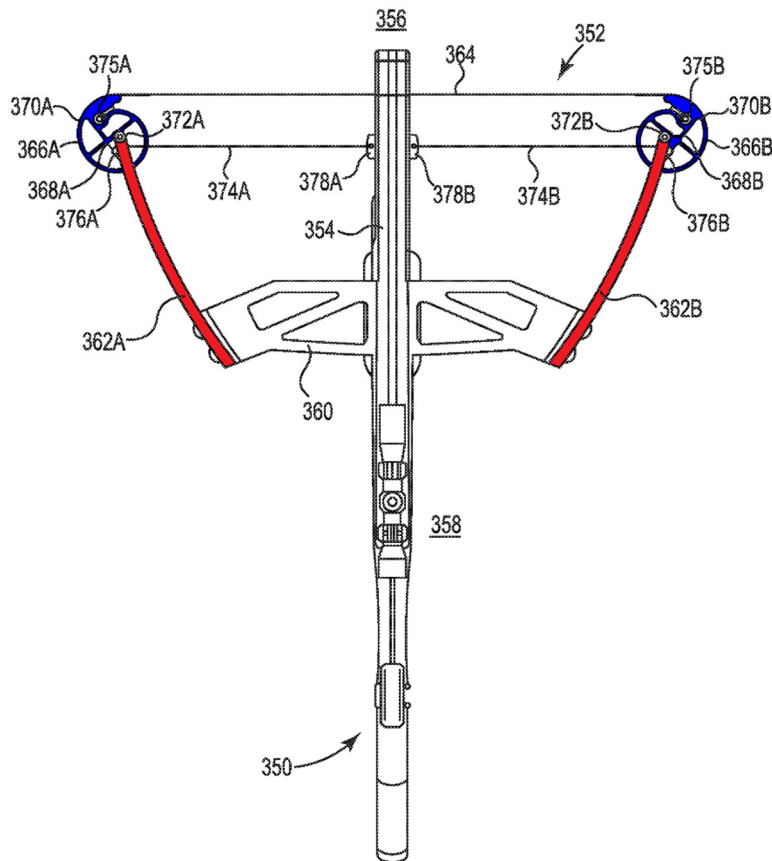
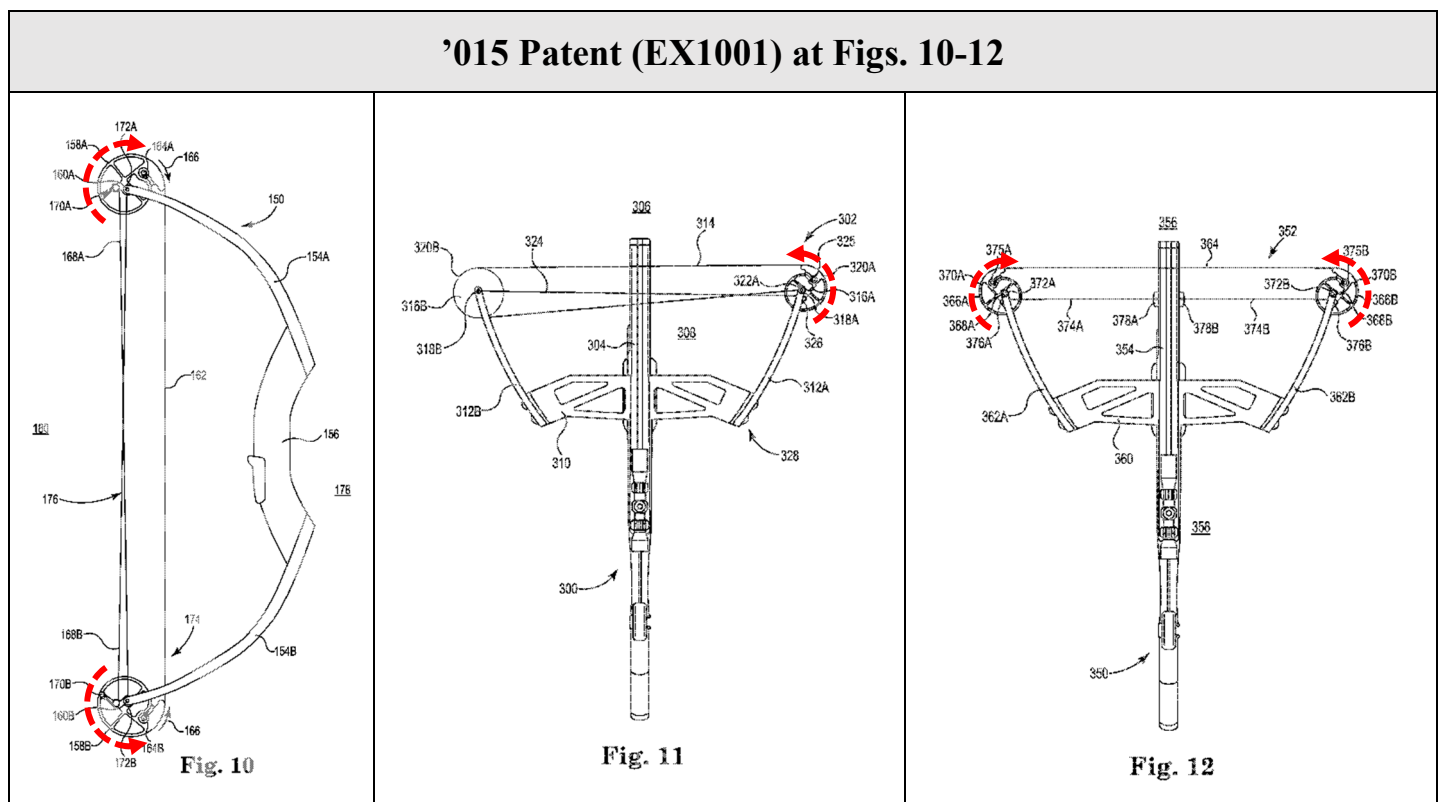


Fig. 12

71. Likewise, in all of the other embodiments in the '015 Patent's specification, the string guides are described or shown as being physically connected to the limbs such that a string guide always moves with the limb it is mounted to and, when the crossbow is viewed from above, the string guide cannot translate along an x- or y-axis relative to that limb. In fact, the only way the '015 Patent describes

or shows the string guide as moving relative to the limb is via rotation. *See, e.g., id.* at Figs. 10-12, 3:34-42.

72. This is true even though the '015 Patent describes a number of structurally different embodiments. For example, as seen in the following annotated versions of Figures 10-12 provided below, all of the Figures illustrate the string guide as being physically connected to the limb in such a way that the string guide will always move with the limb when it comes to translational movement and can only rotate relative to the limb about an axis:



73. The movement of the string guide, both rotationally relative to the limb and translationally with the limb, is also illustrated well in Patent Owner's Exhibit

2005. As can be seen in that animation, while the string guide is able to rotate around a fixed axis on the limb, it is otherwise directly fixed to and remains in the same position relative to the limb. That is, it never translates relative to the limb.

74. In my opinion, a POSA would understand the term “mounted to” to include the previously described characteristics, and I am not aware of anything in the ’015 Patent itself or in its patent prosecution record that would compel a different result.

IX. CLAIM 1 OF THE ’015 PATENT IS NOT ANTICIPATED OR OBVIOUS

75. I disagree with Petitioner’s argument and Dr. Batzer’s opinion that Claim 1 of the ’015 Patent is anticipated or obvious. In my opinion, and as described in more detail below, in some instances, the prior art cited by Petitioner and Dr. Batzer fails to disclose certain limitations required by the claims and therefore cannot anticipate Claim 1. In other instances, the prior art cited does not render Claim 1 obvious as a POSA would not have been motivated to modify or combine the various references in the manner that Petitioner and Dr. Batzer suggest.

A. The Prior Art Fails to Disclose Certain Claim Elements

1. Stanziale ’302 (Grounds 1, 2, and 11)

76. I understand that Petitioner and Dr. Batzer rely on Stanziale ’302 as the sole prior art reference in Grounds 1 and 2 and further rely on Stanziale ’302 as a secondary reference in Ground 11. In these grounds, Petitioner and Dr. Batzer argue

that Stanziale '302 anticipates Claim 1 of the '015 Patent (Ground 1) or renders Claim 1 obvious, either alone (Ground 2) or in combination with Kempf '871 (Ground 11).

77. In my opinion, Stanziale '302 fails to disclose certain limitations for which Petitioner and Dr. Batzer rely on it in Grounds 1, 2, and 11. As a result, these grounds cannot establish that Claim 1 of the '015 Patent is unpatentable as anticipated or obvious.

a. Stanziale '302 does not disclose “a first string guide mounted to the first bow limb” or “a second string guide mounted to the second bow limb”

78. As I previously explained, a POSA would understand the term “mounted to” as used in the context of the '015 Patent's claims to mean “physically connected to allow only rotation about a fixed axis.” See ¶¶65-74, *supra*. Under this proper construction, a POSA would understand that Stanziale '302 does not disclose a crossbow including “a first string guide mounted to the first bow limb” or “a second string guide mounted to the second bow limb,” as required by Claim 1.

79. I understand that Petitioner and Dr. Batzer both identify Stanziale '302's pulley assemblies 50 as corresponding to the string guides recited in Claim 1. Petition at 31; EX1016 at ¶145. The pulley assemblies 50 are shown in several of Stanziale '302's Figures, including Figures 1-4, which are provided below with annotations added to show the pulley assemblies 50 in blue:

Stanziale '302 (EX1007) at Figs. 1-4

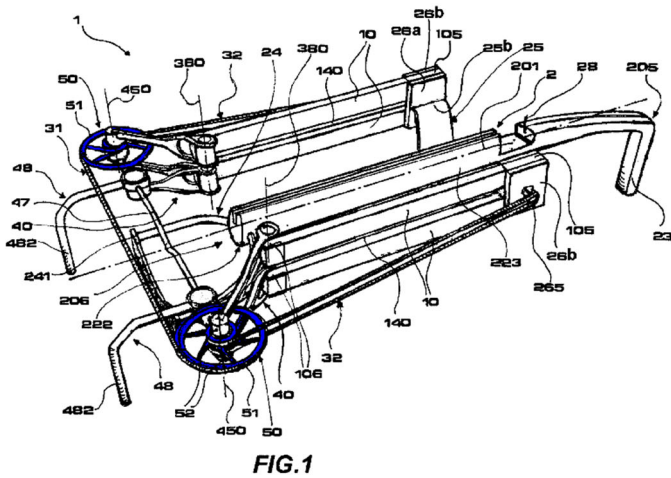


FIG.1

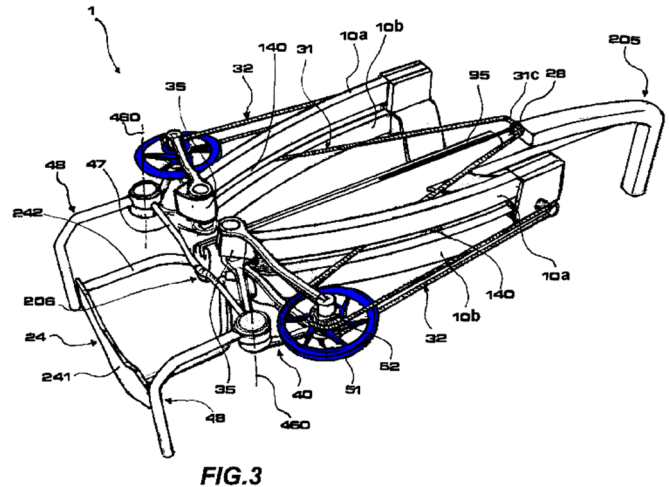


FIG.3

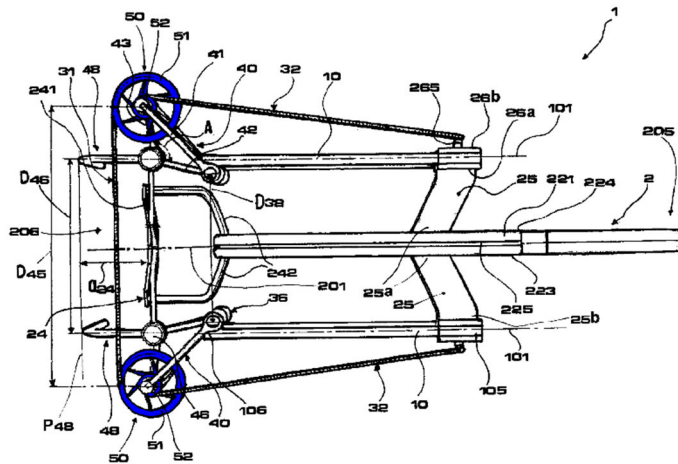


FIG.2

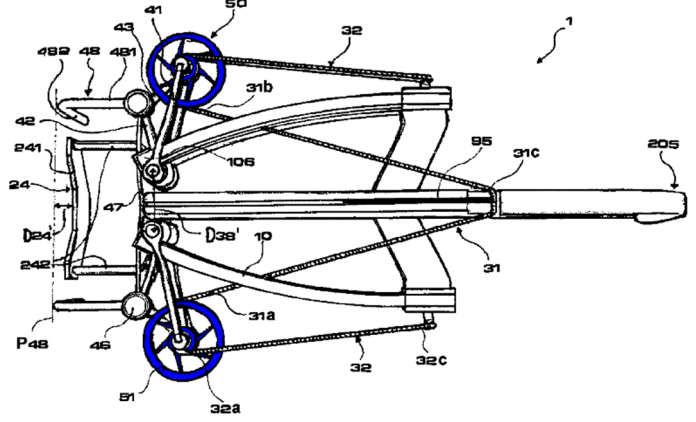


FIG.4

80. I further understand that Petitioner and Dr. Batzer both identify Stanziale '302's elastic members 10 as corresponding to the first and second limbs recited in Claim 1. Petition at 30; EX1016 at ¶144. Like the pulley assemblies 50, the elastic members 10 are also shown in the Stanziale '302 Figures, including Figures 1-4, which are provided below with annotations added to show the elastic members 10 in red:

Stanziale '302 (EX1007) at Figs. 1-4

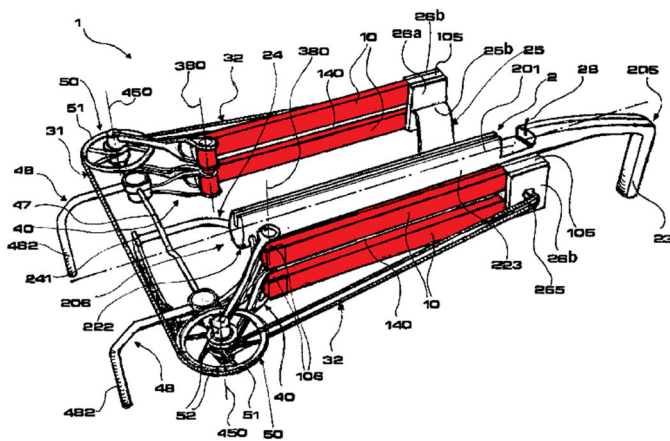


FIG. 1

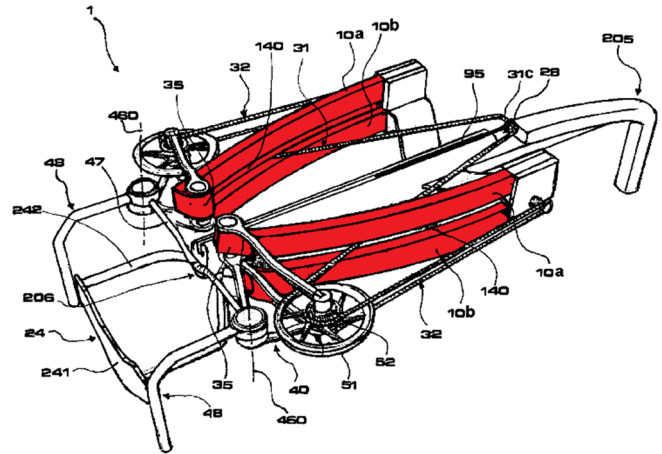


FIG. 3

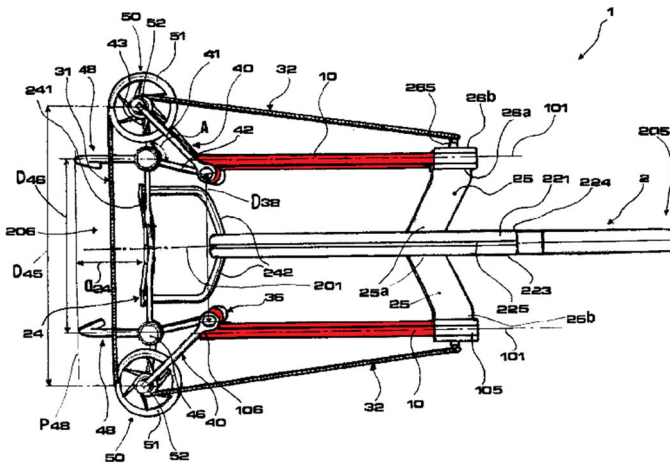


FIG. 2

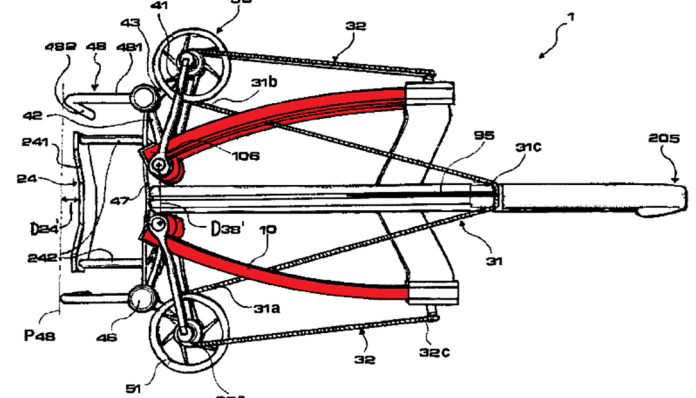


FIG. 4

81. A POSA would understand from these and other teachings of Stanziale '302 that pulley assemblies 50 are not physically connected or “mounted to” the elastic members 10 as required by Claim 1 of the '015 Patent. Rather, the pulley assemblies 50 are mounted to levers 40, separate components from elastic members 10, which are shown in green in the following annotated versions of Figures 2 and 4 along with the pulley assemblies 50 (blue) and elastic members 10 (red):

Stanziale '302 (EX1007) at Figs. 2, 4

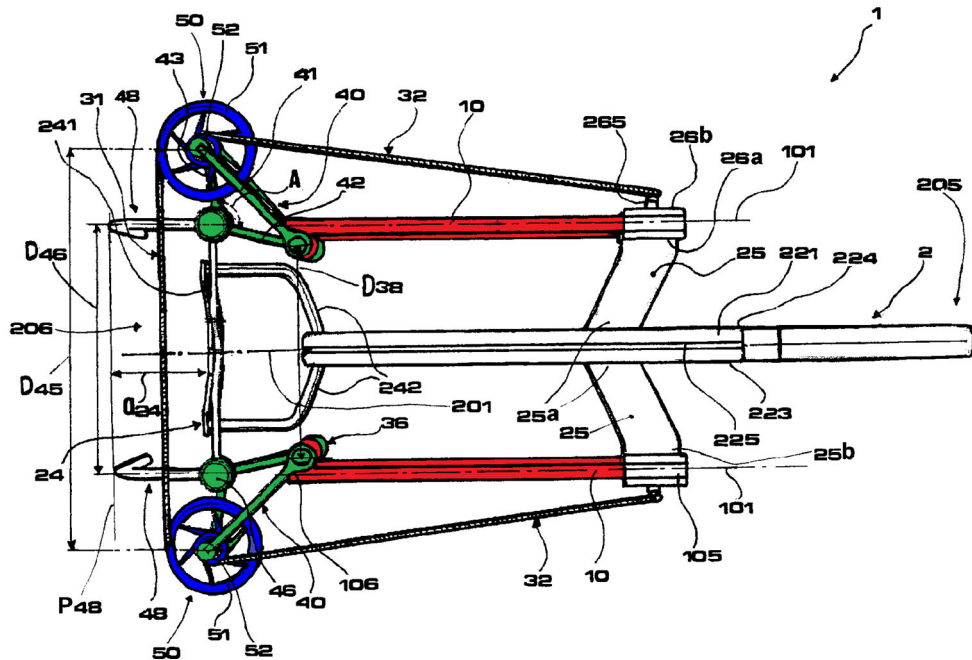


FIG.2

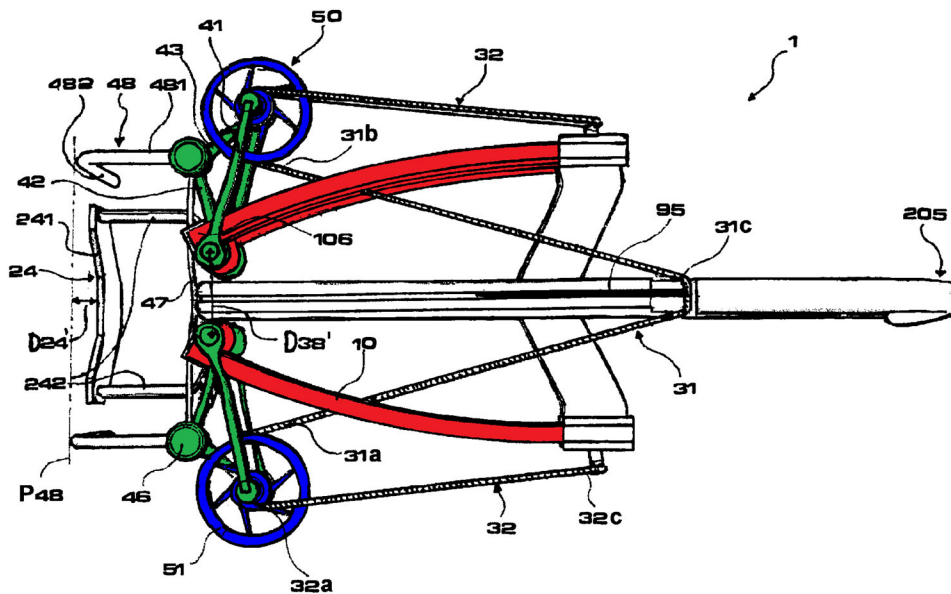


FIG.4

82. Stanziale '302 describes the levers 40 in detail, teaching that the Stanziale '302 device “comprises at least two arms or levers 40 which are movable

with respect to the stock 2” and that each “lever 40 comprises two first branches 41 (in particular, an upper first branch 41 a and a lower first branch 41 b), a second branch 42 and a third branch 43. The first, second and third branches 41, 42, 43 form a substantially triangular structure, so that the lever 40 is a basically non-deformable assembly.” EX1007 at ¶[0078], ¶[0080]. Moreover, “each lever 40 comprises a rigid triangular-shaped structure formed by lower first branch 41b, second branch 42 and third branch 43; the upper first branch 41a is parallel with the lower first branch 41b and both are fastened to the first pivot 45.” *Id.* at ¶[0095]. Each lever 40 as a whole is then “pivoted to the respective connecting members 35a, 35b and, then, to the elastic members 10a, 10b fastened to the latter, the entire lever 40 being rotatable about the pin axis 380,” such that each lever 40 is “pivoted to the second end 106 of the elastic members 10 at the respective side of the stock 2.” *Id.* at ¶[0096], ¶[0078].

83. Meanwhile, each “pulley assembly 50, comprising a first pulley 51 and at least one second pulley 52, is mounted on the first pivot 45 [of a lever 40] and is configured to rotate with respect to the first pivot 45. Thus, the pulley assembly 50 is arranged between the upper first branch 41a and the lower first branch 41b and is pivoted to them.” *Id.* at ¶[0096]; *see also id.* at ¶[0099] (“The pulley assembly 50 has a central bore 505 into which the first pivot 45 is inserted, so that the pulley assembly 50 is rotatable about the first pivot axis 450. In other words, the pulley assembly 50 is mounted idle on the first pivot 45.”); Figs. 9-10. Accordingly, the

pulley assemblies 50 are connected to and rotatable with respect to the levers 40, which are positioned between the pulley assemblies and the elastic members 10.

