

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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

v.

RAVIN CROSSBOWS, LLC,
Patent Owner.

Case No. **IPR2023-00407**
Patent No. **9,354,015**

DECLARATION OF STEPHEN A. BATZER, PH.D., P.E. IN SUPPORT OF
PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE

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I, Stephen A. Batzer, declare as follows:

I. INTRODUCTION

1. I have personal knowledge of the matters set forth herein.

2. I have been retained to provide expert opinions on behalf of Petitioner Hunter's Manufacturing Company, Inc. d/b/a TenPoint Crossbow Technologies ("TenPoint") in the *inter partes* review ("IPR") of U.S. Patent 9,354,015 (the "'015 Patent") owned by Patent Owner Ravin Crossbows, LLC ("Ravin"). To that effect, I previously provided a declaration that was filed as Ex. 1016 to TenPoint's Petition requesting the IPR.

3. I understand that the parties have since filed the following, which I have reviewed: Ravin's Preliminary Response (Paper 9 and supporting exhibits), TenPoint's Reply to the Preliminary Response (Paper 11 and supporting exhibits), and Ravin's Sur-Reply to the Reply (Paper 12 and supporting exhibits). I also understand that the Board has instituted the requested IPR ("Dec.," Paper 13) and Ravin filed a post-institution Response ("Resp.," Paper 25 and supporting exhibits), which I have reviewed.

4. I have been asked to provide my opinion relating to several issues implicated by these latter papers. This declaration supplements my previous declaration (Ex. 1016) without repeating the opinions provided therein, which

remain unaltered; for those opinions, the reader is directed to the previous declaration.

5. In preparing this declaration, I have reviewed the following materials, in addition to the materials referenced above and in my previous declaration (Ex. 1016):

- U.S. Patent No. 9,879,936 (“’936 Patent,” Ex. 1027);
- U.S. Patent No. 10,254,073 (“’073 Patent,” Ex. 1028);
- U.S. Patent No. 6,267,108; and
- Transcript of January 22 and February 6, 2024 depositions of Jonathan Teater (Exs. 1031-1035).

6. In forming the opinions expressed in this declaration, I have considered the materials listed above, the relevant legal standards (see my previous declaration, Ex. 1016), and my own knowledge and experience in the field of archery and bows and crossbows in particular.

II. CREDIBILITY OF JONATHAN TEATER

7. I understand that Ravin is relying on testimony from Jonathan Teater (which I have reviewed) to support its position. I am happy to hear that Mr. Teater believes me to be a person of ordinary skill in the relevant art (“POSA”). Ex.

1034, 68:15-17. I, however, have significant concerns about his credibility and qualifications in testifying about the matters in this case.

8. During his deposition, Mr. Teater testified that he spent approximately 40 hours on this matter. *Id.* at 22:25-23:2. He also testified that he had never been an expert previously and that this was his first time testifying. *Id.* at 7:6-19. His declaration (Ex. 2029) is 151 pages, and he testified that he drafted 95% of it, aside from the illustrations. Ex. 1034, 25:23-26:24, 274:18-275:2, 275:23-277:17. I find this difficult to believe. I have considerably more litigation experience and familiarity than Mr. Teater, and I spent over twice as much time up to the point of my deposition. Since Mr. Teater had more materials to review than I did (since the case has progressed), he would have more work to do than I did.

9. I also disagree with his testimony that helical power cable take-up journals were not known in this field prior to 2013 (when the '015 Patent was applied for), as multiple references in this proceeding (including Norkus, Park, Stanziale '302, Stanziale '062, and Stanziale '771, which he claims to have reviewed) disclose them (as explained in my previous declaration, Ex. 1016). Ex. 1034, 81:11-82:22, 92:15-93:15. This further undercuts his credibility.

10. I also do not believe that Mr. Teater qualifies as an expert in the design of crossbows or compound bows. He initially testified that he is an expert

in *reviewing* crossbow design and development (presumably of others), but disclaimed being an expert in designing crossbows himself. *Id.* at 30:9-12, 31:4-6. He appears to have backtracked later, but still admitted that there were a lot of aspects of crossbow design that he is not familiar with. *Id.* at 31:7-16. While he testified that he provided advice on some design features to some companies (though he refused to provide details), he admitted that only one company might possibly have included just part of his suggestion into its design (*id.* at 33:8-15, 36:1-37:19), which suggests that his design advice was questionable. So while he may be able to opine about testing crossbows, my opinion is that he is not qualified to opine about *designing* crossbows, and thus his testimony thereon should be given little to no weight.