84. Based on these teachings, a POSA would readily understand that under the proper construction of “mounted to” the pulley assemblies 50 are each physically connected to a lever 40 at its first pivot 45, **not** to elastic members 10. The pulley assemblies 50 are not physically connected to elastic members 10, nor are they moveable relative to the elastic members 10 solely via rotation about a vertical axis. Instead, the pulley assemblies 50 are physically connected to and rotatable relative to the levers 40. Each lever 40 is a moment arm that is itself pivotably mounted to the elastic member 10, and as a result, pulley assemblies 50 both rotate about a vertical axis and translate along x- and y-axes relative to the elastic members 10 when the device is viewed from above. This provides for three degrees of freedom between the pulley assemblies 50 and the elastic members 10, not the single degree of freedom (rotation about an axis) that the crossbow of Claim 1 permits between the string guide and limb.

85. The foregoing principles can be clearly observed by comparing the previously annotated versions of Figures 2 and 4 of Stanziale '302, which show the Stanziale '302 device in its released configuration and drawn configuration, respectively, and are reproduced below with further annotations showing the three degrees of freedom of pulley assemblies 50:

Stanziale '302 (EX1007) at Figs. 2, 4

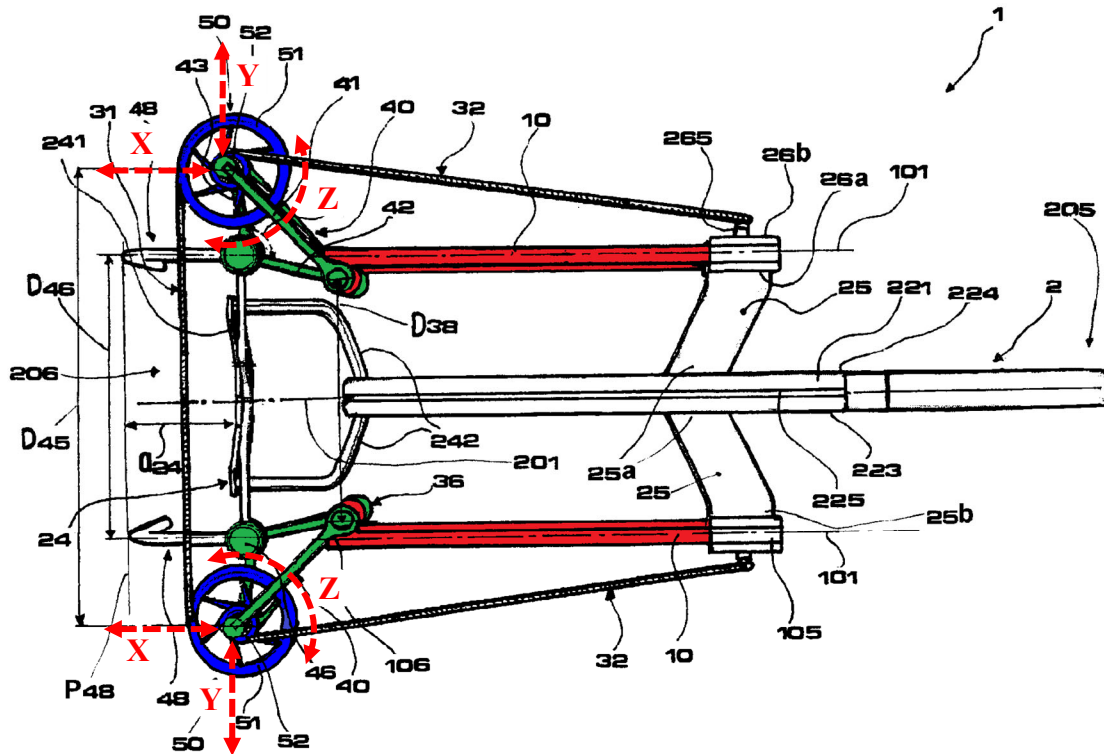


FIG. 2

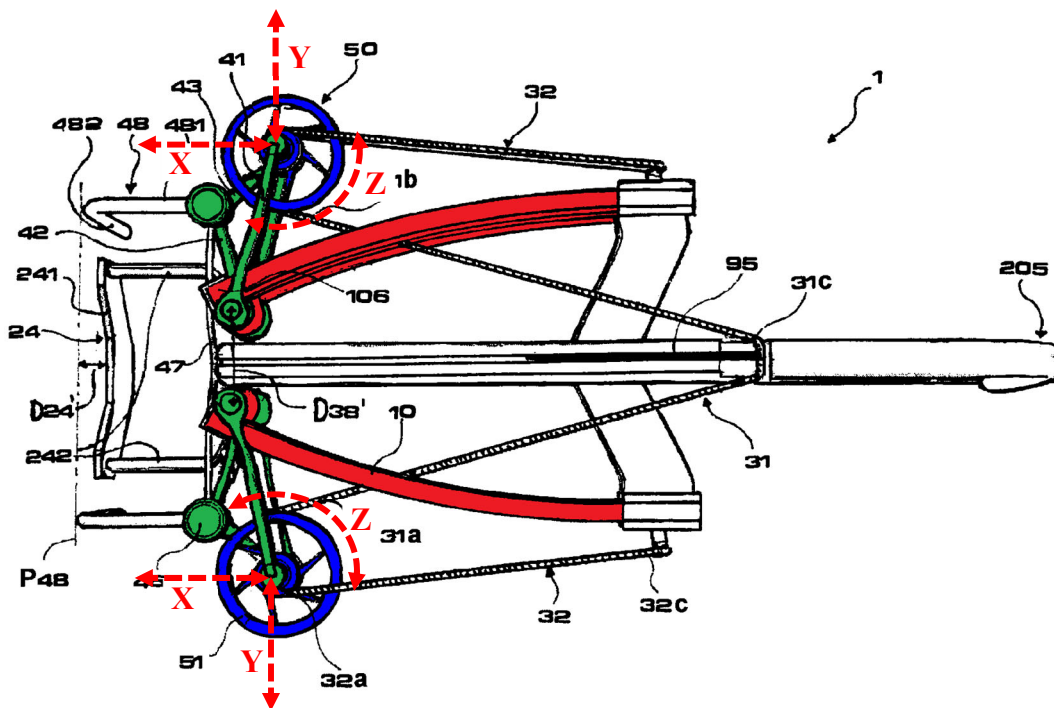


FIG. 4

86. The way that the pulley assemblies 50 are connected to and move relative to elastic members 10 is fundamentally different from how the string guides are connected to and permitted to move relative to the limbs in the crossbow of Claim 1 of the '015 Patent or how the relationship between these components is described in the '015 Patent's specification. Unlike Stanziale '302 with multiple degrees of freedom between the string guides and limbs, the '015 Patent discloses only a single degree of freedom between the string guides and limbs – specifically, the string guides are permitted only to rotate about a fixed axis – and the string guides are otherwise fixed in position relative to the ends of the limbs. This can be seen, for example, in the following annotated versions of Figures 11 and 12 of the '015 Patent, which show the string guides (elements 316A and 366 (EX1001 at 5:64-65; 6:34-36)) in blue and the limbs (elements 312A and 362 (*id.* at 5:57-59; 6:28-30)) in red:

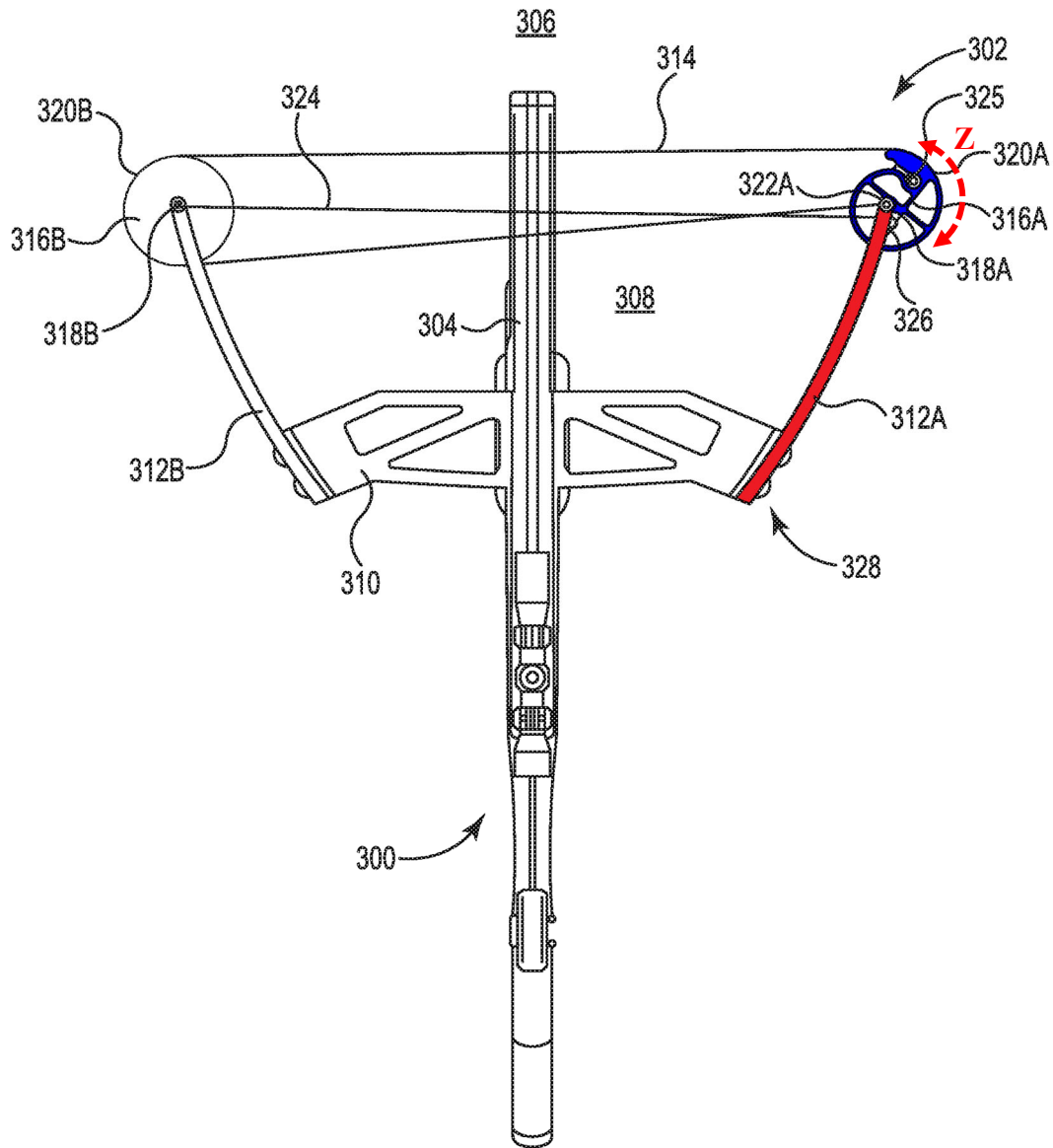


Fig. 11

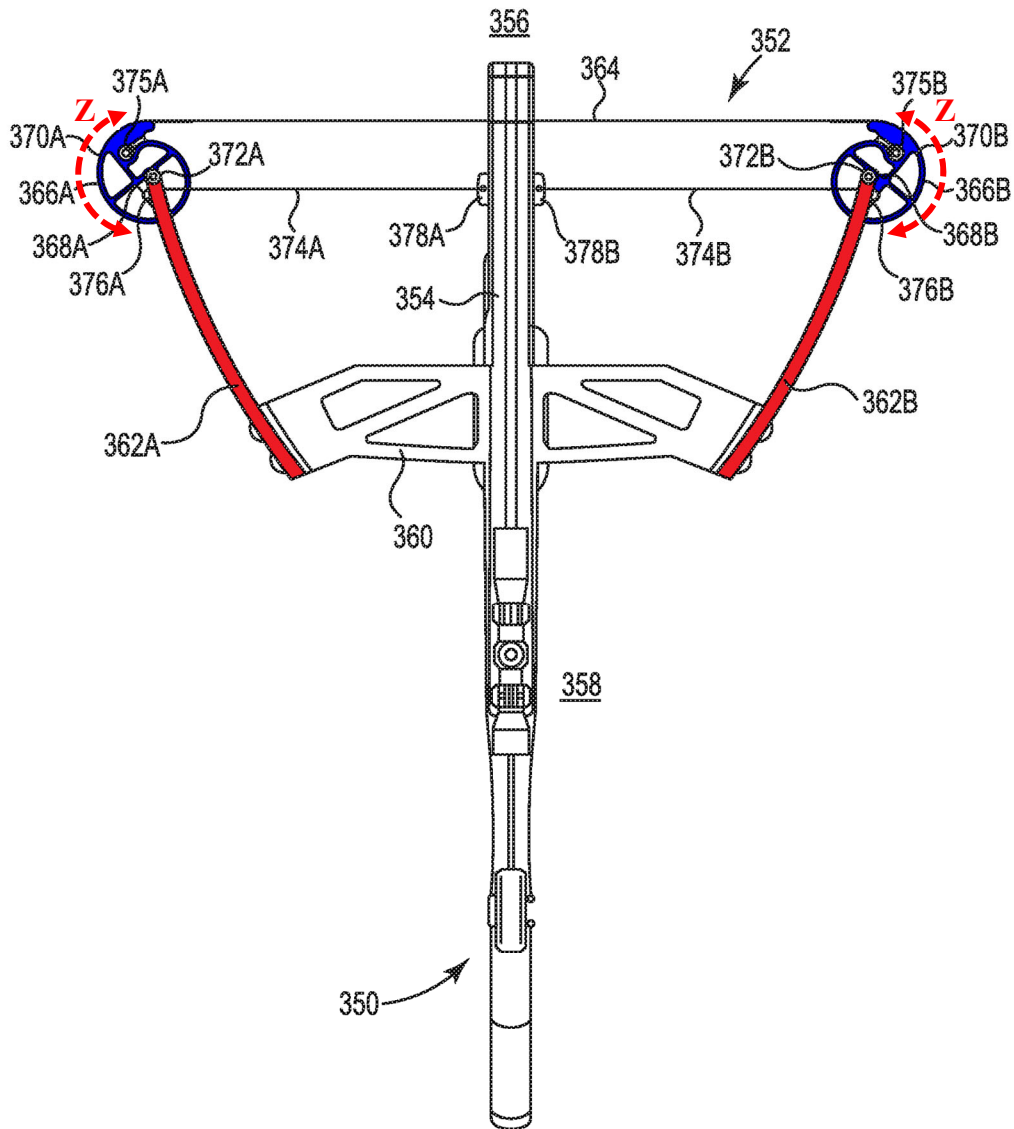


Fig. 12

87. It is therefore my opinion that, when considering Stanziale '302's description and depiction of the pulley assemblies 50, elastic members 10, and levers 40 and the physical relationship between these components, a POSA would

understand that Stanziale '302 does not disclose a crossbow having “a first string guide mounted to the first bow limb” or “a second string guide mounted to the second bow limb” either explicitly or inherently. Accordingly, Grounds 1 and 2, which rely solely on Stanziale '302 for these limitations, fail.

- b. Petitioner and Dr. Batzer do not establish that Stanziale '302 discloses a crossbow in which “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”**

88. A POSA would understand that Stanziale '302 does not disclose a crossbow in which “the upper and lower 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,*” as required by Claim 1.

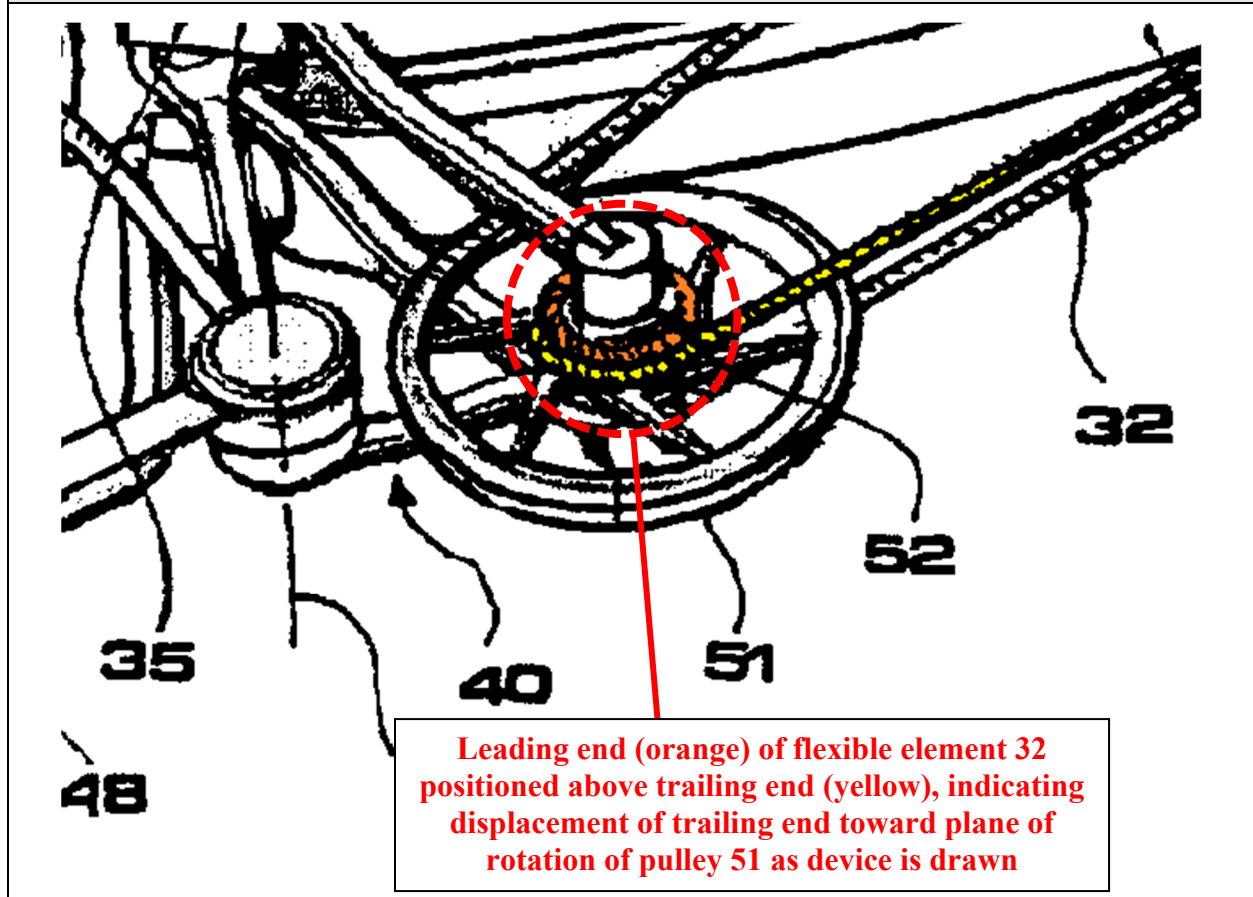
89. I understand that Petitioner and Dr. Batzer both identify Stanziale '302's flexible elements 32 as corresponding to the first and second power cables recited in Claim 1. Petition at 35; EX1016 at ¶150. I further understand that Petitioner and Dr. Batzer identify Stanziale '302's perimetral tracks or grooves 511 as corresponding to the first and second draw string journals and perimetral tracks

or grooves 521 as corresponding to the first and second power cable take-up journals recited in Claim 1.² Petition at 31, 33; EX1016 at ¶¶146-147.

90. Claim 1 specifically requires that the first and second power cables (also referred to in the written description as the upper and lower power cables) are displaced “away from the first and second planes of rotation of the first and second drawstring journals.” Stanziale ’302, however, expressly discloses that flexible elements 32 are displaced towards the planes of rotation for perimetral tracks or grooves 511. This can be seen most clearly in Figure 3 of Stanziale ’302, which shows the leading end of flexible elements 32 positioned above the trailing end, indicating that as flexible element 32 wraps onto perimetral track or groove 521, the trailing end is displaced toward the plane of rotation. The following annotated excerpt of Figure 3, which shows the leading end in orange and the trailing end in yellow, illustrates this point:

² Stanziale ’302 discloses that the perimetral tracks or grooves 511 and 521 are located on pulleys 51 and 52, respectively. EX1007 at ¶[0105]. Pulleys 51 and 52 are both components of pulley assembly 50. *Id.* at ¶[0103].

Stanziale '302 (EX1007) at Fig. 3



91. A POSA would not understand an express teaching of displacing flexible element 32 toward the plane of rotation to also constitute a teaching of displacing flexible element 32 away the plane of rotation. Moreover, as discussed in further detail below, a POSA would have had no motivation to modify perimetral tracks or grooves 521 to reverse the direction of displacement. See ¶¶179-191, *infra*.

92. It is therefore my opinion that, when considering Stanziale '302's description and depiction of flexible elements 32 and the various features of pulley assemblies 50, a POSA would understand that Stanziale '302 does not disclose a

crossbow in which “the upper and lower 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” either explicitly or inherently, nor would it have been obvious to modify Stanziale ’302 to meet this limitation.

2. Stanziale ’062 (Grounds 3 and 4)

93. I understand that Petitioner and Dr. Batzer rely on Stanziale ’062 as the sole prior art reference in Grounds 3 and 4. In these grounds, Petitioner and Dr. Batzer argue that Stanziale ’062 anticipates Claim 1 of the ’015 Patent (Ground 3) or renders Claim 1 obvious (Ground 4).

94. In my opinion, Stanziale ’062 fails to disclose certain limitations for which Petitioner and Dr. Batzer rely on it in Grounds 3 and 4. As a result, these grounds cannot establish that Claim 1 of the ’015 Patent is unpatentable as anticipated or obvious.

a. Stanziale ’062 does not disclose “a first string guide mounted to the first bow limb” or “a second string guide mounted to the second bow limb”

95. As I previously explained, a POSA would understand the term “mounted to” as used in the context of the ’015 Patent’s claims to mean “physically connected to allow only rotation about a fixed axis.” *See* ¶¶65-74, *supra*. Under this proper construction, a POSA would understand that Stanziale ’062 does not disclose

“a first string guide mounted to the first bow limb” or “a second string guide mounted to the second bow limb,” as required by Claim 1.

96. I understand that Petitioner and Dr. Batzer both identify either Stanziale '062's pulley 145 or the combination of Stanziale '062's pulleys 145, pulleys 146, and pivot 147 as corresponding to the string guides recited in Claim 1.³ Petition at 37-38; EX1016 at ¶161. The pulley assemblies 145-146-147 are shown in several of Stanziale '062's Figures, including Figures 17-19, which are provided below with annotations added to show the pulley assemblies 145-146-147 in blue:

³ While Petitioner and Dr. Batzer state that “[p]ulleys 145 are mounted to the first and second limbs...,” they later describe “the combination 145, 146, 147 as the claimed string guide.” Petition at 37-38, EX1016 at ¶161. For clarity, I will discuss the combination of elements 145, 146, 147, which I will refer to as “pulley assemblies 145-146-147,” in the rest of my discussion of Stanziale '062.

Stanziale '062 (EX1011) at Figs. 17-19

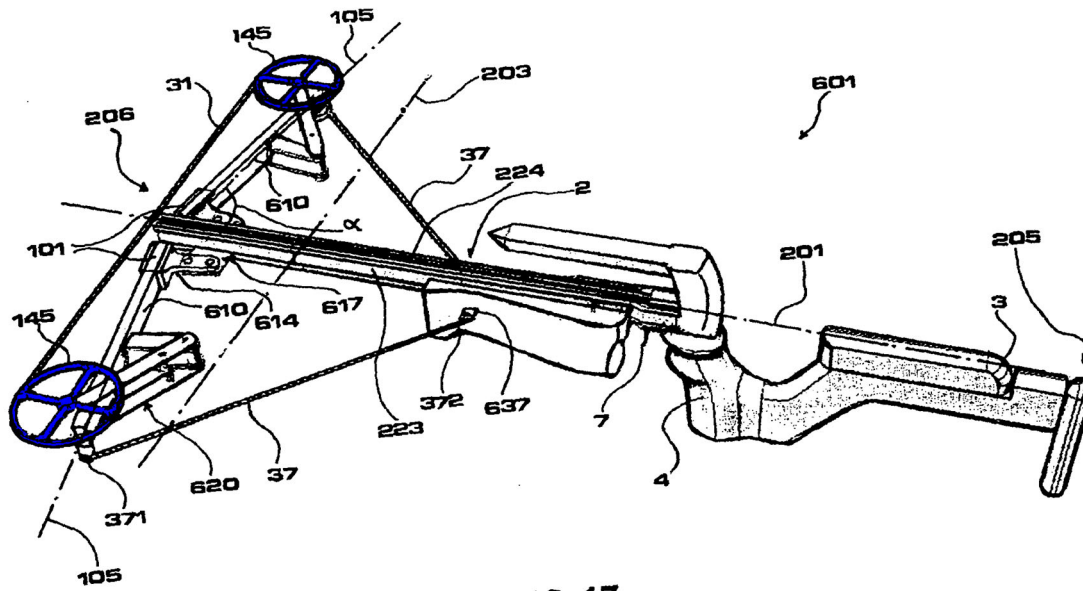


FIG. 17

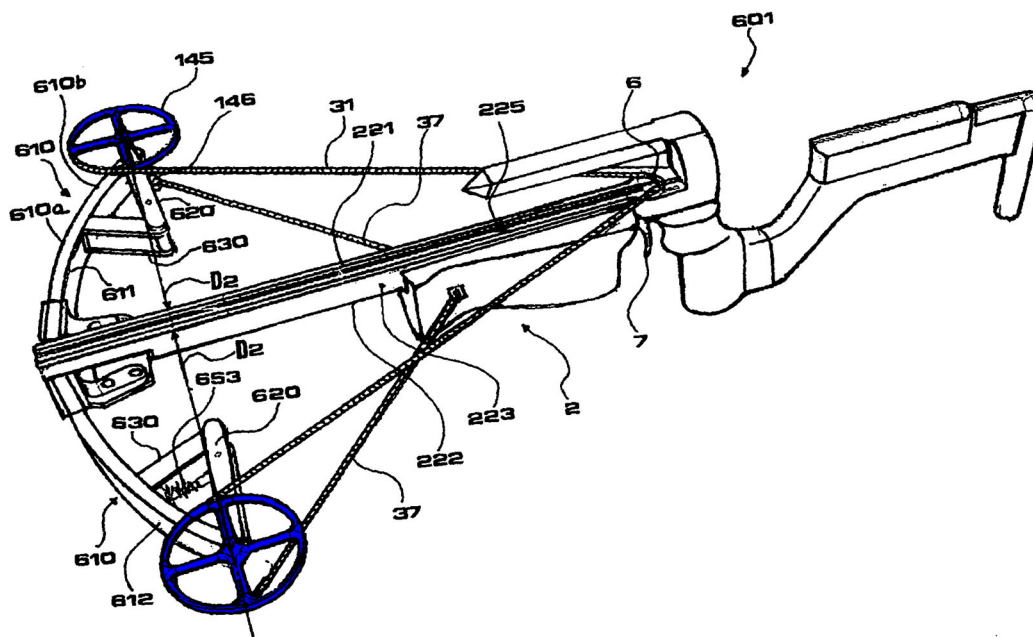


FIG. 18

Stanziale '062 (EX1011) at Figs. 17-19

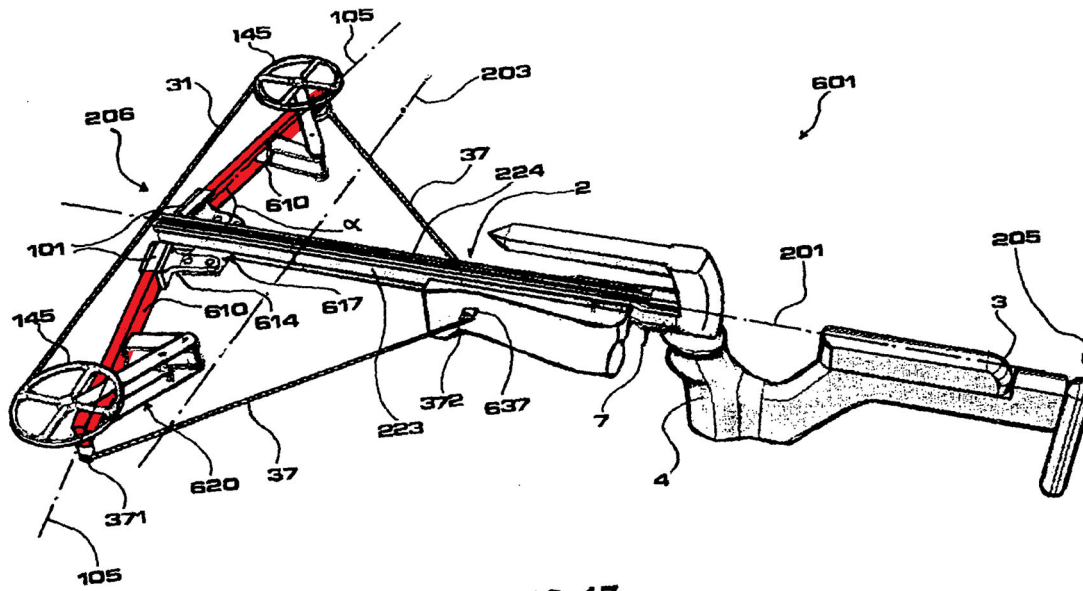


FIG. 17

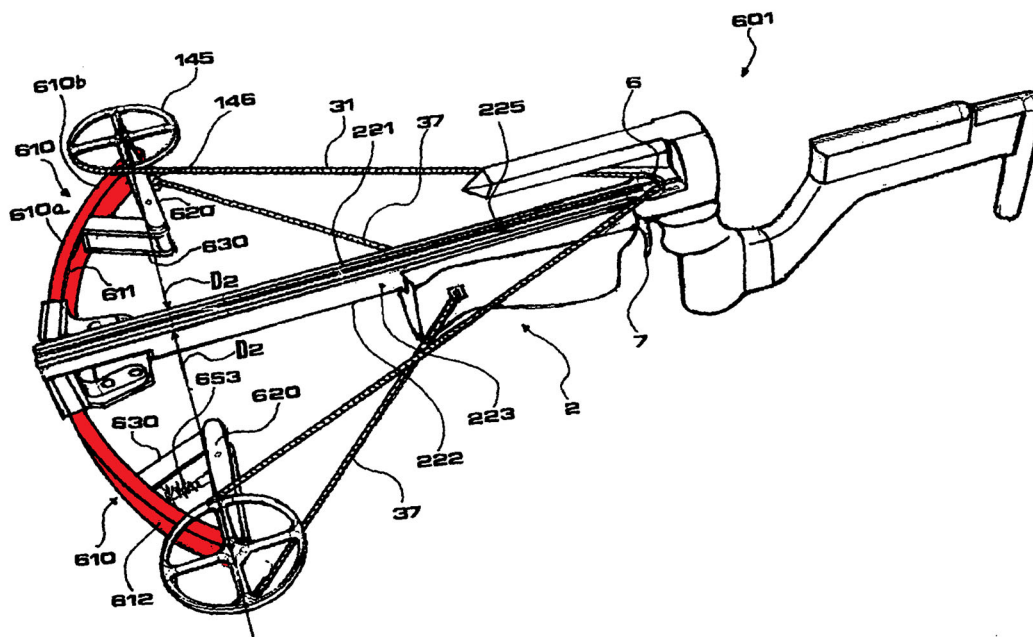
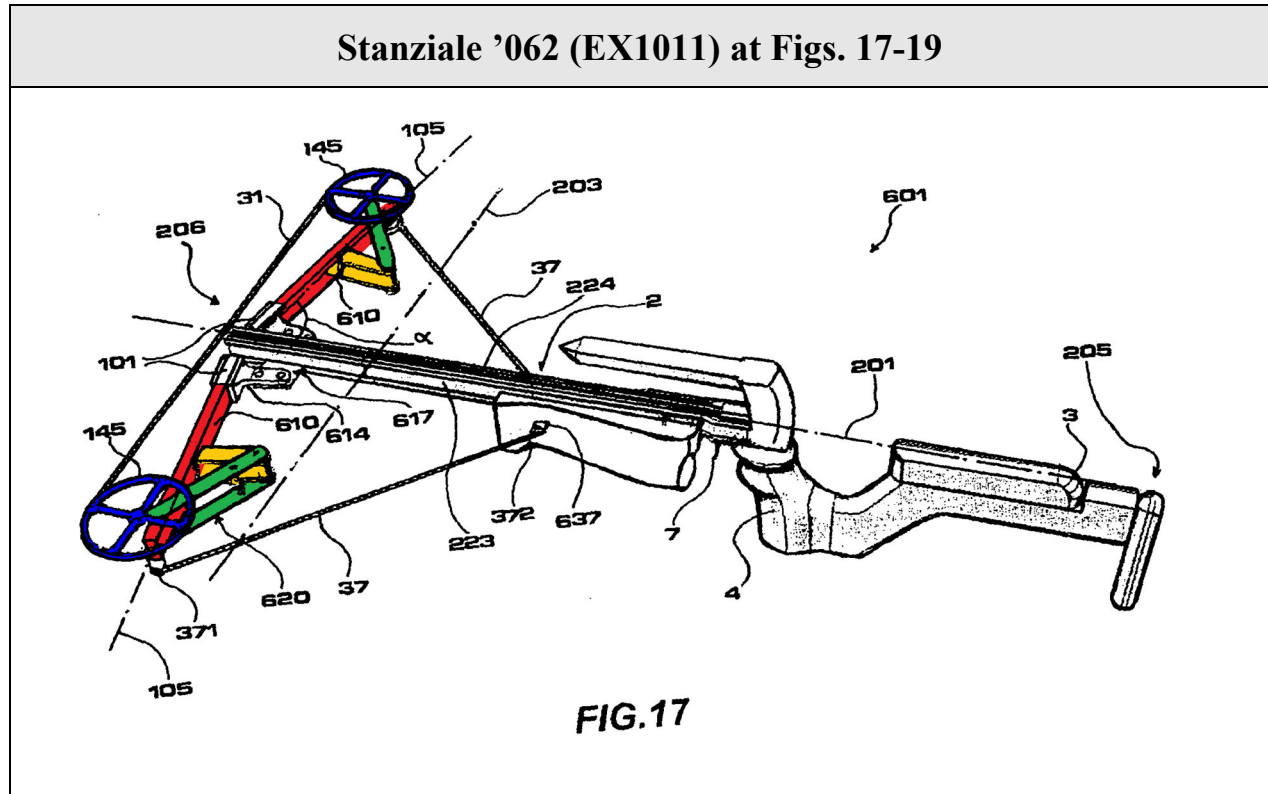


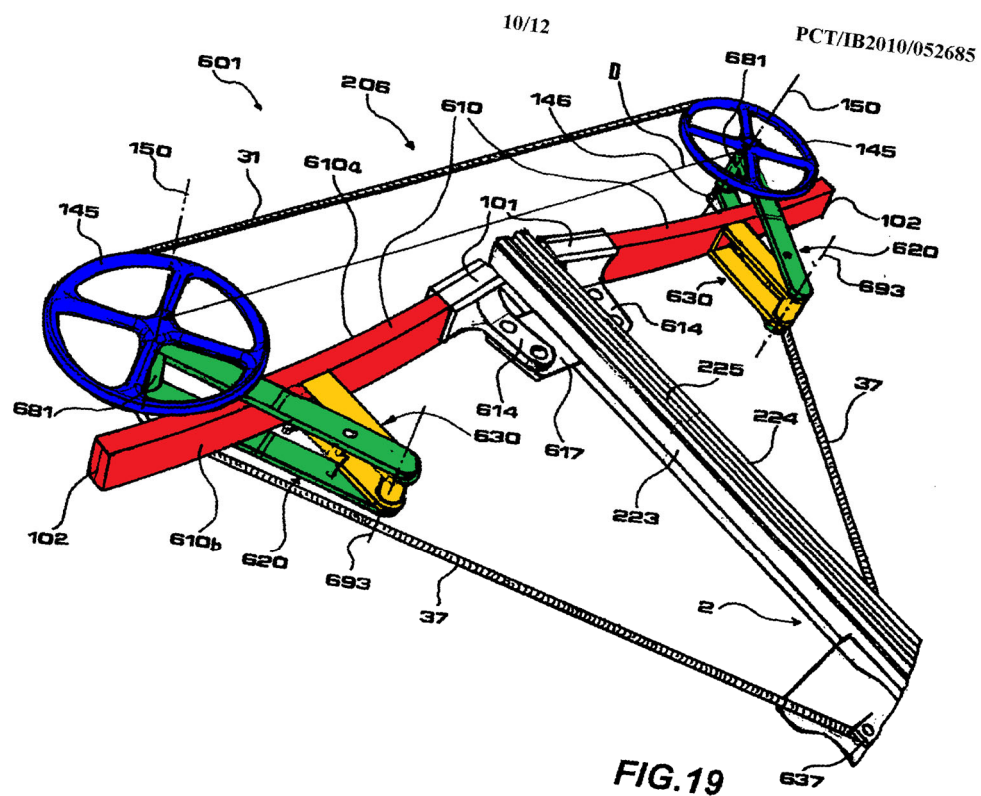
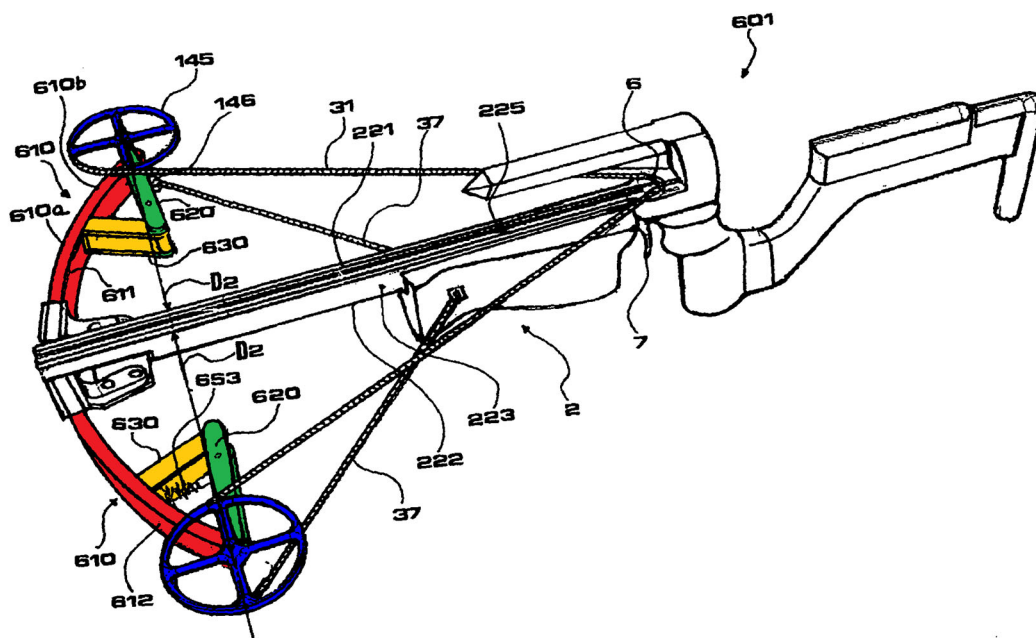
FIG. 18



68

auxiliary arms 620 (green), stirrups 630 (yellow), pulley assemblies 145-146-147 (blue), and elastic members 610 (red):





99. Stanziale '062 describes both auxiliary arms 620 and stirrups 630 and their relationship with elastic members 610 in detail. With respect to stirrups 630, Stanziale '062 teaches:

On each side, a stirrup 630 is fastened at an intermediate length of the elastic member 610. In the example, the stirrup 630 is C-shaped and comprises two spaced and parallel elongated plates, that are a top elongated plate 631 and a bottom elongated plate 632. First ends 631a, 632a of the elongated plates 631, 632 are connected by a side plate 633 which is rigidly fastened to the elastic member 610, in particular to a proximal face 611 of the latter. Second ends 631b, 632b of the elongated plates 631, 632 are provided with seats or holes 635....

EX1011 at 27:6-12. From this, a POSA would understand that, at one end (first ends 631a, 632a), each stirrup 630 is non-movably attached to the proximal or up-range face of an elastic member 610, while at the other end (second ends 631b, 632b), it has connection points for another component of the Stanziale '062 device.

100. Stanziale '062 then teaches that “[a]n auxiliary arm 620 is pivoted to second ends 631b, 632b of the elongated plates 631, 632.” *Id.* at 27:15-16. Each auxiliary arm 620 “comprises two spaced and parallel rods or elongated plates, that are a top rod 621 and a bottom rod 622. First ends 621a, 622a of the rods 621, 622 are rigidly joined by a pivot 623 which is housed in corresponding seats or holes 635 of the stirrup 630.” *Id.* at 27:16-19. “The second ends 621b, 622b of the rods 621, 622 comprise respective slots or through holes 626 which rotatably house a substantially tubular housing 681 having a through hole or seat 682.” *Id.* at 27:24-

26. From this, a POSA would understand that, at one end (first ends 621a, 622a), each auxiliary arm 620 is pivotably attached to the second ends 631b, 632b of a stirrup 630, and thus capable of rotating relative to the stirrup 630, while at the other end (second ends 621b, 622b), its connection points for rotatably attaching yet another component of the Stanziale '062 device.

101. Finally, with respect to pulley assemblies 145-146-147, Stanziale '062 teaches that “[t]he auxiliary arm 620 is then a supporting member for the pulleys 145, 146, which are pivotably mounted on the auxiliary arm 620 itself.” *Id.* at 29:2-3. More specifically, the “pivot 147 of respective pulleys 145, 146 is housed idle in [the auxiliary arm 620’s] hole 682,” such that “the auxiliary arm 620 is interposed between the stirrup 630 and the respective first pulley 145 and second pulley 146.” *Id.* at 27:27-29. As a result, the first and second pulleys 145, 146 of pulley assemblies 145-146-147 “rotate jointly around an axis of rotation 150, which is the axis of pivot 147 and of tubular housing 681.” *Id.*, 27:34-28:1; *see also id.*, Figs. 20-21. From this, a POSA would understand that each pulley assembly 145-146-147 is pivotably attached to an auxiliary arm 620 and is thus capable of rotating relative to auxiliary arm 620.

102. This configuration has significant implications for how the various components of the Stanziale '062 device are physically related to and are capable of moving relative to each other. As Stanziale '062 teaches, “[t]he second length 610b

of the elastic member 610, the stirrup 630 and the auxiliary arm 620 form a triangle having a variable shape, i.e. having one movable side 620,” while “the auxiliary arm 620 crosses the respective elastic member 610.” *Id.* at 29:30-35. Because the auxiliary arms 620 are pivoted to the stirrups 630, which are themselves immovably attached to the proximal faces of elastic members 610, “the auxiliary arms 620 move on a plane which is substantially parallel to a plane on which portions of elastic members 610 move during deformation.” *Id.* at 29:15-16; *see also id.* at 29:23-29. Meanwhile, the first and second pulleys 145, 146 of pulley assemblies 145-146-147 “rotate jointly around an axis of rotation 150, which is the axis of pivot 147 and of [the auxiliary arm’s] tubular housing 681.” *Id.*, 27:34-28:1; *see also id.*, Figs. 20-21.

103. As a result, when the Stanziale ’062 device is drawn or released, pulley assemblies 145-146-147 do not move relative to the elastic members 610 solely via rotation about a vertical axis. Rather, when the Stanziale ’062 device is viewed from above, pulley assemblies 145-146-147 both rotate about a vertical axis and translate along x- and y-axes relative to the elastic members 610. This provides for at least three degrees of freedom between the pulley assemblies 145-146-147 and the elastic members 610, as can be observed in the previously annotated versions of Figures 11 and 12, which show the Stanziale ’062 device in its released configuration and drawn configuration, respectively. These Figures are reproduced below with further

147:

Stanziale '062 (EX1011) at Figs. 17-18

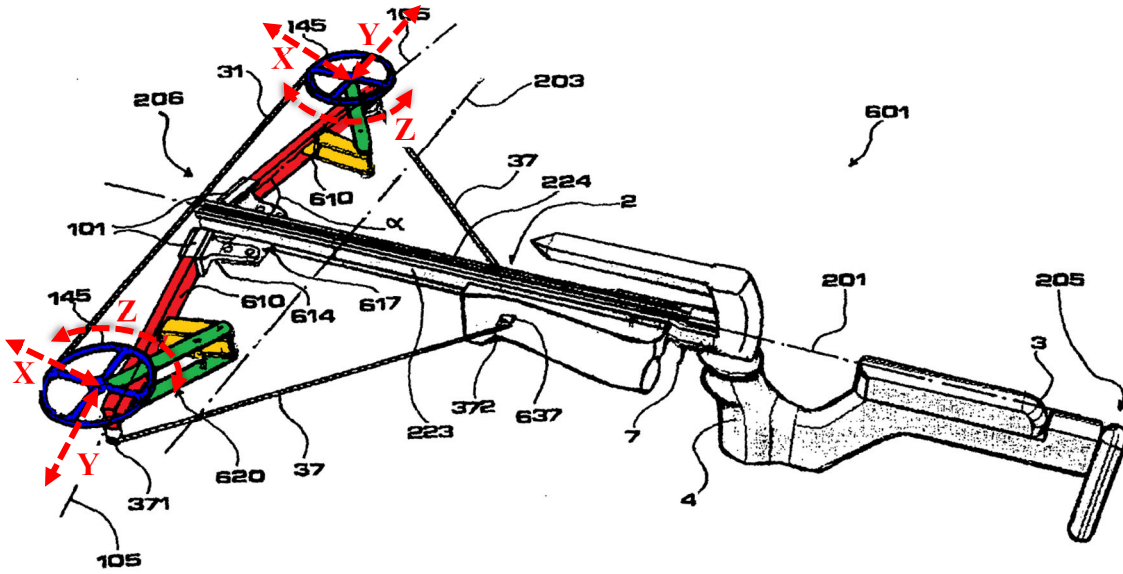
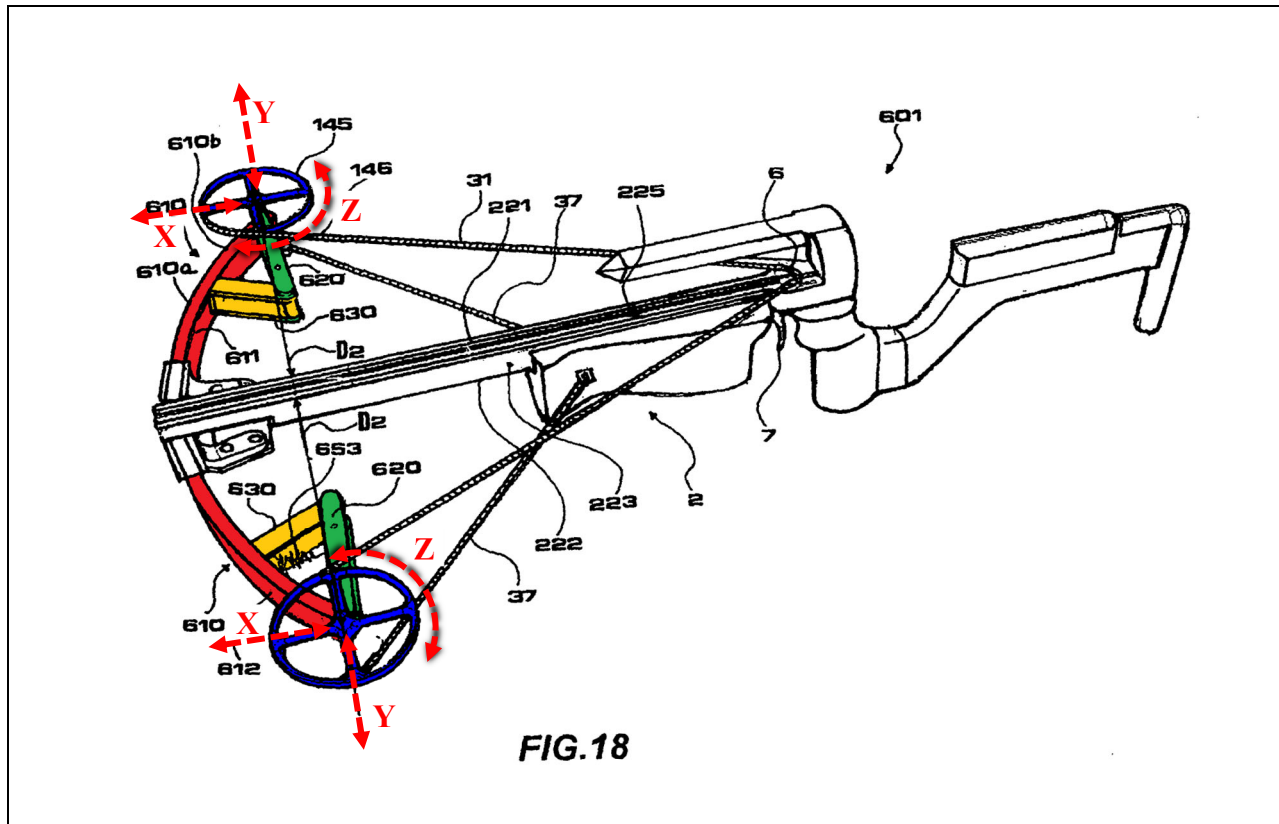


FIG.17



104. Based on these teachings, a POSA would readily understand that the pulley assemblies 145-146-147 are each mounted to an auxiliary arm 620 at pivot 147, *not* to elastic members 610. The pulley assemblies 145-146-147 are not physically connected to elastic members 610, nor are they moveable relative to the elastic members 610 solely via rotation about a vertical axis. Instead, the pulley assemblies 145-146-147 are physically connected to and rotatable relative to the auxiliary arms 620. Each auxiliary arm 620 is a moment arm that is itself pivotably mounted to the stirrups 630, which are, in turn, non-rotatably affixed to the elastic members 610. This allows for at least three degrees of freedom between the pulley

assemblies 145-146-147 and the elastic members 610 rather than the single degree of freedom that Claim 1 permits between the string guide and limb.