11. Reviewing his education, while some of his statistics courses may be useful in *testing*, he does not appear to have had any courses that would be useful in crossbow *design*, and he appears to agree. *Id.* at 43:20-44:1. His bachelor's degree is in business and management information systems, not mechanical engineering, which he admits is the appropriate discipline for crossbow technology. *Id.* at 42:13-45:10-12. He never took any mechanical engineering classes (including statics, dynamics, kinematics, vibrations, or metrology) or any classes related to crossbows or compound bows. *Id.* at 45:4-46:17, 67:8-10. He

agreed that his degrees alone would not qualify a person as a POSA. *Id.* at 47:13-17.

12. Furthermore, his answers to some of the technical questions were incorrect. He testified that the units of measurement for kinetic energy are mass and velocity (*id.* at 47:21-25), when the correct units are Joules. When the question was broadened to units of energy, his answer was Newtons (*id.* at 48:3-9), but again, the correct units are Joules; a Newton is the unit for measuring force. He testified that the units of measurement for efficiency are foot-pounds or perhaps foot-pounds per inches (*id.* at 61:14-20), but efficiency is always unitless. He testified that there can be at most 5 degrees of freedom (*id.* at 66:1-6), which is a term that he uses quite a bit in his declaration, as I discuss further below, but the correct answer is 6. He testified that one can measure stress with string gauges (*id.* at 51:10-18), but that is inaccurate; a string gauge can measure deformation, not stress. Furthermore, despite using “strain” in his declaration, he did not know its units or the difference between engineering strain and natural strain. *Id.* at 67:11-68:4. This lack of knowledge on fundamental technical aspects in this field significantly weakens the weight I could give to his testimony.

13. Mr. Teater testified that limbs and attached cams moving toward each other was one of the key aspects of the ‘015 Patent’s claimed invention. Ex. 2029

¶27; Ex. 1034, 141:3-10. When told at his deposition that cams moving toward each other was not a novel aspect, Mr. Teater argued that some bows “had static limbs.” Ex. 1034, 141:22-24. His further discussion admitted that the existing limbs and cams did in fact move, but argued that it was minimal, i.e., “almost no movement.” *Id.* at 141:24-142:6, 143:22-144:20. Perhaps Mr. Teater is using his words loosely, but if the limbs did not move (or “almost” did not move), then there would be no energy stored that could discharge the arrow in a conventional crossbow, in which the potential energy that is to be input to the arrow as kinetic energy is always stored in the limbs.

14. He also testified that he did not know how the bows disclosed in Park work based on its disclosure. *Id.* at 192:1-6. In my opinion, Park adequately describes the design and functionality of the disclosed embodiments, and a POSA would readily be able to ascertain how they work. He also testified that he would not know how to implement Norkus’s helical power cable journals on Kempf ‘871’s crossbow, though he then admitted that a proposed design would be one way to implement that combination. *Id.* at 238:22-242:13. As I explained in my prior declaration (Ex. 1016) and below, such combinations would be well-within a POSA’s skillset. Such assertions by Mr. Teater further raise questions about his

technical grasp and demonstrate that he does not qualify as a POSA on crossbow design.

III. CLAIM CONSTRUCTION

A. “mounted to”

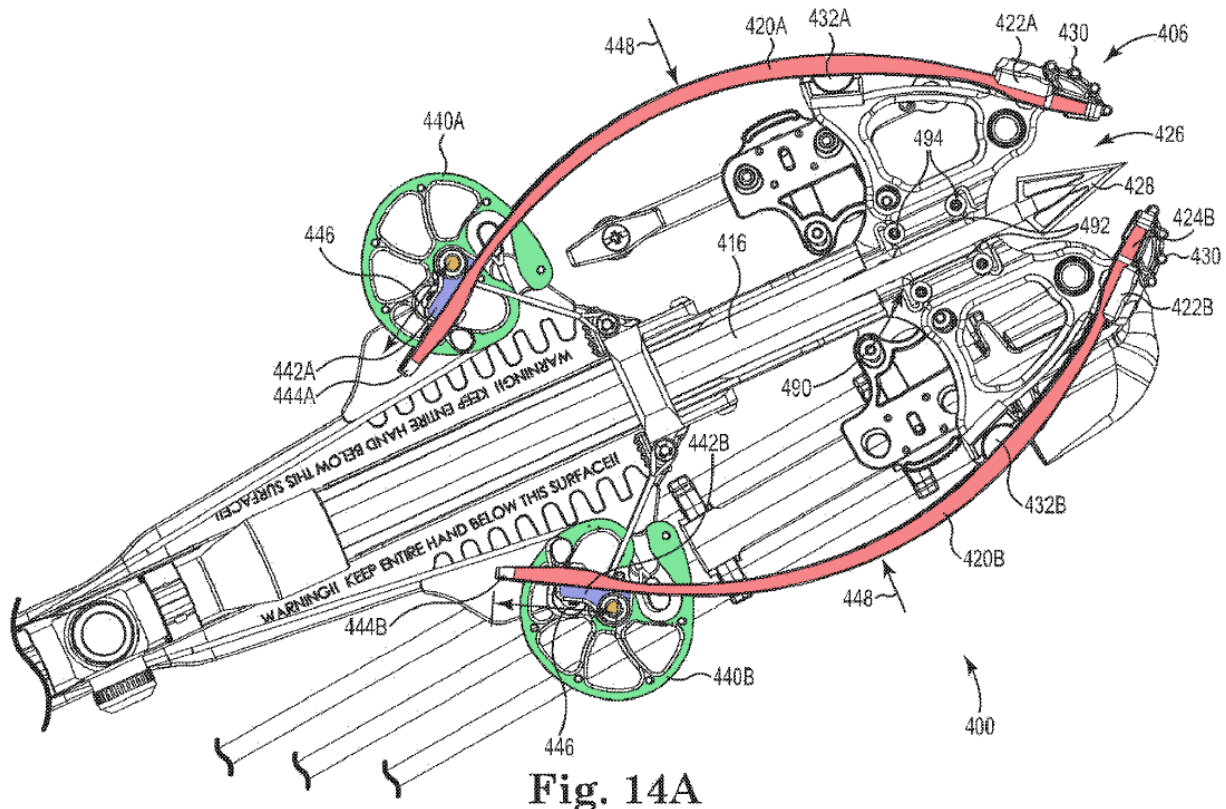
15. I understand that the Board encouraged the parties to further develop the construction of the claim term “mounted to.”