105. As with Stanziale '302, the way that Stanziale '062's pulley assemblies 145-146-147 are connected to and move relative to elastic members 610 is fundamentally different from how the string guides are connected to and permitted to move relative to the limbs in the crossbow of Claim 1 of the '015 Patent or how the relationship between these components is described in the '015 Patent's specification.

106. It is therefore my opinion that, when considering Stanziale '062's description and depiction of the pulley assemblies 145-146-147, elastic members 610, auxiliary arms 620, and stirrups 630, as well as the physical relationship between these features, a POSA would understand that Stanziale '062 does not disclose "a first string guide mounted to the first bow limb" or "a second string guide mounted to the second bow limb" either explicitly or inherently. Accordingly, Grounds 3 or 4, both of which rely solely on Stanziale '062 for these limitations, fail.

- b. Petitioner and Dr. Batzer do not establish that Stanziale '062 discloses a crossbow in which “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”**

107. A POSA would understand that Stanziale '062 does not disclose a crossbow in which “the upper and lower 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*,” as required by Claim 1.

108. I understand that Petitioner and Dr. Batzer both identify Stanziale '062's flexible force member 37 as corresponding to the first and second power cables recited in Claim 1 and identify Stanziale '062's tracks or grooves 1461 as corresponding to the first and second power cable take-up journals recited in Claim 1. Petition at 38-39; EX1016 at ¶166, ¶163.

109. I further understand that Petitioner and Dr. Batzer both argue that “[t]he 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.” Petition at 39; EX1016 at ¶167. I understand this to mean that Petitioner and Dr. Batzer admit that Stanziale '062 does not expressly disclose the direction of displacement (if any) of flexible force member 37

as they are wound onto a track or groove 1461. Instead, it is my understanding that Petitioner and Dr. Batzer contend that a POSA would assume that Stanziale '062's teachings equally support arranging a helical version of a track or groove 1461 so that a flexible force member wrapped onto that track or groove would be displaced *toward* the plane of rotation and arranging a helical version of a track or groove 1461 so that a flexible force member wrapped onto that track or groove would be displaced *away* from the plane of rotation.

110. While I agree that Stanziale '062 does not expressly disclose the direction of displacement (if any) of flexible force member 37 as it is wound onto a helical track or groove 1461, I disagree that a POSA would necessarily conclude from this lack of teaching that she would have a simple, binary choice between two equally viable paths, i.e., displacement away from the plane of rotation and toward the plane of rotation, and that such choices are attributable to other design features that are interdependently created.

111. Stanziale '062 merely mentions that “groove 1461 has a spiral or helical shape, so as to wind a plurality of turns of flexible force element 37, or it is a simply annular groove.” EX1011 at 17:8-9. Such a statement is almost completely open-ended and effectively leaves the actual structure of the track or groove 1461 without any meaningful boundaries. Even assuming that a POSA would find a helical track

or groove 1461 desirable, the POSA would have no guidance as to how that shape should be implemented.

112. Rather than encouraging a POSA to try displacing the flexible force member 37 both toward and away from the plane of rotation, the lack of disclosure about the actual structure of track or groove 1461 in Stanziale '062 would discourage a POSA from attempting either. As discussed in further detail below, a POSA would recognize that the direction of displacement would have significant implications for the functionality of the device as even minor changes to a crossbow's design can have a dramatic impact on things like accuracy or structural stability. *See* ¶¶179-191, *infra*. Stanziale '062 does not provide any information from which a POSA could determine what extent or direction of displacement would allow the disclosed device to function as intended. Accordingly, a POSA would recognize that she would have to engage in extensive experimentation to determine what effects a practically limitless number of variations on the structure of track or groove 1461 would have on the device's performance and, indeed, whether any form of displacement would be feasible at all.

113. It is therefore my opinion that, when considering the extent of Stanziale '062's description and depiction of the disclosed device and its various features, a POSA would understand that Stanziale '062 does not disclose a crossbow in which “the upper and lower 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” either explicitly or inherently, nor would it have been obvious to modify Stanziale ’062 to meet this limitation.

3. Stanziale ’771 (Grounds 5 and 6)

114. I understand that Petitioner and Dr. Batzer rely on Stanziale ’771 as the sole prior art reference in Grounds 5 and 6. In these grounds, Petitioner and Dr. Batzer argue that Stanziale ’771 anticipates Claim 1 of the ’015 Patent (Ground 5) or renders Claim 1 obvious (Ground 6).

115. In my opinion, Stanziale ’771 fails to disclose certain limitations for which Petitioner and Dr. Batzer rely on it in Grounds 5 and 6. As a result, these grounds cannot establish that Claim 1 of the ’015 Patent is unpatentable as anticipated or obvious.

a. Stanziale ’771 does not disclose “a first string guide mounted to the first bow limb” or “a second string guide mounted to the second bow limb”

116. As I previously explained, a POSA would understand the term “mounted to” as used in the context of the ’015 Patent’s claims to mean “physically connected to allow only rotation about a fixed axis.” *See* ¶¶65-74, *supra*. Under this proper construction, a POSA would understand that Stanziale ’771 does not disclose

a crossbow including “a first string guide mounted to the first bow limb” or “a second string guide mounted to the second bow limb,” as required by Claim 1.

117. I understand that Petitioner and Dr. Batzer both identify Stanziale ’771’s pulley 145 or the combination of Stanziale ’771’s pulleys 145, pulleys 146, and pivot 147 as corresponding to the string guides recited in Claim 1.⁴ Petition at 41-42; EX1016 at ¶145. The pulleys 145 or pulley assemblies 145-146-147 are shown in several of Stanziale ’771’s Figures, including Figures 11-12, which are provided below with annotations added to show the pulleys 145 or pulley assemblies 145-146-147 in blue:

⁴ While Petitioner and Dr. Batzer state that “[p]ulleys 145 are mounted to the first and second limbs...,” they later describe “the combination 145, 146, 147 as the claimed string guide.” Petition at 41-42, EX1016 at ¶179. For clarity, I will discuss the combination of elements 145, 146, 147, which I will refer to as “pulley assemblies 145-146-147,” in the rest of my discussion of Stanziale ’771.

Stanziale '771 (EX1012) at Figs. 11-12

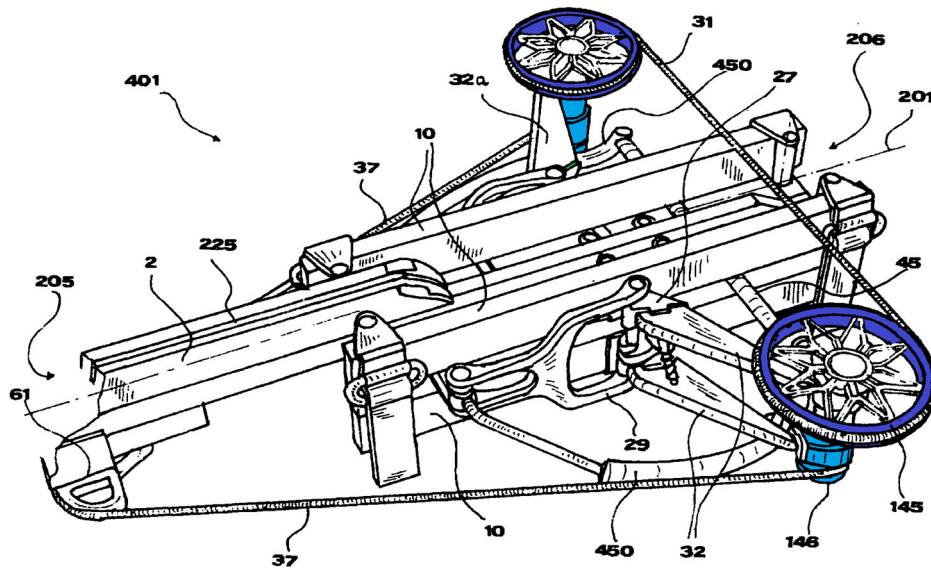


FIG.11

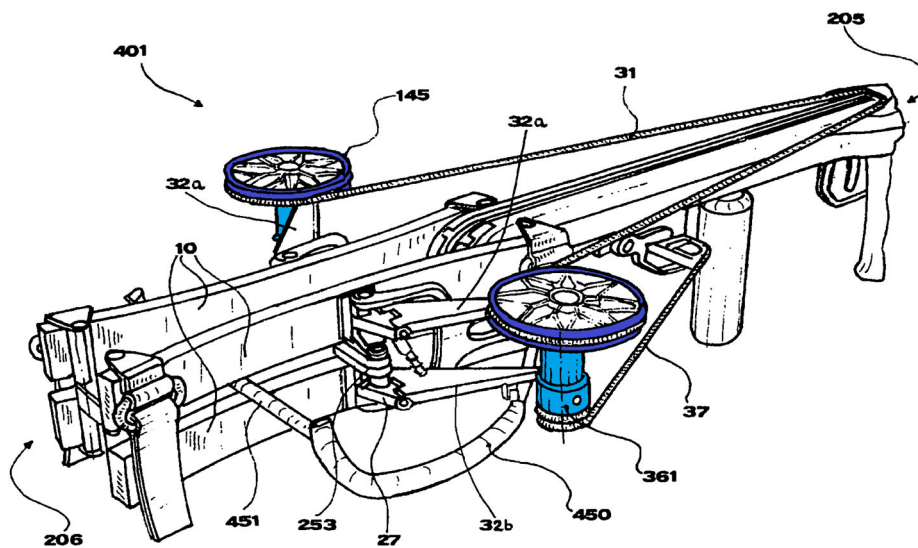
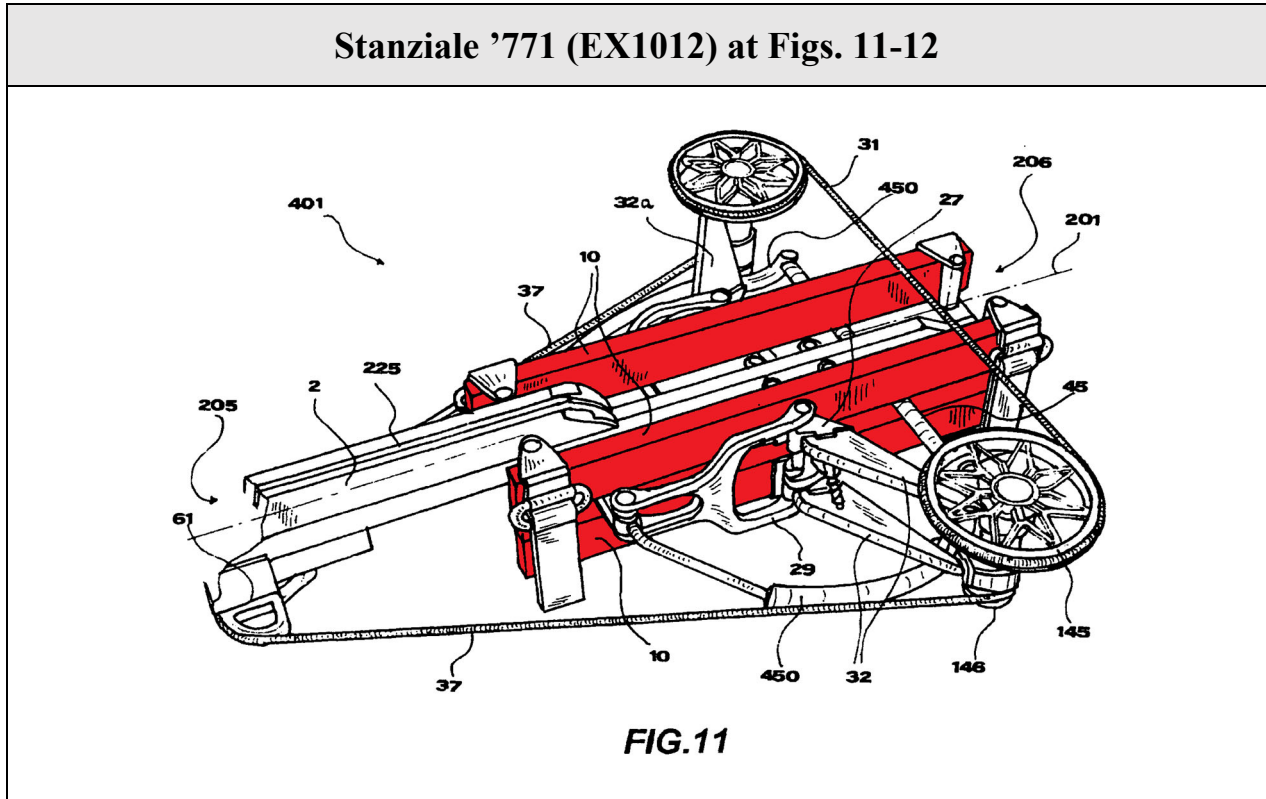
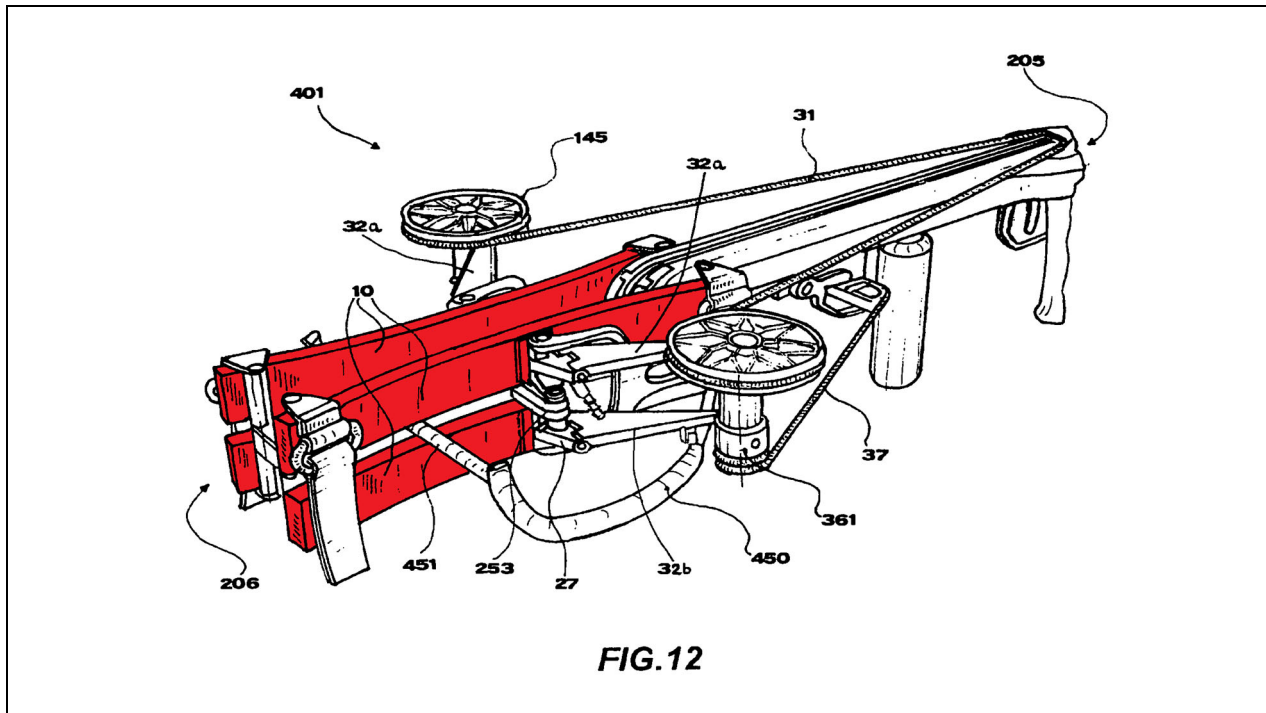


FIG.12

118. I further understand that Petitioner and Dr. Batzer both identify Stanziale '771's elastic members 10 as corresponding to the first and second limbs

recited in Claim 1. Petition at 42; EX1016 at ¶178. Like the pulley assemblies 145-146-147, the elastic members 10 are also shown in the Stanziale '771 Figures, including Figures 11-12, which are provided below with annotations added to show the elastic members 10 in red:





119. A POSA would understand from these and other teachings of Stanziale '771 that pulley assemblies 145-146-147 are not physically connected to elastic members 10 as required by Claim 1 of the '015 Patent. Rather, the pulley assemblies 145-146-147 are mounted to pushing arms 32, which are separate components from elastic members 10. The pushing arms 32 are then mounted to elements 27. At least as depicted in Stanziale '771's Figures, it is these elements 27 that are physically connected to the elastic members 610, not pulley assemblies 145-146-147. This can be seen in the following annotated versions of Figures 11 and 12, which are annotated to show pushing arms 32 (green), elements 27 (yellow), pulley assemblies 145-146-147 (blue), and elastic members 10 (red):

Stanziale '771 (EX1012) at Figs. 11-12

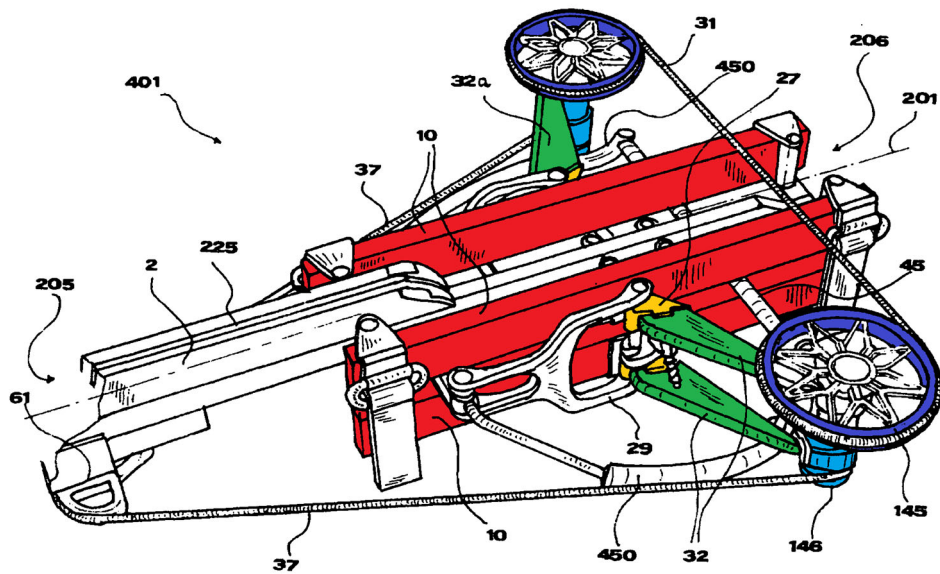


FIG. 11

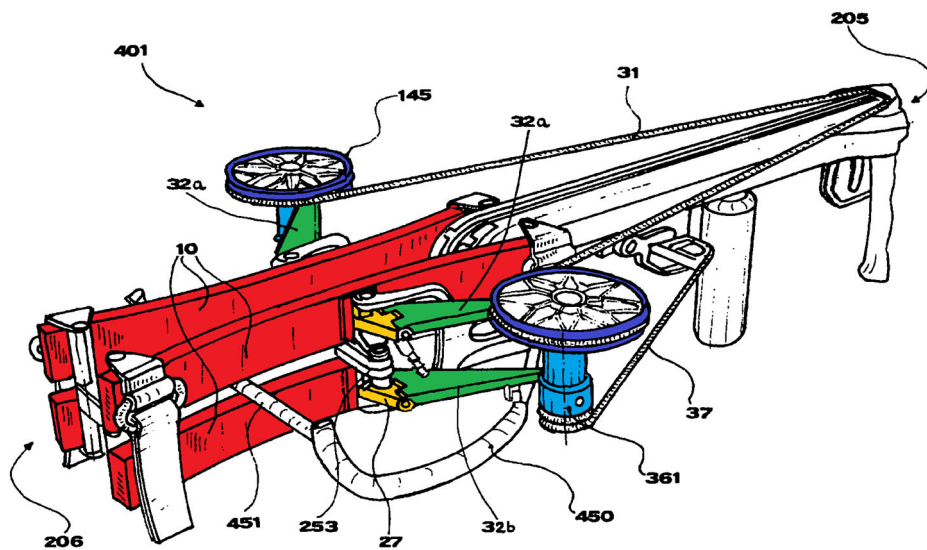


FIG. 12

120. Stanziale '771's teachings regarding pushing arms 32 are confusing.

While Stanziale '771 describes the pushing arms 32 in some degree of detail, it is

unclear how pushing arms 32 attach to elastic members 10, if they attach to elastic members 10 at all. For example, while Stanziale '771's Figures 11-12 appear to show pushing arms 32 connecting to elastic members 10 via an intermediate element 27, Stanziale '771's written description says that "pushing arms 32 are *rotatably associated to the stock 2* through a respective connecting element 27," not to elastic members 10. *Id.* at 10:10-11 (emphasis added), Figs. 7, 11-12.

121. In my opinion, a POSA would find Stanziale '771's disclosure ambiguous as to whether pushing arms 32 attach to the stock 2 via elements 27 or attach to the elastic members 10 via elements 27. However, for purposes of my analysis in this declaration, I will rely on the figures' depiction of pushing arms 32 and element 27, which appear to show that the pushing arms 32 are rotatably attached at one end to elastic members 10, as depicted in Figures 11 and 12.

122. Stanziale '771 further teaches that, at the other end, "[a] pair of pushing arms 32 are hinged on the respective connecting element 27...." *Id.* at 12:32. More specifically, "pushing arm 32 is ... rotatably associated with the connecting element 27 thanks to hinge pin 278, said rotation taking place about a respective second rotation axis 93...." *Id.* at 13:3-5. From this and Stanziale '771's other teachings regarding element 27, a POSA would understand that, at one end, each element 27 is rotatably attached to an elastic member 10, while at the other end, each element 27 is rotatably connected to an end of a pushing arm 32. Thus, each pushing arm 32

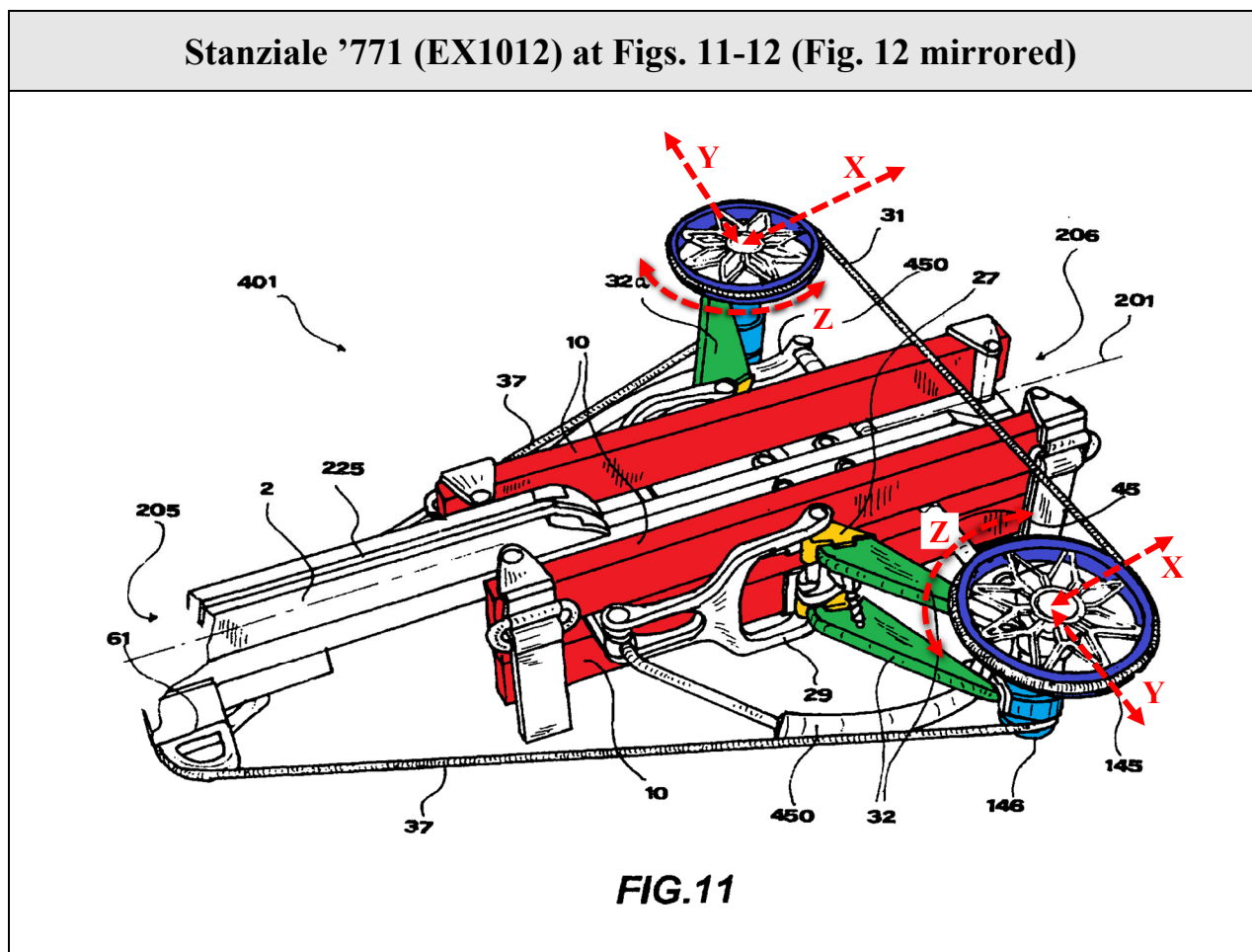
is capable of rotating relative to an element 27 which is itself capable of rotating relative to an elastic member 10.

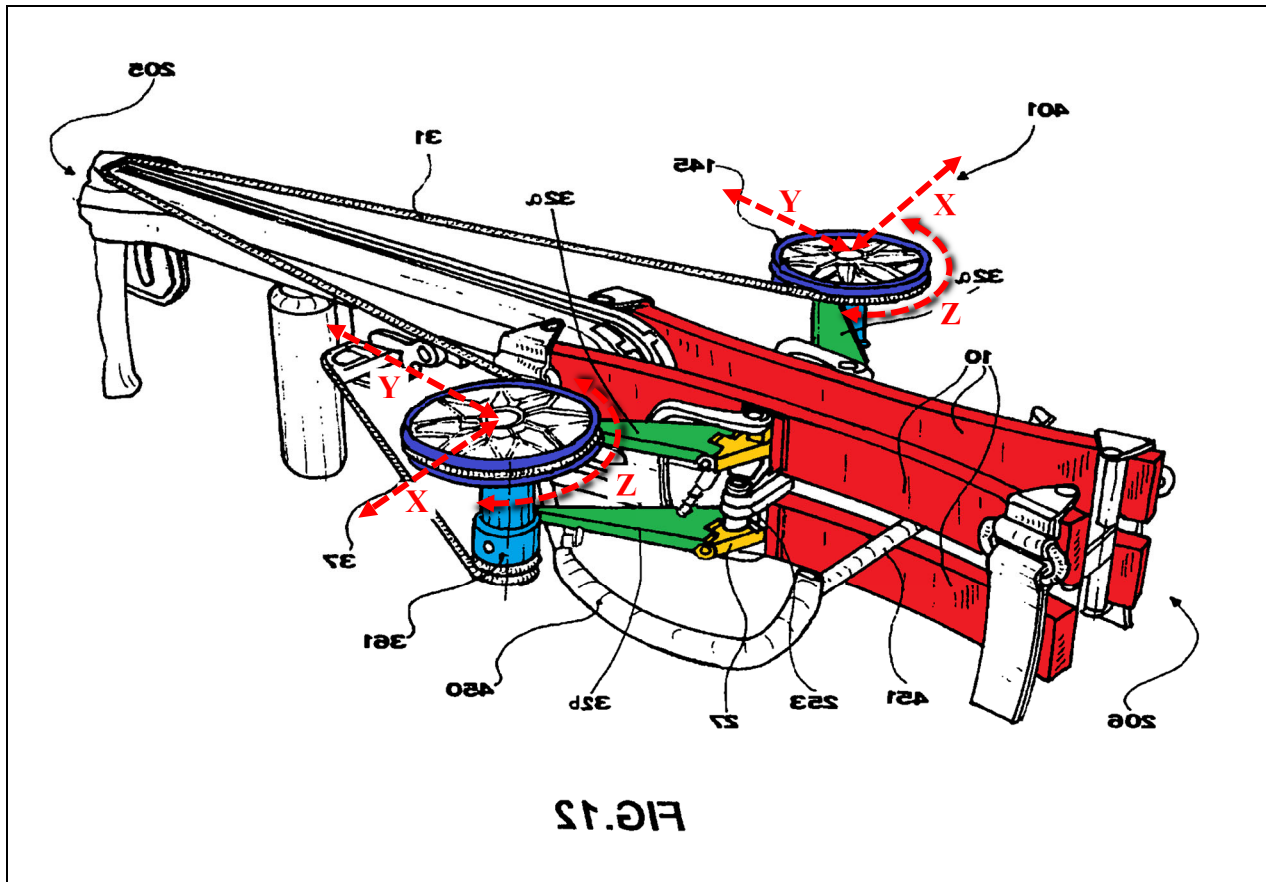
123. Meanwhile, Stanziale '771 teaches that “[a] second end 322 of the pushing arm 32 is pivoted to a respective collar 361,” while “[e]ach collar 361 has a slot or a through hole 36, wherein a pivot 147 of a respective first pulley 145 is housed idle; in other words the collar 361 is interposed between the pushing arm 32 and the respective first pulley 145.” *Id.* at 15:15, 24-26. “A second pulley 146 is fastened to the same pivot 147....” *Id.* at 15:29. As a result, “pulleys 145, 146 are positioned at opposite sides of the pair of pushing arms 32” and “rotate jointly about an axis of rotation 150....” *Id.* at 15:29-30, 16:2-5. From this, a POSA would understand that each pulley assembly 145-146-147 is pivotably attached to a pushing arm 32 and is thus capable of rotating relative to pushing arm 32.

124. This configuration has significant implications for how the various components of the Stanziale '771 device are physically related to and capable of moving relative to each other. As Stanziale '771 explicitly states, “the pulleys 145, 146 move synchronized with the respective pushing arms 32, ***with a combined translation and rotation movement.***” *Id.* at 18:16-18 (emphasis added).

125. As a result, when the Stanziale '771 device is drawn or released, pulley assemblies 145-146-147 do not move relative to the elastic members 610 solely via rotation about a vertical axis. Rather, when the Stanziale '771 device is viewed from

above, pulley assemblies 145-146-147 both rotate about a vertical axis and translate along x- and y-axes relative to the elastic members 10. This provides for at least three degrees of freedom between the pulley assemblies 145-146-147 and the elastic members 10, as can be observed in the previously annotated versions of Figures 11 and 12, which show the Stanziale '771 device in its released configuration and drawn configuration, respectively. These Figures are reproduced below with further annotations showing the three degrees of freedom of pulley assemblies 145-146-147:





126. Based on these teachings, a POSA would readily understand that the pulley assemblies 145-146-147 are each mounted to a pushing arm 32 at pivot 147, not to elastic members 10. The pulley assemblies 145-146-147 are not physically connected to elastic members 10, nor are they moveable relative to the elastic members 10 solely via rotation about a vertical axis. Instead, the pulley assemblies 145-146-147 are physically connected to and rotatable relative to the pushing arms 32. Each pushing arm 32 is a moment arm that is pivotably mounted to an intervening element 27, which is itself mounted to the elastic member 10. This allows for at least three degrees of freedom between the pulley assemblies 145-146-

147 and the elastic members 610 rather than the single degree of freedom that Claim 1 permits between the string guide and limb.

127. As with Stanziale '302 and Stanziale '062, the way that Stanziale '771's pulley assemblies 145-146-147 are connected to and move relative to elastic members 10 is fundamentally different from how the string guides are connected to and permitted to move relative to the limbs in the crossbow of Claim 1 of the '015 Patent or how the relationship between these components is described in the '015 Patent's specification.

128. It is therefore my opinion that, when considering Stanziale '771's description and depiction of the pulley assemblies 145-146-147, elastic members 610, pushing arms 32, and elements 27, as well as the physical relationship between these components, a POSA would understand that Stanziale '771 does not disclose "a first string guide mounted to the first bow limb" or "a second string guide mounted to the second bow limb" either explicitly or inherently. Accordingly, Grounds 5 or 6, both of which rely solely on Stanziale '771 for these limitations, fail.

4. Darlington (Grounds 7, 8, and 12)

129. I understand that Petitioner and Dr. Batzer rely on Darlington as a primary reference in alleging obviousness of Claim 1 in Grounds 7 and 8 and as a secondary reference in alleging obviousness of Claim 1 in Ground 12. In these grounds, Petitioner and Dr. Batzer argue that Darlington renders Claim 1 obvious,

either in combination with Norkus (Ground 7), in combination with Park (Ground 8), or in combination with Islas and Park (Ground 12).

130. In my opinion, Darlington fails to disclose a crossbow having certain limitations of Claim 1 of the '015 Patent for which Petitioner and Dr. Batzer rely on it in Grounds 7, 8, and 12. Indeed, Darlington teaches away from including these limitations in a crossbow. As a result, Grounds 7, 8, and 12 cannot establish that Claim 1 of the '015 Patent is unpatentable as obvious.

a. Darlington teaches away from displacing the power cables relative to the plane of rotation

131. I understand that Petitioner and Dr. Batzer both argue that “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.” Petition at 48; EX1016 at ¶204; *see also* Petition at 50, 61; EX1016 at ¶210, ¶253. I understand this to mean that Petitioner and Dr. Batzer both admit that Darlington does not disclose the following elements of Claim 1:

- “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;”

- “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;” and
- “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.”

132. Petitioner and Dr. Batzer both contend, however, that it would have been obvious to a POSA to modify Darlington to meet these limitations, including specifically the requirement that, “as the bow is drawn from the released configuration to the drawn configuration[,] the first and second power cables ... 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,” in view of either Norkus (Ground 7) or Park (Grounds 8 and 12). *See* Petition at 48-52, 61; EX1016 at ¶¶205-213, ¶¶253-254. I disagree, at least because Darlington expressly teaches that to increase accuracy (1) the power cables and the bowstring should be substantially parallel with the draw string, and therefore substantially parallel with each cam’s plane of rotation, and (2) the orientation of the power cables and the bowstring

relative to each other should remain consistent throughout the draw cycle with the orientation of the power cables and the bowstring in the drawn position just as they are in the relaxed position. To accommodate the most extreme angle between power cables and bowstring acceptable to Darlington to accommodate a shoot-over configuration, Darlington teaches that a hybrid two-groove cam must be used in which the let-out groove of the cam is disposed close to the hybrid groove. Furthermore, the hybrid groove needs to include a let-out portion that receives one of the power cables and a take-up portion that receives the other power cable.

133. As indicated in its Abstract, Darlington “is directed to a compound archery crossbow *wherein the power cables and the bowstring remain substantially parallel* allowing the bowstring to be positioned for increased power and accuracy of an arrow....” EX1013 at Abstract (emphasis added). Darlington repeatedly emphasizes that, in its design, the power cables and bowstring must be “substantially parallel to each other” at all times, including both as the bow is drawn and when it is relaxed, with the two power cables and the bowstring arranged in a consistent orientation throughout the draw cycle. *See, e.g., id.* at ¶[0041], ¶[0043], ¶[0046] (“When the bowstring 32 is drawn back to cock the crossbow 10, the first power cable 28, the second power cable 30, and the bowstring 32 remain substantially parallel to each other, just as in the ‘relaxed’ position.”).

134. Keeping the power cables and bowstring “substantially parallel to each other [in the drawn position], just as in the ‘relaxed’ position,” when the bowstring is drawn are a crucial design features of the Darlington device. Darlington teaches that the substantially parallel alignment of the power cables and the consistent orientation of the power cables and bowstring is necessary, among other reasons, to eliminate twisting forces on the bow limbs and improve accuracy:

When the bowstring **32** is drawn back to cock the crossbow **10**, the first power cable **28**, the second power cable **30**, and the bowstring **32** remain substantially parallel to each other, just as in the “relaxed” position. And, because the first power cable **28** is anchored at the top of the first cam **24** and second cam **26**, the second power cable **30** is anchored at the bottom of the first cam **24** and second cam **26**, and the bowstring **32** is anchored substantially in the middle of the first cam **24** and second cam **26**, the torque on the first axel assembly **34A** and the second axel assembly is effectively neutralized, which substantially eliminates twisting forces on the limbs **16A** & **B** and **18A** & **B** of the crossbow **10**. **Eliminating those twisting forces helps further improve the accuracy of the crossbow 10.**

Id. at ¶[0046] (emphasis added).

135. Darlington teaches that displacement of the power cables relative to the bowstring still results in acceptable accuracy, while providing for a shoot-over configuration, only when the orientation of the power cables and drawstring is the consistent throughout the drawn cycle and when using with a hybrid two-groove cam in which the let-out groove is disposed close to the hybrid groove of each cam:

[T]he first power cable 28 and the second power cable 30 are both located at the bottoms of the first cam 102 and second cam 104 and must therefore be deflected. That deflection may result in twisting forces being exerted on the limbs 16A & B and 18A & B. **That twisting force, however, is significantly reduced because the let-out grooves 102A and 104A are disposed close to the hybrid grooves 102B and 104B on the first axle assembly 34A and second axle assembly 34B, respectively, thereby reducing the torque produced on the limbs 16A & B and 18A & B when the bowstring is drawn away from the riser 20.**

Id. at ¶[0060] (emphasis added).

136. As taught by Darlington, a hybrid groove receives a portion of both power cables, with a portion of the hybrid groove being a let-out portion for one power cable and another portion of the hybrid groove being a take-up portion for the other power cable such that the two cams are synced together with the first power cable unwinding from the let-out portion of the hybrid groove of the first cam at the same time it is winding onto the take-up portion of hybrid groove of the second cam and the second power cable unwinding from the let-out portion of the hybrid groove of the second cam at the same time it is winding onto the take-up portion of the hybrid groove of the first cam. *Id.* at ¶[056]-[0057] and FIGS. 13-15.

137. Darlington therefore teaches that keeping the power cables and bowstring substantially parallel to each other and keeping the orientation of the power cables and bowstring consistent throughout the draw cycle are critical to reduce twisting on the limbs of the crossbow and thereby improve its accuracy in

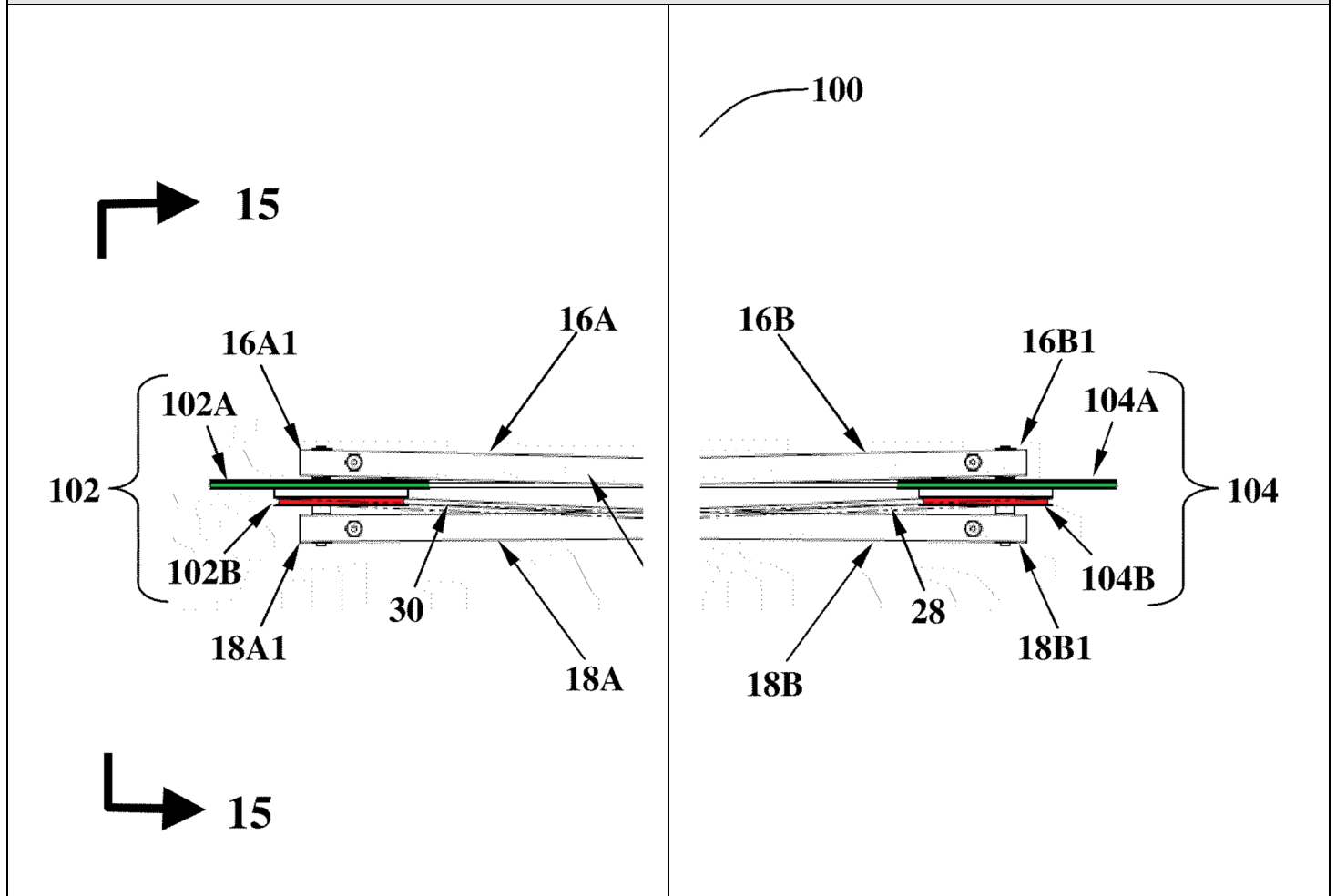
either a shoot-through or a shoot-over configuration. *E.g., id.* at Abstract, ¶[0046], ¶[0060].

138. By extension, a POSA would understand that Darlington teaches away from a design in which the power cables are displaced relative to the drawstring as the bowstring moves between the relaxed and drawn positions, as with a helical power cable take-up journal, because this would change the orientation of the power cables and bowstring as the bowstring moves between the relaxed position (i.e., the power cable and drawstring are substantially parallel to each other at each string guide) and the drawn position (the power cable angles away from the drawstring at each string guide), which according to the Darlington would reduce accuracy. Even when Darlington acknowledges that some displacement of the power cables relative to the drawstring is necessary for a shoot-over configuration, Darlington teaches that the orientation of the power cables and drawstring to one another must remain consistent in the relaxed position, the drawn position, and when transitioning between these two positions.

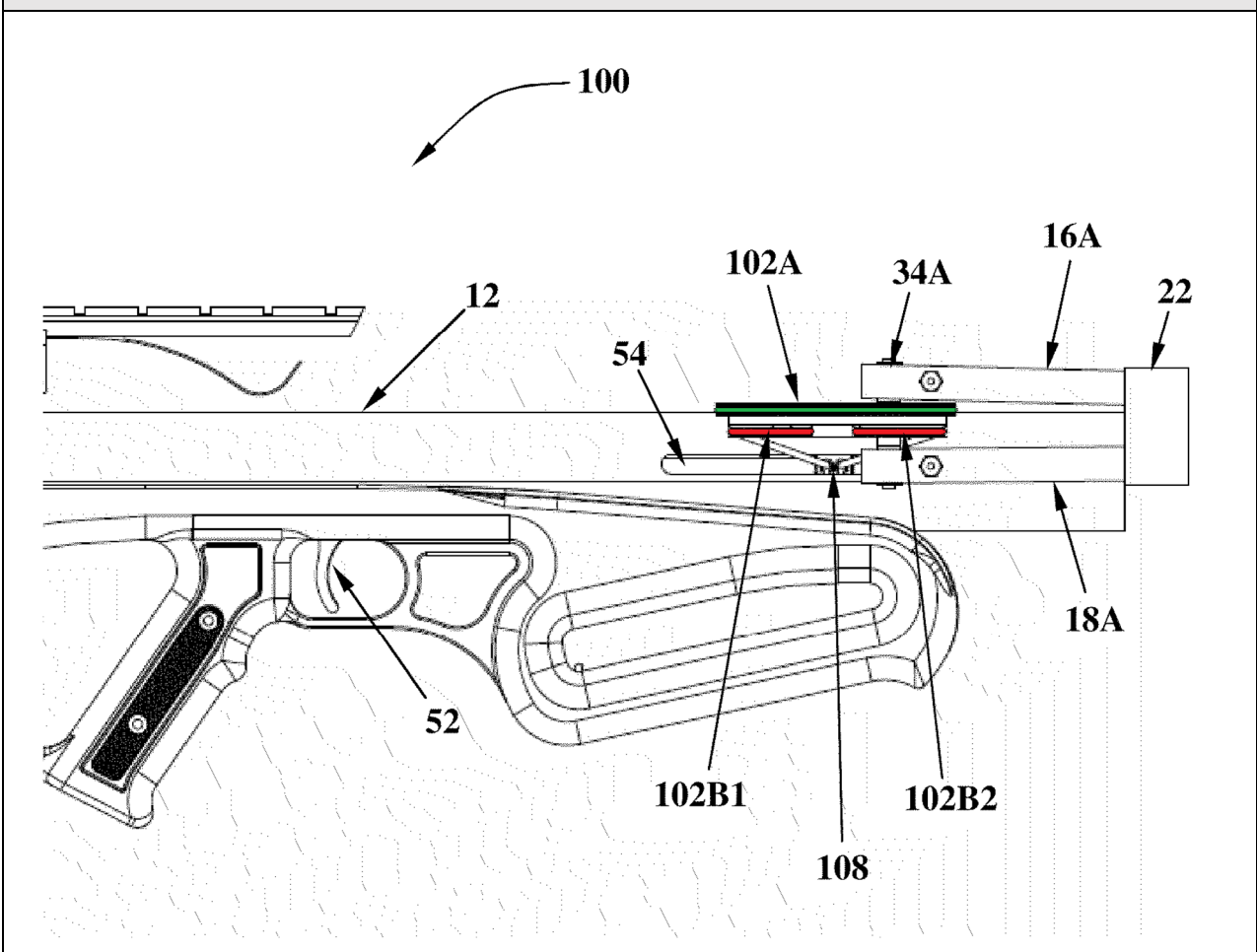
139. As Darlington teaches, in a “shoot-over configuration,” the power cables must be deflected out of the path of the drawstring. *Id.* at ¶[0060]. This deflection, however, “may result in twisting forces being exerted on the limbs 16A & B and 18A & B,” which is undesirable because, as previously explained, such twisting forces decrease the accuracy of the bow. *Id.* at ¶[0060], ¶[0046]. To remedy

this problem, Darlington teaches it is vital that “the let-out grooves 102A and 104A are disposed close to the hybrid grooves 102B and 104B on the first axle assembly 34A and second axle assembly 34B, respectively, thereby reducing the torque produced on the limbs 16A & B and 18A & B when the bowstring is drawn away from the riser 20.” *Id.* at ¶[0060]. The close orientation in Darlington between let-out grooves 102A and 104A and hybrid grooves 102B and 104B in a “shoot-over configuration” can be observed in at least Figures 14-15, excerpts of which are provided below with the let-out grooves annotated in green and the hybrid grooves in annotated red:

Darlington (EX1013) at Fig. 14



Darlington (EX1013) at Fig. 15



140. That is, Darlington teaches that hybrid grooves 102B, 104B (which Petitioner and Dr. Batzer identify as the first and second power cable take-up journals (Petition at 48, EX1016 at ¶202)) must **not** extend away from let-out grooves 102A and 104A (which Petitioner and Dr. Batzer identify as the first and second drawstring journals (Petition at 47, EX1016 at ¶199)) in any significant way but rather must remain in close proximity to the let-out grooves. Doing so ensures that the forces exerted by the power cables and bowstring on the cam and therefore

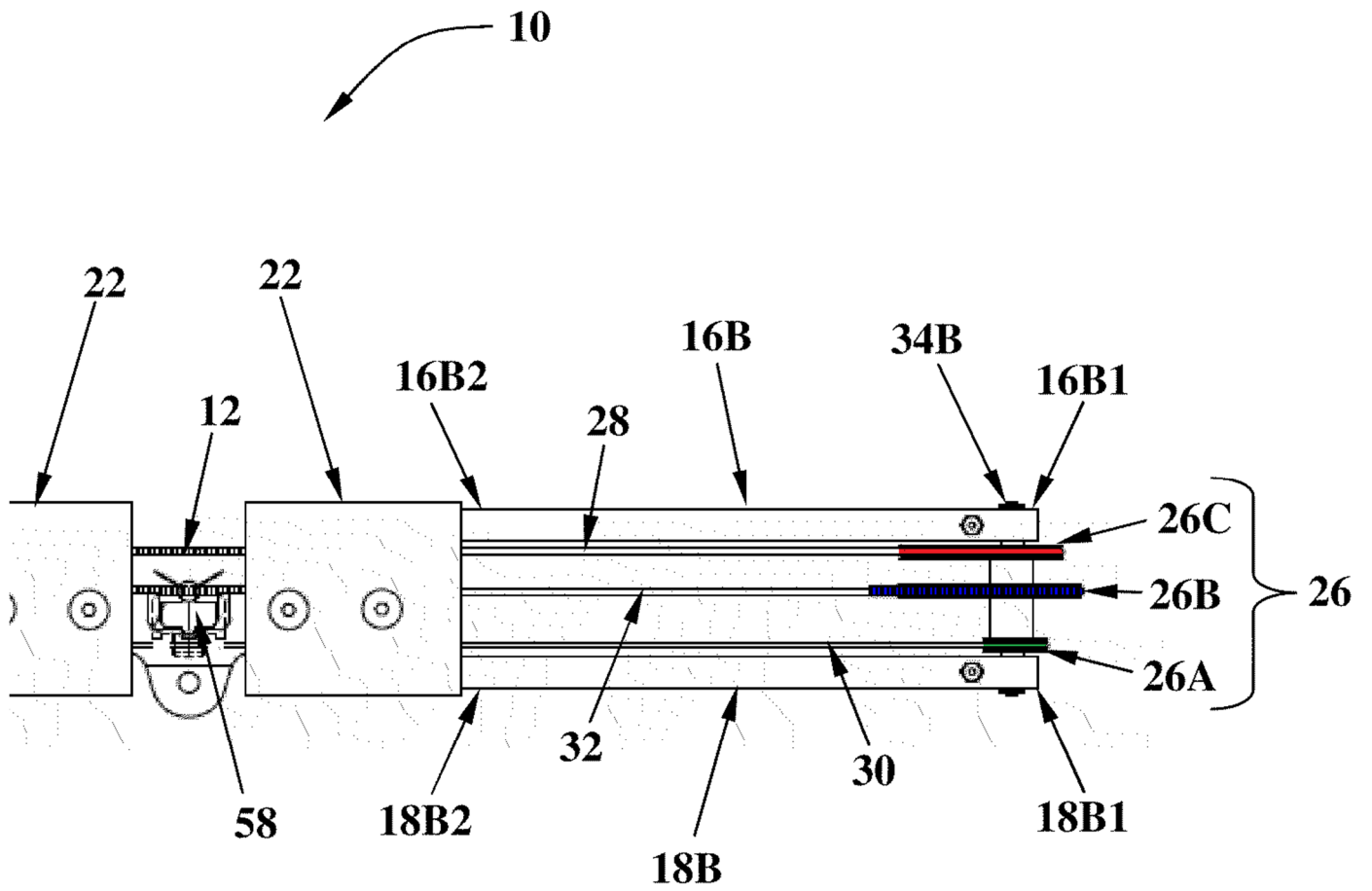
the limb the cam is attached to are exerted in consistent directions throughout the draw cycle, rather than varying direction as the bowstring transitions between the relaxed position and the drawn position. Allowing the hybrid grooves to extend away from the let-out grooves, such as by implementing a helical groove structure, would significantly harm Darlington's stated goal of improved accuracy by introducing more torque and varying forces on the limbs than Darlington deemed to be acceptable for a shoot-over configuration of a crossbow.

141. A POSA would readily understand why torque or twisting forces on the limbs would harm the accuracy of the device. Any twisting of the limbs will cause the cams to be deflected out of their normal, shared plane of rotation where the cam of the first limb is arranged in the same horizontal plane as the cam of the second limb. Even a small amount of deflection at the cams will, in turn, be translated to the drawstring and affect the travel of a bolt or other projectile launched with the drawstring. As a result, the bolt or other projectile will not travel in a straight line but rather will deviate relative to one or both of the horizontal and vertical planes.

142. Darlington attempts to avoid these problems by expressly teaching that the power cables in a shoot-through configuration – i.e., where the power cables are positioned both above and below the drawstring journals – are kept substantially parallel to the drawstring while the power cable attachment points in a shoot-over configuration – i.e., where the power cables are positioned and deflected below the

drawstring journals – are kept as close as possible to the drawstring journals so as to minimize any twisting on the limbs and in both configurations the orientation of the power cables and the drawstring relative to one another is consistent throughout the draw cycle. These solutions require little to no displacement of the power cables away from the drawstring journals and their planes of rotation and keep the directions of forces exerted on each cam consistent by maintaining the same orientation of the power cables and drawstring throughout the drawstring's travel between the relaxed and drawn positions, as can be seen in the following annotated excerpts of Figure 2 (showing a shoot-through configuration with first let out grooves 26A in green, second let out grooves 26B in blue, and take-up grooves 26C in red) and Figure 14 (showing a shoot-over configuration with let-out grooves 104A in green and hybrid grooves 104B in red), each annotated with the let-out grooves in green and the hybrid grooves in red:

Darlington (EX1013) at Fig. 2 – Shoot-Through Configuration



Darlington (EX1013) at Fig. 14 – Shoot-Over Configuration

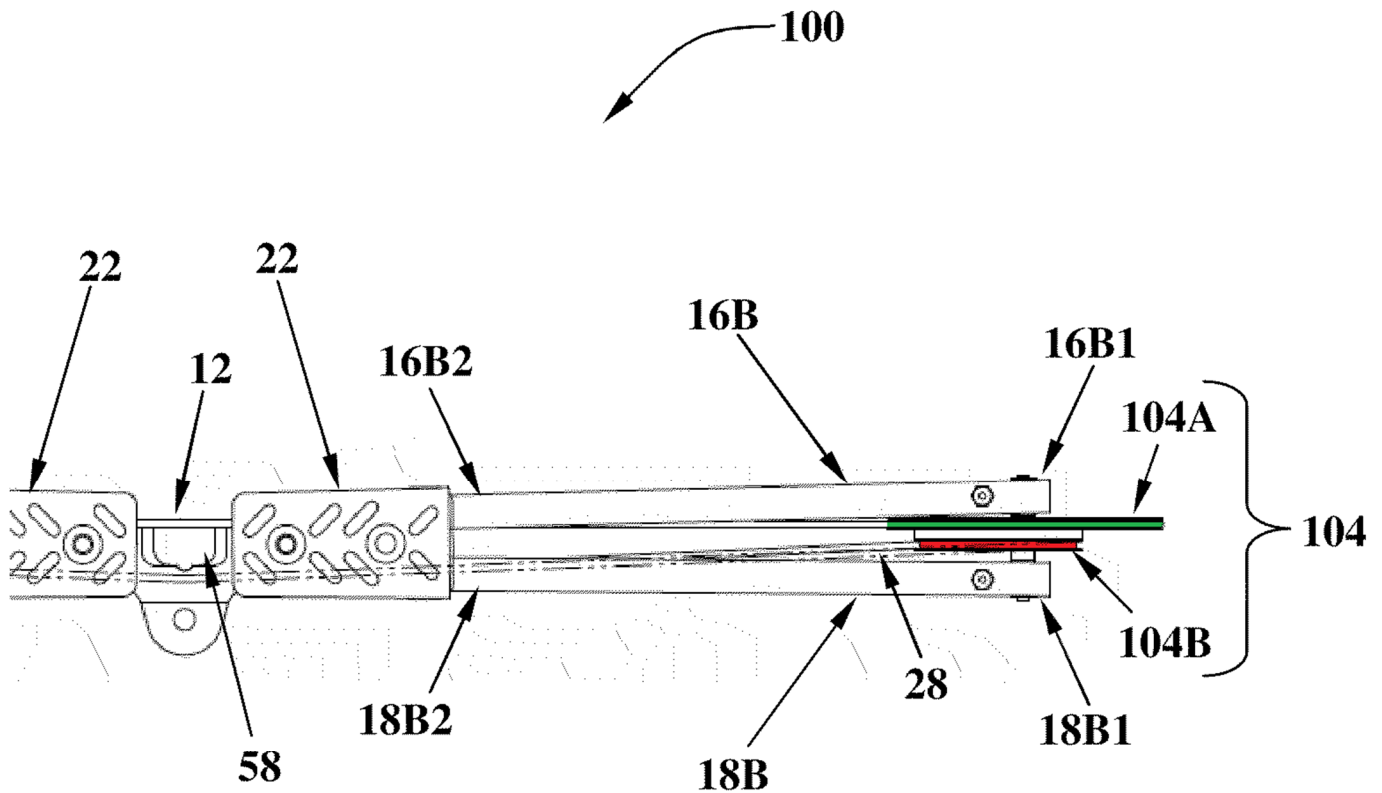


FIG. 14

143. Claim 1 of the '015 Patent, however, requires both “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” and “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.” Because Darlington teaches that hybrid journals 102B, 104B (i.e., the power cable take-up journals) should not extend away from the plane

of rotation of let-out grooves 102A and 104A (i.e., the first and second drawstring journals) because doing so would hinder the stated goal of increased accuracy by introducing forces of varying directions on the cam as the bow string moves throughout the draw cycle, a POSA would have understood that Darlington teaches away from a design in which the power cables are displaced away from the planes of rotation of the draw string journals through the use of helical power cable take-up journals extending in a direction perpendicular to the draw string journals' plane of rotation even in a "shoot-over" configuration.

144. Indeed, as described in further detail below, a POSA would have been well-aware that modifying a crossbow in which the power cables are kept parallel to the drawstring journals' planes of rotation so that the power cables are instead displaced relative to the plane of rotation or modifying a crossbow in which the power cable take-up journals are kept close to drawstring journals' planes of rotation so that the power cable take-up journals are instead extended perpendicularly relative to the plane of rotation would have significant implications for the functionality of the device even beyond the teachings of Darlington. *See* ¶¶192-211, *infra*.

145. It is therefore my opinion that, given the knowledge of a POSA and the express teachings of Darlington emphasizing the importance of keeping the power cables and drawstring substantially parallel as the bow is drawn and of keeping the

orientation of the power cable and the drawstring consistent relative to each other throughout the draw cycle, a POSA would have understood Darlington to teach away from any modifications that would cause displacement of the power cables as the power cables wind on to or out of the power cable take-up journal. A POSA would not have been motivated to make any such modifications in view of these teachings. Accordingly, Grounds 7, 8, or 12, all of which require that Darlington's design be modified to have power cable take-up journals that extend away from the drawstring journals' plane of rotation and to allow for displacement of the power cables away from that plane of rotation, fail.

5. Kempf '871 (Grounds 9, 10, and 11)

146. I understand that Petitioner and Dr. Batzer rely on Kempf '871 as a primary reference in alleging obviousness of Claim 1 in Grounds 9-11. In these grounds, Petitioner and Dr. Batzer argue that Kempf '871 renders Claim 1 obvious, either in combination with Norkus (Ground 9), in combination with Park (Ground 10), or in combination with Stanziale '302 (Ground 11).

147. In my opinion, Kempf '871 fails to disclose certain limitations for which Petitioner and Dr. Batzer rely on it in Grounds 9-11. As a result, these grounds cannot establish that Claim 1 of the '015 Patent is unpatentable as obvious.

a. Kempf '871 does not disclose “the second string guide comprising a second draw string journal”

148. A POSA would understand that Kempf '871 does not disclose “the second string guide comprising a second draw string journal,” as required by Claim 1, given Petitioner and Dr. Batzer’s identification of Kempf '871’s outer track (30) as the claimed “draw string journal.”

149. I understand that Petitioner and Dr. Batzer both identify Kempf '871’s pulley (28) and cam (36) as corresponding to the first and second string guides recited in Claim 1, although both argue that “two cams may also be used.”⁵ Petition at 53; EX1016 at ¶219. I further understand that Petitioner and Dr. Batzer purport to identify a pair of outer tracks (30) as the first and second draw string journals, arguing that “[e]ach string guide [i.e., both pulley (28) and cam (36) or, alternatively, two cams (36)] has a draw string journal (called outer track) 30....” Petition at 54;

⁵ Neither Petitioner nor Dr. Batzer specify which element corresponds to the first string guide and which corresponds to the second string guide. I assume for purposes of this declaration that pulley (28) corresponds to the first string guide and cam (36) corresponds to the second string guide. My analysis, however, remains essentially the same if these designations are reversed; in that case, Kempf '871 would fail to disclose an element that purportedly corresponds to the claimed first draw string journal rather than the claimed second draw string journal.

EX1016 at ¶220. To my knowledge, neither Petitioner’s Petition nor Dr. Batzer’s Declaration identify any other structure purportedly meeting the first and second draw string journal limitations.

150. Petitioner and Dr. Batzer are wrong at least with respect to their assertion that Kempf ’871 discloses two outer tracks (30), one for the pulley (28) and the other for the cam (36) or one for each cam (36) in a two cam arrangement. Kempf ’871 only teaches one outer track (30), which is a component of pulley (28). EX1014 at 3:57-59 (“Coupled to the first limb (24) is a first string guide, which in the preferred embodiment is a pulley (28), having an outer track (30) and an inner track (32).”); *see also id.* at 3:64-4:19 (discussing cam (36) and not disclosing any outer track (30)), Fig. 1 (showing only one outer track (30), located on pulley (28)), Fig. 10 (same). As a result, a POSA would readily understand that Kempf ’871 never teaches a second outer track (30) that could correspond to the claimed second string guide.

151. Kempf ’871’s alternative embodiment does not resolve the issue of the missing second outer track (30). Kempf ’871’s alternative embodiment provides that “two synchronized *cams*... may be used in place of the cam (36) and pulley (28).” EX1014, 4:12-13 (emphasis added). Petitioner and Dr. Batzer both acknowledge this as they assert that “two cams may also be used.”

152. However, as previously discussed, Kempf '871 only discloses pulley (28) as having an outer track (30); cam (36) is not described as having an outer track. There is nothing in Kempf '871 to suggest that the “two synchronized cams” in the alternative embodiment would each incorporate an outer track (30). In fact, given that outer track (30) is described as a component of a pulley (not a cam), a POSA would almost certainly conclude that the cams contemplated by Kempf '871 would not have such a feature. Accordingly, a POSA would also readily understand that the dual-cam alternative embodiment would have no outer track (30) to correspond to either the claimed first string guide or the claimed second string guide.

153. It is therefore my opinion that, when considering Kempf '871's description and depiction of the pulley (28) and cam (36), a POSA would understand that Kempf '871 does not disclose a crossbow in which “the second string guide comprising a second draw string journal,” either explicitly or inherently. Accordingly, Grounds 9-11, all of which rely on Kempf '871 for this limitation, fail.

b. Kempf '871 does not disclose “the second string guide comprising ... a second helical power cable take-up journal”

154. A POSA would understand that Kempf '871 does not disclose “the second string guide comprising ... a second helical power cable take-up journal,” as required by Claim 1, given Petitioner and Dr. Batzer's identification of Kempf '871's inner track (32) as the claimed “helical power cable take-up journal.”

155. As previously discussed, I understand that Petitioner and Dr. Batzer both identify Kempf '871's pulley (28) and cam (36) as corresponding to the first and second string guides recited in Claim 1, although both argue that "two cams may also be used."⁶ Petition at 53; EX1016 at ¶219. I further understand that Petitioner and Dr. Batzer purport to identify a pair of inner tracks (32) as the first and second helical power cable take-up journals, arguing that "[e]ach string guide [i.e., both pulley (28) and cam (36) or, alternatively, two cams (36)] also has a power cable take-up journal (called inner track) 32, though perhaps not helical."⁷ Petition at 54;

⁶ Neither Petitioner nor Dr. Batzer specify which element corresponds to the first string guide and which corresponds to the second string guide. I assume for purposes of this declaration that pulley (28) corresponds to the first string guide and cam (36) corresponds to the second string guide. My analysis, however, remains essentially the same if these designations are reversed; in that case, Kempf '871 would fail to disclose an element that purportedly corresponds to the claimed first draw string journal rather than the claimed second helical power cable take-up journal.

⁷ I note that Petitioner and Dr. Batzer both admit that inner track (32) is not helical. Both also assert that "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

EX1016 at ¶221. To my knowledge, neither Petitioner’s Petition nor Dr. Batzer’s Declaration identify any other structure as meeting the first and second helical power cable take-up journals limitations.

156. Petitioner and Dr. Batzer are wrong at least with respect to their assertion that Kempf ’871 discloses two inner tracks (32), one for the pulley (28) and the other for the cam (36) or one for each cam (36) in a two cam arrangement. As with outer track (30), Kempf ’871 only teaches the pulley (28) as having a single inner track (32). EX1014 at 3:57-59 (“Coupled to the first limb (24) is a first string guide, which in the preferred embodiment is a pulley (28), having an outer track (30) and an inner track (32).”); *see also id.* at 3:64-4:19 (discussing cam (36) and not disclosing any outer track (30)), Fig. 1 (showing only one outer track (30), located on pulley (28)), Fig. 10 (same). As Kempf ’871 does not teach a two pulley (28) configuration and the cam (36) is not described as having an inner track, there is no

the respective axes away from the planes of rotation as the cables wrap onto the helical journals.” Petition at 54-55, EX1016 at ¶225. I understand this to mean that Petitioner and Dr. Batzer admit that Kempf ’871 fails to disclose “power cable take-up journal[s]” that are “helical” and that “extend[] in a direction perpendicular to the first [or second] plane of rotation of the first [or second] draw string journal,” as required by Claim 1.

disclosure or teaching in Kempf '871 that would allow for a second string guide having a second power cable take up journal. As a result, a POSA would readily understand that Kempf '871 fails to teach a cam or a second pulley having a second inner track (32) that could correspond to the claimed second string guide.

157. Kempf '871's alternative embodiment does not resolve the issue of the missing second inner track (32). Kempf '871's alternative embodiment provides that "two synchronized *cams*... may be used in place of the cam (36) and pulley (28)." EX1014, 4:12-13 (emphasis added). Petitioner and Dr. Batzer both acknowledge this as they assert that "two cams may also be used."

158. However, as previously discussed, only pulley (28) has an inner track (32); cam (36) does not. There is nothing in Kempf '871 to suggest that the "two synchronized cams" in the alternative embodiment would incorporate an inner track (32). In fact, given that inner track (32) is described as a component of a pulley (not a cam), a POSA would almost certainly conclude that the cams would not have such a feature. Accordingly, a POSA would also readily understand that the dual-cam alternative embodiment would have no inner track (32) to correspond to either the claimed first string guide or the claimed second string guide.

159. It is therefore my opinion that, when considering Kempf '871's description and depiction of the pulley (28) and cam (36), a POSA would understand that Kempf '871 does not disclose a crossbow in which "the second string guide

comprising ... a second draw string journal,” either explicitly or inherently. Accordingly, Grounds 9-11, all of which rely on Kempf ’871 for this limitation, fail.

6. Islas (Ground 12)

160. I understand that Petitioner and Dr. Batzer rely on Islas as a primary reference in alleging obviousness of Claim 1 in Ground 12. In this ground, Petitioner and Dr. Batzer argue that Islas renders Claim 1 obvious in combination with Darlington and Park.

161. In my opinion, Islas fails to disclose a crossbow including certain limitations recited in Claim 1 for which Petitioner and Dr. Batzer rely on it in Ground 12. In fact, Islas teaches away from these limitations. As a result, Ground 12 cannot establish that Claim 1 of the ’015 Patent is unpatentable as obvious.

a. The Islas device would not function if converted to a reverse-draw configuration

162. I understand that Petitioner and Dr. Batzer both acknowledge that, in Islas, the “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).” Petition at 60; EX1016 at ¶250. I understand this to mean that Petitioner and Dr. Batzer both admit that Islas does not disclose “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,” as required by Claim 1.

163. Petitioner and Dr. Batzer both contend, however, that it would have been obvious to a POSA to modify Islas to “implement the reverse-draw configuration” in view of Darlington and that such a change would be “simpl[e].” Petition at 60; EX1016 at ¶250. I strongly disagree, at least because modifying Islas to have a reverse draw configuration would cause interference between Islas’s bowstring and its power cables and prevent the device from functioning as intended.

164. Notably, it appears that, despite what his declaration says, Dr. Batzer understands that converting a forward-draw crossbow like that disclosed in Islas to a reverse-draw configuration would be anything but simple. When asked during his deposition whether one would “just substitute a reverse draw configuration for a forward draw configuration without additional design modification and vice versa,” Dr. Batzer testified that one “typically wouldn’t....” EX1030 at 189:14-18. Dr. Batzer further testified: “You couldn’t just take a crossbow that is reverse draw and say, ‘Well, with all these same parts, I am going to take it apart, put it back together, but now it is going to be conventional draw.’ You couldn’t do that.... You would have to make compensatory design changes....” *Id.* at 190:11-19. This principle, according to Dr. Batzer, “is known to every designer.” *Id.* at 190:24-25.

165. I agree with Dr. Batzer's deposition testimony – a POSA would have recognized that converting a forward-draw crossbow to a reverse-draw configuration would be a complicated process, not a simple one. Islas's teachings, including specifically its teachings regarding the structure and layout of its drawstring and power cables, illustrate some of the easily recognized problems that make such a modification so difficult.

166. With respect to the bowstring, power cables, and their respective attachment points, Islas teaches as follows:

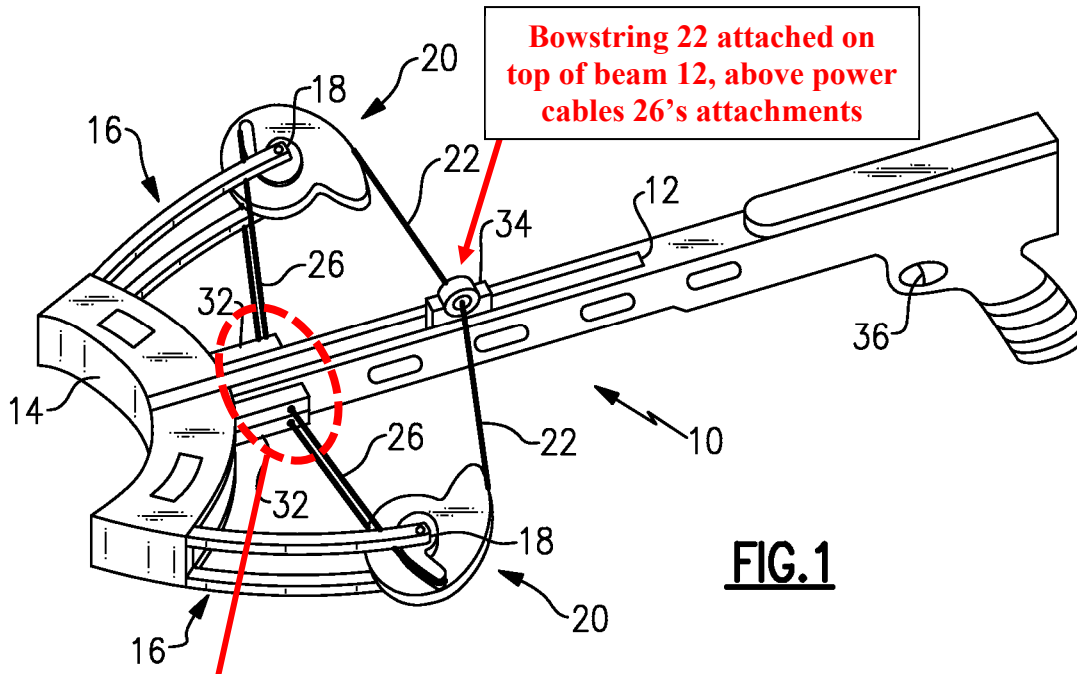
A bow string 22 is attached to each bowstring cam 20 and rides in a peripheral bowstring groove or channel 24 in each of these cams.... At each limb there are a pair of power cables 26 are reeved to respective power cable cam grooves 28 *a* and 28 *b* that are coaxial with the associated bowstring cam groove 24, and are situated axially above and below the same.... The other ends of the power cables 26 are affixed at anchor points, here in the form of rigid pylons 32 affixed onto the riser, and projecting proximally (toward the archer position or handle end of the crossbow). In other possible embodiments, the anchor points may be on the beam or stock 12. Importantly, the power cords 26 do not cross the medial plane of the bolt or arrow, and do not travel against one another nor travel on or against any mechanical parts such as pulleys....

Also shown here is a traveling string release 34 mounted on a track on the top of the beam 12. This release can closed over the bow string and then cranked back to a full draw position....

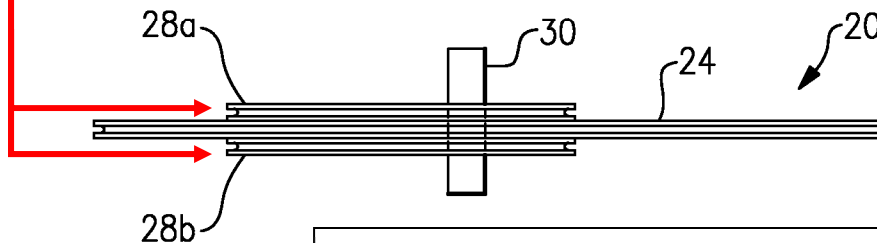
EX1015 at ¶¶[0013]-[0014].

167. As can further be seen in at least Islas's Figures 1 and 4, both of which are provided below with annotations, Islas therefore teaches that the power cables are attached on either side of the bowstring's attachment point at the cams (i.e., one above and one below) but are both attached below the bowstring's attachment point at the stock.

Islas (EX1015) at Figs. 1, 3



Power cable cam grooves 28a and 28b for receiving power cables, respectively located above and below bowstring groove



Peripheral bowstring groove 24 for receiving bowstring, located between power cable cam grooves

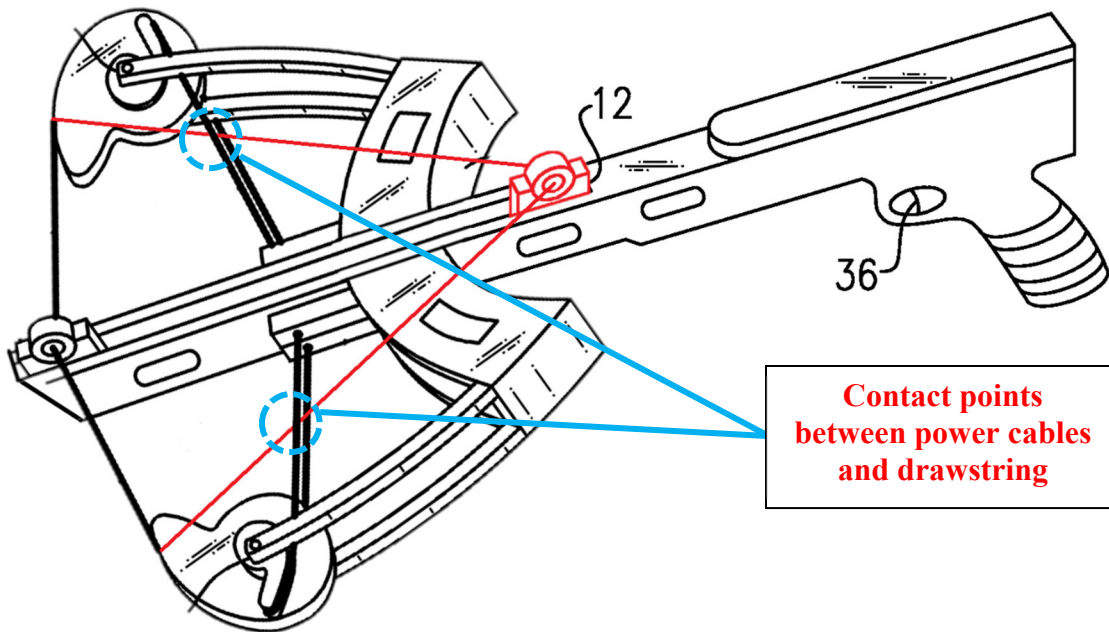
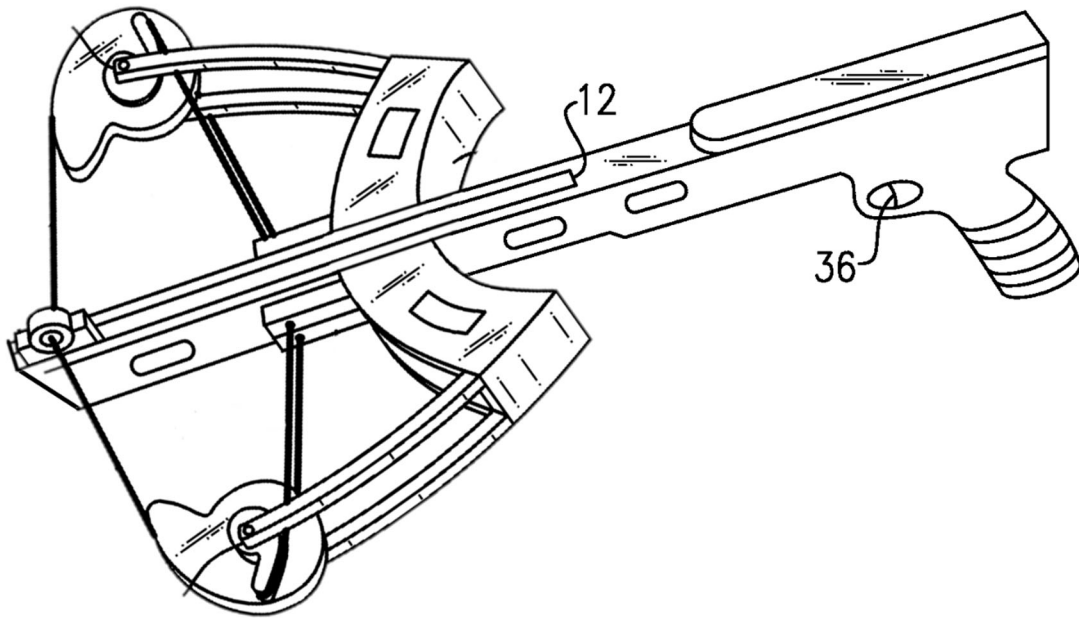
168. Because of this configuration of the power cable and drawstring attachment points, if the Islas device were “simpl[y]” reconfigured so that “the string [is] adjacent the down-range side of the string guides 20 in a released configuration,

such that the string translates from the down-range side toward the up-range side while being drawn” as Petitioner and Dr. Batzer argue, a POSA would readily understand that the device would not be able to function. This is because the drawstring, which would still be attached above the attachment points for both power cables at the stock (now at the down-range side of the device) but attached between the power cables at the cams (now up-range), would necessarily interfere with the power cables before the bow can reach its full-drawn position.

169. The necessary conflict between the power cables and drawstring can be visualized using the following modified versions of Islas’s Figure 1, which show the reversed positions of the power string and drawstring attachment points if the modifications Petitioner and Dr. Batzer suggest are applied. In the second annotated figure, the approximate points where the drawstring would cross and contact the top power cable when in the drawn position⁸ (shown in red) are illustrated:

⁸ In the drawn position, the limbs in this reconfigured version of Islas would also flex inward, and the cams would rotate toward the stock. These effects are not shown in the provided, simplified figure but would have been understood by a POSA.

Patent Owner-Generated, Modified Islas Figure 1



170. The interference between the power cables and the drawstring caused by trying to implement a reverse-draw configuration in Islas would have significant implications on the function of the crossbow. For example, if the drawstring and power cables make contact early enough in the power stroke, it may even prevent the crossbow from being fully drawn and cocked, which would in turn prevent the user from being able to fire the crossbow at all. As such, the device would be inoperable and not function as intended.

171. A POSA would understand that the device of Islas would have to be completely redesigned to implement a reverse-draw configuration. Significantly, the cams in Islas are designed to rotate in a specific direction. “Simpl[y]” reconfiguring Islas to be in a reverse-draw configuration would require the cams to rotate in the opposite direction. However, that is impossible for the cams depicted in Islas because the control cables prevent rotation in the opposite direction. The cams would not rotate at all if configured as Petitioner and Dr. Batzer argue. Rather, control cables, spacing requirements, the need to design through barrels, and considerations for the string placement would require a complete reconstruction of the Islas crossbow to become a reverse-draw configuration. The reverse-draw configuration directly computed from the forward-draw or traditional design would also have control cable planes of rotation aligned with the string rotation.

172. Even if the crossbow could be fully drawn and cocked, however, a POSA would understand that, where the top power cables make contact with the drawstring, the drawstring would be pressed downward at the point of contact and, as the drawstring is released, hinder the smooth movement of the drawstring needed for the released bolt to be fired accurately. Draw strings that are pulled in directions outside of the plane of rotation tend to create misalignment and inaccuracies, along with string wear. This would cause the device to cease to function as intended or, at a minimum, severely hamper its intended function.

173. Moreover, constant friction between the drawstring and top power cables as the bow is cyclically drawn and released will eventually lead to wear-and-tear that will damage one or both of the drawstring and power cables and may eventually cause one or both to snap. This would not only cause the crossbow to cease to function but would also pose a significant safety risk to the user given the amount of tensile force stored in the drawstring and power cables.

174. Petitioner and Dr. Batzer do not offer any explanation why or how a POSA would know how to resolve the foregoing problems. In fact, they do not identify any specific solutions. While Petitioner and Dr. Batzer both point to Darlington and argue that “Darlington shows various embodiments in forward-draw and reverse-draw configurations, indicating the simplicity of making such a modification,” (Petition at 60-61; EX1016 at ¶250), a POSA would immediately

recognize that Darlington teaches a series of crossbows that have significantly different structures from that disclosed in Islas and thus conclude that Darlington's teachings could not be easily implemented in Islas. *Generally compare* EX1013 *with* EX1015.

175. In fact, while it is not at all clear what aspects of the various Darlington designs Petitioner and Dr. Batzer contend could be implemented in Islas to convert it to a reverse-draw configuration, a POSA would have immediately recognized that at least some of Darlington's teachings suggest that a reverse-draw crossbow configuration could not be implemented in Islas. For example, in at least one set of embodiments, Darlington explains that the described reverse-draw configuration requires a "shoot-through configuration," *i.e.*, a configuration where the bowstring is "vertically disposed in between the first power cable 28 and the second power cable 30" at all times, which "allow[s] the bowstring 32 to be pulled away from the riser 20 and through the first power cable 28 and second power cable 30." EX1013 at ¶[0041]-[0042]; *see also id.* at Fig. 1.

176. As previously discussed, Islas describes its bowstring as being positioned on top of the stock and therefore above the power cables, not between them as required for Darlington's shoot-through reverse draw configuration. EX1015 at Fig. 1, ¶[0014] (bowstring's string release 34 is "mounted on a track on the top of the beam 12"). A POSA therefore would have immediately recognized

that attempting to implement Darlington's reverse-draw configuration in Islas would result in interference between the power cables and the drawstring as the crossbow is drawn and the drawstring is forced to cross and tangle with the upper power cables. This would, in turn, render the crossbow inoperable for its intended purpose as described above. Accordingly, it is my opinion that a POSA would understand the teachings of Islas and Darlington to be incompatible.

177. Indeed, attempting to convert Islas's design to a shoot-through, reverse-draw configuration, like that described in Darlington, would require an almost complete redesign of the Islas device. At a minimum, the cams would have to be reconfigured to rotate in the correct direction, and the riser and stock would have to be completely redesigned so that the drawstring can travel through the center of the riser and through a channel running down the center of the barrel to a trigger mechanism integrated into the stock. These changes would fundamentally change the bulk of the Islas design and leave little behind that resembles the taught device. Dr. Batzer omits any discussion of these necessary changes.

178. It is therefore my opinion that, given the knowledge of a POSA, the express teachings of Islas regarding the configuration of attachment points for its drawstring and power cables, a POSA would have understood Islas to teach away from any attempts to convert the disclosed crossbow to a reverse-draw configuration. A POSA would not have been motivated to make any such modifications in view of

these teachings. Accordingly, Ground 12, which requires that Islas's design be "simpl[y]" modified to have a reverse draw configuration, fails.

B. Lack of Motivation to Combine or Modify the Prior Art

1. A POSA would not have been motivated to modify Stanziale '302, Stanziale '062, or Stanziale '771 in the Way Petitioner and Dr. Batzer Argue (Grounds 2, 4, and 6)

179. I disagree with Petitioner's and Dr. Batzer's arguments that a POSA would have been motivated to modify any of Stanziale '302, Stanziale '062, or Stanziale '771 so that the power cables would be displaced away from the plane of rotation of the draw string journals, as argued in Grounds 2, 4, and 6.

180. As an initial matter, I note that neither Petitioner nor Dr. Batzer provide any explanation for why they contend a POSA would have been motivated to modify any of the Stanziale references in any way, which is not only contrary to my understanding of the law as it relates to properly articulating why a claim would have been obvious, but it hinders my ability to offer an opinion on these proposed modifications.

181. However, at a minimum, it is clear to me that both Petitioner and Dr. Batzer overlook or ignore significant reasons why a POSA would have specifically been motivated to avoid modifying Stanziale '302, Stanziale '062, or Stanziale '771 in a manner that would have resulted in the crossbow as recited in Claim 1, or indeed, any of the references discussed in the Petition and Dr. Batzer's Declaration.

182. In particular, a POSA would readily understand that modifying the direction that the power cables are displaced or allowing for displacement where none previously existed would change the forces on the limbs and harm the accuracy of a crossbow.

183. Both Petitioner and Dr. Batzer overlook the negative effect that torque or twisting forces have on the function and structural stability of any crossbow. It has long been known in the field of archery and bow and crossbow design that, when torque or other twisting forces are applied to a crossbow (and particularly to the crossbow's limb) without any steps to compensate for or neutralize those forces, the accuracy or other functionality of the bow suffers. For example, limb twist impacts the path of the arrow and results in related inaccuracies as both limbs and cams move in unwanted directions, impacting arrow propulsion. EX2031.

184. Additionally, it was known in the industry at the relevant time that, if the torque or twisting forces are severe enough, the various components of the crossbow (e.g., the limbs, the cams or pulleys, or any intervening structures between the limbs and the cams or pulleys) may be permanently warped or may even fracture (either laterally or longitudinally), resulting in catastrophic failure of the bow. This risk is heightened if the crossbow is used frequently as, under such circumstances, the twisting forces will act on the crossbow's components in a repeated, cyclical manner. In many instances, designs do not account or allow for adjustment to limb

deflection or alignment of cams in crossbows, and limb twist and cam lean can result in greater wear on components like strings and cables.

185. It was also known in the field at the time of invention that configuring a bow such that the power cables are capable of moving or being displaced relative to the drawstring could introduce undesirable twisting forces to the limbs. In fact, at least one of the prior art references Petitioner and Dr. Batzer rely on – Darlington – specifically describes the need to keep the power cables substantially parallel to the drawstring in order to improve accuracy. EX1013 at ¶[0046].

186. Given the structure of the various Stanziale references, a POSA would have readily recognized that introducing or modifying the direction of power cable displacement in any of Stanziale '302, Stanziale '062, or Stanziale '771 would carry a heightened risk of decreased accuracy. More specifically the presence of one or more intervening structures (e.g., lever 40 in Stanziale '302, auxiliary arms 620 and stirrups 630 in Stanziale '062, and pushing arms 32 and elements 27 in Stanziale '771) between the devices' cams or pulleys and their limbs introduces a number of additional joints or components that are likely prone to failure or warping when unplanned forces are applied to them. Changing the displacement of the power cables not only affects the cam and its immediately connected components but imposes twisting forces on the other connection points and components in the intervening structures and down the length of the limbs themselves. Moreover,

having more components between the cam and the limb results in the amount of torque acting on the limb to be amplified, which in turn requires the use of a more robust limb to absorb and withstand those forces.

187. The limbs in the Stanziale references, however, are not robust enough to survive this degree of torque. Stanziale '302, for example, describes how the device has three different positions: (1) an unloaded or rest condition (EX1007 at ¶¶0134], Figs. 1-2); (2) a loaded condition (*id.* at ¶¶0140], Figs. 3-4), and (3) a fully unloaded condition (*id.* at ¶¶0154], Figs. 5-6). In the “fully unloaded condition,” Stanziale '302 teaches that “elastic members 10 are deformed in an opposite direction with respect to the loaded condition, i.e. they are bent away from the stock 2.” *Id.* at ¶¶0155]. A POSA would immediately recognize this to be a severe disadvantage and a feature that undermines both the longevity of the device and the feasibilities of making any changes that increase torque on the limbs. For example, residual vibration from the volume of moving parts as the bow moves from the loaded configuration to an unloaded configuration will run through the limb, resulting in stress and the potential for fatigue fractures that may damage and weaken the limb, resulting in catastrophic failure.

188. Notably, Stanziale '062 and Stanziale '771 also describe or depict the same problematic, vibration-inducing design. *See, e.g.*, EX1011 at 7:12-14 (describing the device “in a rest condition, in a loaded or charge condition, and in a

maximum discharge condition”), Figs. 17-19 (Fig. 19 showing reverse flexing of limbs); EX1012 at 22:34-23:1 (describing the device “in a rest condition, in a loaded or charge condition, and in a maximum discharge condition”), Figs. 11-13. Accordingly, a POSA would expect the same problems to arise in those devices as in Stanziale ’302.

189. Additionally, placing pulley assemblies or any other heavy component away from the end of the limbs – as is taught in each of the Stanziale references – increases the risk that one pulley assembly, or some components thereof, will become out of sync with the other pulley assembly, which is detrimental to the accuracy and functionality of the crossbow. A POSA would recognize that further modifying those pulley assemblies, such as by reversing the direction of a helical journal or adding a helical journal where one previously did not exist, exacerbates the effect this added weight has and increases the risk of de-synchronization and the resulting decrease in accuracy and functionality by changing how that weight is distributed relative to the end of the limb. Moreover, while this would directly impact deflection of the limbs, it also would have a cascading effect throughout other components of the device, such as the drawstring, which would negatively impact the path of a bolt or other projectile as it is released from the device.

190. Thus, a POSA would immediately recognize that even minor changes to components of the Stanziale devices, such as the power cable take-up journals,

would have unpredictable but potentially dramatic effects on the structural stability and functionality of the relevant device. Dr. Batzer says nothing on this point.

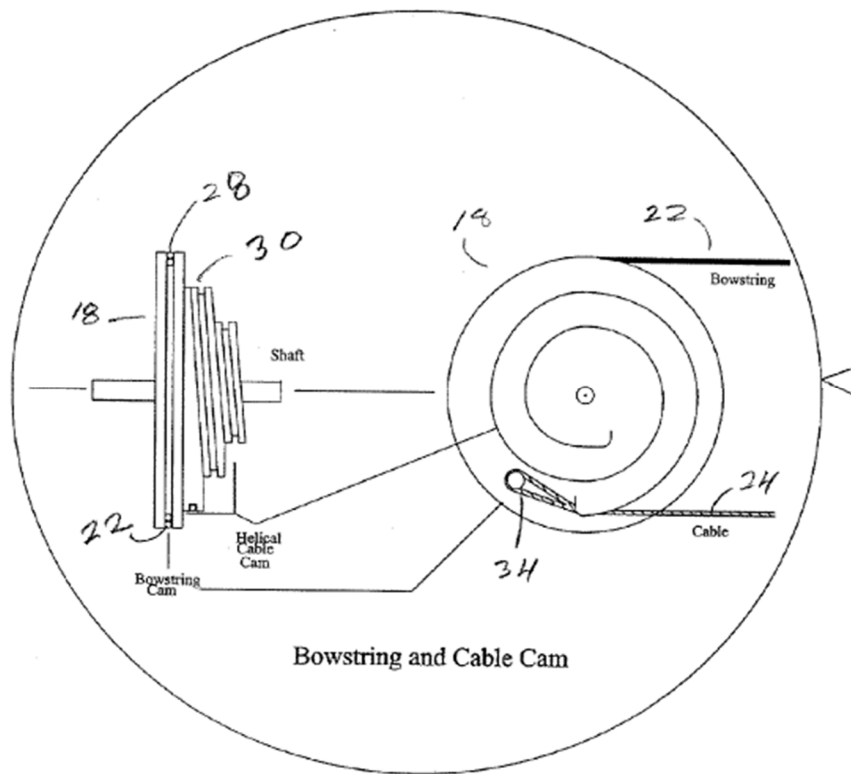
191. Accordingly, it is my opinion that a POSA would not have been motivated to modify any of Stanziale '302, Stanziale '062, or Stanziale '771 to result in the crossbow of Claim 1, particularly not a crossbow including Claim 1's requirement that the power cables be "displaced ... away from the first and second planes of rotation." Accordingly, the proposed combinations predicated on modifications to Stanziale '302 (Ground 2), Stanziale '062 (Ground 4), and Stanziale '771 (Ground 6) fail.

2. A POSA would not have been motivated to combine Darlington with Norkus or Park (Grounds 7, 8, and 12)

192. I disagree with Petitioner's and Dr. Batzer's argument that a POSA would have been motivated to combine Darlington with Norkus or Park, as argued in Grounds 7, 8, and 12.

193. Norkus discloses "[a]n inverted compound archery bow" with various structural features. EX1010 at Abstract. In Norkus's disclosed bow, which is not a crossbow, "[t]he cams 18 and 20 of the bow each contain a groove 28 to receive the bowstring 22 and a groove 30 to receive the respective [power] cables 24 or 26.... The grooves 30 for the [power] cables 24 and 26 are helical in shape and also have the capacity for two full wraps." *Id.* at 2:66-3:7. These grooves can be seen in Norkus's Figure 7, an excerpt of which is provided below:

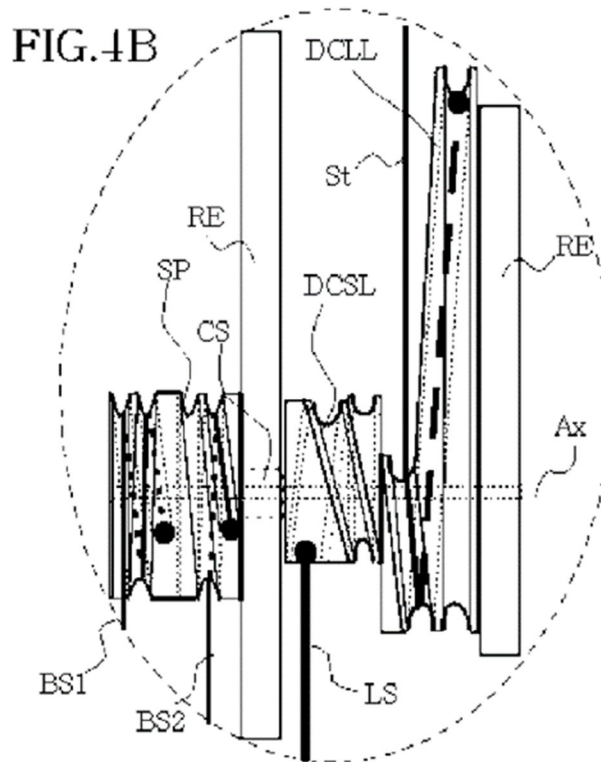
Norkus (EX1010) at Fig. 7



I understand that Petitioner and Dr. Batzer both contend that this teaching discloses a “helical power cable take-up journal.” Petition at 48-49; EX1016 at 205.

194. Park similarly discloses “a compound bow,” but not a crossbow EX1009 at Abstract. Although Park’s specification never uses the word “helical” or “spiral” in any context, I understand that Petitioner and Dr. Batzer both contend that certain figures of Park show a “helical power cable take-up journal,” although neither identifies the specific structure(s) they are referring to by number. Petition at 50; EX1016 at ¶211. One such figure, Park’s Figure 4B, is provided below for reference:

Park (EX1009) at Fig. 4B



195. I understand that Petitioner and Dr. Batzer both contend that Norkus’s and Park’s purported teachings of helical power cable take-up journals necessarily mean that both Norkus and Park have power cables that are “displaced along the respective axes away from the planes of rotation as the cables wrap onto the helical journals.” Petition at 48, 50; EX1016 at ¶¶204-205, ¶¶210-211.

196. I further understand that Petitioner and Dr. Batzer assert that a POSA would have been motivated to modify Darlington in view of the foregoing teachings of Norkus and Park to meet the following elements of Claim 1:

- “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;”
- “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;” and
- “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.”

197. I disagree that a POSA would have been motivated to combine Darlington with Norkus or Park to meet any of the above limitations.

198. As an initial matter, Petitioner and Dr. Batzer rely on allegedly shared teachings between Darlington and Norkus of a higher level of stored energy and increased power stroke by citing to paragraphs [0003], [0015], and [0042] of Darlington. However, none of these cited paragraphs provide any teachings of particular relevance to the claim elements above that are missing from Darlington. Paragraphs [0015] and [0042] teach that a crossbow with a reverse draw

configuration provides an increase power stroke in comparison to a conventional draw configuration.⁹ There are simply no teachings to be found here that a helical power cable journal, or any particular configuration of a power cable journal, has any impact on power stroke or storing a higher level of energy. Paragraph [0003] teaches that “a ‘three-groove cam’” with “two let-out grooves and a take-up groove” in a two cam system with two power cables, each attached to both cams, “helps maintain straight nock travel and makes it possible to get a higher level of stored energy to peak weight from the bow.” *Id.* at ¶[0003]. This limited insight into a higher level of stored energy is provided in the Background of the Invention section, and a POSA would have understood it to be background information well-known at the time of Darlington’s invention and not a specific teaching of an improvement provided by Darlington’s proposed invention. Darlington’s only well-articulated teachings that relate to the design of the cams that must be modified in order to meet

⁹ “The cams are reversed in orientation with the bowstring positioned horizontally between cams and the riser so the power stroke can be increased, which results in better performance,” EX1013 at ¶[0015]. “[The] reverse draw configuration increases the distance that the bowstring 32 can be pulled away from the riser, thereby increasing the power stroke and improving the performance of the crossbow 10’.” *Id.* at ¶[0042].

all the elements of Claim 1 are teachings to improve accuracy or cam synchronization, not to provide higher levels of stored energy or increase power stroke. *See id.* at ¶¶ [0045], [0046], [0048], and [0060].

199. Additionally, as I previously explained, a POSA would have understood that Darlington teaches that the power cables and drawstring should be kept substantially parallel at all times with the orientation of the power cables and the drawstring relative to each other kept consistent throughout the draw cycle to achieve the goal of better accuracy. Therefore, Darlington teaches away from any modifications that would cause displacement of the power cables either toward or away from the drawstring journals' planes of rotation. *See* ¶¶131-145, *supra*.

200. In particular, Darlington teaches that, in a shoot-through configuration, the substantially parallel configuration is necessary, among other reasons, to eliminate twisting forces on the bow limbs and improve accuracy. EX1013 at ¶[0046]; *see also id.* at ¶[0041], ¶[0043]. Likewise, in a shoot-over configuration in which the power cables must be deflected out of the path of the drawstring (*id.* at ¶[0057]), Darlington teaches that this deflection may result in undesirable “twisting forces being exerted on the limbs,” and as a result, Darlington’s shoot-over configurations require that “the let-out grooves 102A and 104A [drawstring journals] are disposed close to the hybrid grooves 102B and 104B [power cable take-up journals] on the first axle assembly 34A and second axle assembly 34B,

respectively, thereby reducing the torque produced on the limbs 16A & B and 18A & B when the bowstring is drawn away from the riser 20.” *Id.* at ¶[0060]. *See also* ¶¶139-140, *supra*.

201. As previously explained, a POSA would readily understand why torque or twisting forces on the limbs would harm the accuracy of the device. Any twisting of the limbs will cause the cams to be deflected out of their normal, shared plane of rotation where the cam of the first limb is arranged in the same horizontal plane as the cam of the second limb. Even a small amount of deflection at the cams will, in turn, be translated to the drawstring and affect the travel of a bolt or other projectile launched with the drawstring. As a result, the bolt or other projectile will not travel in a straight line but rather will deviate relative to one or both of the horizontal and vertical planes. ¶141, *supra*.

202. Darlington aims to avoid these problems by expressly teaching that the power cables in a shoot-through configuration – i.e., where the power cables are positioned both above and below the drawstring journals – are kept substantially parallel to the drawstring while the power cable attachment points in a shoot-over configuration – i.e., where the power cables are positioned and deflected below the drawstring journals – are kept as close as possible to the drawstring journals so as to minimize any twisting on the limbs and in both configurations the orientation of the power cables and the drawstring relative to one another is consistent throughout the

draw cycle. These solutions require little to no displacement of the power cables away from the drawstring journals and their planes of rotation and keep the directions of forces exerted on each cam consistent by maintaining the same orientation of the power cables and drawstring throughout the drawstring's travel between the relaxed and drawn positions. ¶142, *supra*.

203. Because Darlington teaches that power cable journals 102B, 104B (i.e., the power cable take-up journals) should not extend away from the plane of rotation of let-out grooves 102A and 104A (i.e., the first and second drawstring journals) because doing so would hinder the stated goal of increased accuracy, a POSA would understand that Darlington teaches away from a design having “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” and “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 required by Claim 1. ¶143, *supra*.

204. In addition, substituting the cams of Norkus for the cams of Darlington would not in and of itself increase the power stroke of the resulting crossbow as compared to the crossbow of Darlington. Norkus's cams allow for the possibility of increasing power stroke, but to actually do so, the drawn position of the bowstring must be moved further away from the relaxed position. Norkus itself teaches this as shown in and described with reference to Figure 3. EX1010 at 1:55-60. Neither

Petitioner nor Dr. Batzer provide any explanation as to how a POSA would have further modified the crossbow of Darlington to move the drawn position further away from the relaxed position to actually increase the power stroke of the crossbow after adding the cams of Norkus. Doing so would of course have resulted in a longer crossbow inherently more unstable and unwieldy for a user to aim and thereby further reducing accuracy relative to the crossbow of Darlington, which is contrary to Darlington's express goal to provide a crossbow having improved accuracy.

205. After weighing the relative merits of the teachings of Darlington for improving accuracy and the teachings of Norkus for increasing power stroke, it is my opinion that a POSA would have preferred Darlington's cams that provide increased accuracy (i.e., cams that provide for (1) consistent orientation of power cables and drawstring and (2) close positioning of let-out groove and hybrid groove) to Norkus's cams that provide for a longer power stroke (i.e., grooves that "are helical in shape and also the capacity for two full wraps") as Darlington already taught the POSA a manner of increasing accuracy *and* increasing power stroke—that is, using Darlington's cams in either a shoot-through or shoot-over configuration in a reverse draw crossbow. In total, the decrease in accuracy caused by the use of Norkus's cams in Darlington's crossbow combined with ability to increase power stroke in accordance with Darlington's teachings of using a reverse drawn configuration crossbow without having to resort to less accurate cams, like Norkus's

cams, would not have motivated a POSA to combine Darlington and Norkus to result in a crossbow meeting all of the elements of Claim 1 in the manner proposed by Petitioner and Dr. Batzer.

206. Petitioner and Dr. Batzer also do not explain how the cam of Norkus would meet the functional requirements of the hybrid two-groove cam of Darlington in which each cam includes a let-out groove that receives the bowstring and a hybrid groove including a let-out portion that receives a first power cable and a take-up portion that receives the second power cable to provide the additional benefit of improved cam synchronization. EX1013 at ¶[0060]. As taught by Darlington, the pair of hybrid two-groove cams in which the distal ends of the first power cable and the second cable are attached to the first cam and the second cam improve cam synchronization in addition to improving accuracy. *Id.* at ¶[0056] and ¶[0060]. A POSA would have weighed Norkus's cams' possible improvement of power stroke against the loss of improved accuracy and the loss of improved cam synchronization from replacing Darlington's cams and found Norkus's cams wanting. It is my opinion that a POSA would not have valued increased power stroke over both increased accuracy and increased cam synchronization and would not have substituted Norkus's cams for Darlington's cams in a manner that would have rendered Claim 1 obvious.

207. Petitioner and Dr. Batzer also do not explain how the cam of Park would meet the functional requirements of the hybrid two-groove cam of Darlington in which each cam includes a let-out groove that receives the bowstring and a hybrid groove including a let-out portion that receives a first power cable and a take-up portion that receives the second power cable to provide the additional benefit of improved cam synchronization. EX1013 at ¶[0060]. As taught by Darlington, the pair of hybrid two-groove cams in which the distal ends of the first power cable and the second cable are attached to the first cam and the second cam improve cam synchronization in addition to improving accuracy. *Id.* at ¶[0056] and ¶[0060]. A POSA would have weighed Park's cams' possible improvement of power stroke against the loss of improved accuracy and the loss of improved cam synchronization from replacing Darlington's cams and found Park's cams wanting. It is my opinion that a POSA would not have valued increased power stroke over both increased accuracy and increased cam synchronization and would not have substituted Park's cams for Darlington's cams in a manner that would have rendered Claim 1 obvious. The same holds true for substituting other cams with helical journals for Darlington's cams, including those of Stanziale '062, Stanziale '771, Stanziale '302, Despart, and Lester.

208. It is therefore my opinion that these teachings would have motivated a POSA to avoid combining Darlington with either Norkus and Park to incorporate

helical power cable take-up journals and/or to cause the power cables to wrap onto helical power cable take-up journals such that the power cables are displaced away from the plane of rotation of the draw string journals.

209. Even if Darlington does not go so far as to teach away from displacing the power cables so as not to negatively impact accuracy, it is my opinion that a POSA still would not have been motivated to modify Darlington to incorporate the helical with Norkus or Park.

210. As explained above, a POSA would have understood that even relatively minor changes to the design of a crossbow's mechanical components, and especially to its pulleys or cams, would have significant effects on the crossbow's function and structural stability. *See* ¶¶179-190, *supra*.

211. Accordingly, it is my opinion that a POSA would not have been motivated to combine Darlington with Norkus or Park in an attempt to meet any of the following elements of Claim 1:

- “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;”
- “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;” and

- “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.”

3. A POSA would not have been motivated to combine Kempf '871 with Norkus, Park, or Stanziale '302 (Grounds 9, 10, and 11)

212. I disagree with Petitioner’s and Dr. Batzer’s argument that a POSA would have been motivated to combine Kempf '871 with Norkus, Park, or Stanziale '302, as argued in Grounds 9-11.

213. As discussed above, Norkus discloses “[a]n inverted compound archery bow” with various structural features, including “grooves 30 ... [that] are helical in shape and also have the capacity for two full wraps.” EX1010 at Abstract, 2:66-3:7, Fig. 7. I understand that Petitioner and Dr. Batzer both contend that these teachings disclose a “helical power cable take-up journal.” Petition at 48-49; EX1016 at 205.

214. As also discussed above, Park similarly discloses “a compound bow.” EX1009 at Abstract. Although Park’s specification never uses the word “helical” or “spiral” in any context, I understand that Petitioner and Dr. Batzer both contend that certain figures of Park show a “helical power cable take-up journal,” although

neither identifies the specific structure(s) they are referring to by number. Petition at 50; EX1016 at ¶211.

215. I understand that Petitioner and Dr. Batzer both contend that Norkus's and Park's purported teachings of helical power cable take-up journals necessarily mean that both Norkus and Park have power cables that are "displaced along the respective axes away from the planes of rotation as the cables wrap onto the helical journals." Petition at 48, 50; EX1016 at ¶¶204-205, ¶¶210-211.

216. I further understand that Petitioner and Dr. Batzer assert that a POSA would have been motivated to modify Kempf '871 in view of the foregoing teachings of Norkus or Park, or the teachings of Stanziale '302,¹⁰ to meet the following elements of Claim 1:

- "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;"

¹⁰ Petitioner and Dr. Batzer both contend that Stanziale '302 discloses that its power cables are "displaced along the respective axes away from the planes of rotation as the cables wrap onto the helical journals." However, as I previously explained, Stanziale '302 fails to disclose this limitation. *See* ¶¶88-92, *supra*.

- “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;” and
- “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.”

217. I disagree that a POSA would have been motivated to combine Kempf '871 with Norkus, Park, or Stanziale '302 to meet any of the above limitations. As explained above, a POSA would have understood that even relatively minor changes to the design of a crossbow's mechanical components, and especially to its pulleys or cams, would have significant effects on the crossbow's function and structural stability, which is a fundamental issue Petitioner and Dr. Batzer fail to address. *See* ¶¶179-190, *supra*.

218. As I previously explained, a POSA would readily understand that modifying the direction that the power cables are displaced or allowing for displacement where none previously existed would change the forces on the limbs and harm the accuracy of a crossbow. ¶182, *supra*. In particular, such modifications

would result in the introduction of torque or twisting forces in the modified device, which would have a negative effect on both the function and structural stability of the crossbow. ¶183, *supra*.

219. It has long been known in the field of archery and bow and crossbow design that, when torque or other twisting forces are applied to a crossbow (and particularly to the crossbow's limb) without any steps to compensate for or neutralize those forces, the accuracy or other functionality of the bow suffers as both limbs and cams move in unwanted directions, impacting arrow propulsion. ¶183, *supra*.

220. Additionally, it was known in the industry that, if the torque or twisting forces are severe enough, the various components of the crossbow (e.g., the limbs, the cams or pulleys, or any intervening structures between the limbs and the cams or pulleys) may be permanently warped or may even fracture, resulting in catastrophic failure of the bow. This risk is heightened if the crossbow is used frequently as, under such circumstances, the twisting forces will act on the crossbow's components in a repeated, cyclical manner. In many instances, designs do not account or allow for adjustment to limb deflection or alignment of cams in crossbows, and limb twist and cam lean can result in greater wear on components like strings and cables. ¶184, *supra*.

221. It was also known in the field at the time of invention that configuring a bow such that the power cables are capable of moving or being displaced relative to the drawstring could introduce undesirable twisting forces to the limbs. In fact, at least one of the prior art references Petitioner and Dr. Batzer rely on – Darlington – specifically describes the need to keep the power cables substantially parallel to the drawstring in order to improve accuracy. EX1013 at ¶[0046]. ¶185, *supra*.

222. Accordingly, it is my opinion that a POSA would not have been motivated to combine Kempf '871 with Norkus, Park, or Stanziale '302 in order to obtain the crossbow of Claim 1, particularly a crossbow including the following limitations:

- “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;”
- “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;” and
- “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.”

4. A POSA would not have been motivated to combine Islas with Darlington and Park (Ground 12)

223. As I previously explained, a POSA would have understood that the collective teachings of Islas and Darlington teach away from the combination bow Petitioner and Dr. Batzer describe in Ground 12. The structure of Islas means that a reverse-draw configuration could not be easily implemented and, in fact, would lead to a number of problems that would prevent the resulting crossbow from functioning properly or at all. *See* ¶¶162-178, *supra*. Petitioner and Dr. Batzer do not identify these problems or otherwise explain how a POSA addresses any of these problems.

224. Moreover, while Petitioner and Dr. Batzer both point to Darlington and argue that “Darlington shows various embodiments in forward-draw and reverse-draw configurations, indicating the simplicity of making such a modification,” (Petition at 60-61; EX1016 at ¶250), Darlington teaches a series of crossbows that have significantly different structures from the Islas crossbow. *Generally compare* EX1013 *with* EX1015. Petitioner and Dr. Batzer do not explain what aspects of the various Darlington designs a POSA would find obvious to implement in Islas, and in my opinion, a POSA would not have been able to identify them herself given the structural differences between the various designs.

225. For example, Islas teaches a design with independent cams – that is, cams that are not synchronized or slaved to one another. Instead, the cams have their own independent power cables, with one cam’s power cables having no interaction with the other cam. *See* EX1015 at ¶[0013] (“In this invention, there are no synchronizing pulleys....”), Figs. 1-3. Darlington, on the other hand, emphasizes that its cams and pulleys must be synchronized or slaved to one another. EX1013 at ¶¶[0044]-[0045], ¶[0056], ¶[0060]. In fact, that is another stated objective of Darlington’s purported invention. *Id.* at ¶[0005] (“[T]here is a need for a dual-cam crossbow with synchronized cams....”).

226. A POSA would recognize that a synchronized cam design like that in Darlington would be incompatible with a non-synchronized/independent cam design like that in Islas. In synchronized cam designs, every element of the crossbow is functionally tied to one another and optimized to work in that specific crossbow. A POSA would understand that there was no way to predict, at least without significant and time-consuming testing, whether any particular component of a specific synchronized cam crossbow would work in another design at all. A POSA therefore would not have been motivated to use any feature from a synchronized cam design, including any of the Darlington designs, in an non-synchronized/independent cam design like that taught in Islas due to the unpredictability of the results.

227. Accordingly, in my opinion, a POSA would not have been motivated to combine Islas with Darlington to obtain the crossbow recited in Claim 1.

228. Additionally, even if Islas and Darlington could be combined, it is my opinion that a POSA would not have been motivated to further modify the resulting device in view of Park such that the power cables would be displaced away from the drawstring journals' plane of rotation when the device is drawn.

229. As explained above, it is my opinion that a POSA would not have been motivated to combine Darlington with Park given Darlington's teaching that maintaining the power cables parallel to the drawstring at all times was crucial to meeting Darlington's goal of improved accuracy. *See* ¶¶192-211, *supra*.

230. In particular, Darlington teaches that, in a shoot-through configuration, the parallel configuration is necessary, among other reasons, to eliminate twisting forces on the bow limbs and improve accuracy. EX1013 at ¶[0046]; *see also id.* at ¶[0041], ¶[0043]. Likewise, in a shoot-over configuration in which the power cables must be deflected out of the path of the drawstring, Darlington teaches that this deflection may result in undesirable "twisting forces being exerted on the limbs," and as a result, Darlington's shoot-over configurations require that "the let-out grooves 102A and 104A [drawstring journals] are disposed close to the hybrid grooves 102B and 104B [power cable take-up journals] on the first axle assembly 34A and second axle assembly 34B, respectively, thereby reducing the torque

produced on the limbs 16A & B and 18A & B when the bowstring is drawn away from the riser 20.” *Id.* at ¶[0060]. *See also* ¶¶139-140, *supra*.

231. As previously explained, A POSA would readily understand why torque or twisting forces on the limbs would harm the accuracy of the device. Any twisting of the limbs will cause the cams to be deflected out of their normal, shared plane of rotation where the cam of the first limb is arranged in the same horizontal plane as the cam of the second limb. Even a small amount of unwanted deflection at the cams will, in turn, be translated to the drawstring and affect the travel of a bolt or other projectile launched with the drawstring. As a result, the bolt or projectile will not travel in a straight line but rather will deviate relative to one or both of the horizontal and vertical planes. ¶141, *supra*.

232. Darlington aims to avoid these problems by expressly teaching that the power cables in a shoot-through configuration – i.e., where the power cables are positioned both above and below the drawstring journals – are kept substantially parallel to the drawstring while the power cable attachment points in a shoot-over configuration – i.e., where the power cables are positioned and deflected below the drawstring journals – are kept as close as possible to the drawstring journals so as to minimize any twisting on the limbs and in both configurations the orientation of the power cables and the drawstring relative to one another is consistent throughout the draw cycle. These solutions require little to no displacement of the power cables

away from the drawstring journals and their planes of rotation and keep the directions of forces exerted on each cam consistent by maintaining the same orientation of the power cables and drawstring throughout the drawstring's travel between the relaxed and drawn positions. ¶142, *supra*.

233. Because Darlington teaches that power cable journals 102B, 104B (i.e., the power cable take-up journals) should not extend away from the plane of rotation of let-out grooves 102A and 104A (i.e., the first and second drawstring journals) because doing so would hinder the stated goal of increased accuracy, a POSA would understand that Darlington teaches away from a design having “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” and “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 required by Claim 1. ¶143, *supra*.

234. Accordingly, it is further my opinion that a POSA would not have been motivated to combine Park with the combination of Islas and Darlington, particularly if the combination is intended to incorporate one of Darlington's reverse-draw drawstring and power cable arrangements, as required by Ground 12.

235. As such, it is my opinion that a POSA would not have been motivated to combine Islas, Darlington, and Park in order to create a single crossbow meeting any of the following elements of Claim 1:

- “a draw string... 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;”
- “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;”
- “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;” and
- “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.”

X. **CONCLUSION**

236. I declare under penalty of perjury that the foregoing is true and correct.

Dated: 18 October 2023



Jonathan Teater