16. My previous declaration (Ex. 1016) discussed the construction of “mounted to” in light of the ‘015 Patent and its child U.S. Patent 9,494,379 (the “’379 Patent,” because my understanding is that statements in related patents (even if prosecuted subsequently) may inform the meaning of claims (even if issued earlier)). That construction is also supported by the ‘936 Patent (which is a child of the ‘379 Patent) and the ‘073 Patent (which is a child of the ‘936 Patent), both of which claim the benefit of the ‘015 Patent.

17. Claim 1 of the ‘936 Patent recites that the first and second cams are each “mounted to the [respective] bow limb and rotatable around a [respective] axis.” This same phrasing is also used in claim 1 of the ‘015 Patent, except reciting “string guide” instead of “cam.” However, both patents explain that a “cam” is included in the term “string guide.” Ex. 1001, 4:9-11; Ex. 1027, 6:4-6.

18. Claim 9 of the ‘936 Patent (which depends on claim 1) further requires the cams to be mounted to the respective limbs “with first and second axes of rotation offset from distal tips of the bow limbs by about 1.0 inch to about 3.0 inches.” (The same narrowing is also true of the ‘936 Patent’s claim 18 as compared to its independent claim 11.)

19. The specification explains that this offset is accomplished by attaching the cams 440A, 440B to the limbs 420 using axle mounts 442A, 442B (Ex. 1027, 9:63-10:13), and the referenced Fig. 14A (shown below) confirms that the cams (green) are not actually mounted directly to the limbs (pink); rather, the axle (brown) going through each cam 440A, 440B (green) is secured to a bracket (purple) (called axle mount 442A, 442B), which is then secured to the respective limb 420A, 420B (pink). *See also id.* at Figs. 21A, 23A. Thus, the ‘936 Patent supports that “mounted to” in this patent family is not limited to just direct mounting but also encompasses mounting through intervening components.



20. Neither have I seen, in my review of the intrinsic evidence to the ‘015 Patent, any statements made by Ravin that exclude the above-discussed indirect mounting from the scope of “mounted to.”

21. Turning to the ‘073 Patent, its independent claims provide more details on the mounting. Claim 1 recites that the first and second string guides are each “mounted to the [respective] flexible limb by a [respective] axle mount and rotatable around a [respective] axis located a fixed distance from the [respective] flexible limb by the [respective] axle mount.” (The ‘073 Patent’s independent claims 11 and 15 are similar.) The specification parallels this language, stating:

“Cams 440A, 440B (‘440’) are attached to the limbs 420 by axle mounts 442A, 442B (‘442’).” Ex. 1028, 10:47-48. These statements confirm that when this patent family refers to the string guides as being “mounted to” the limbs, they are not limited to just direct mounting but rather include mounting through intervening components.

22. Under Ravin’s proposed construction (i.e., “mounted to” encompasses only direct mounting), this ‘073 Patent claim limitation would then essentially read: each “string guide [is directly] mounted to the . . . limb [indirectly] by a[n] . . . axle mount and rotatable around a[n] . . . axis located a fixed distance from the . . . flexible limb by the . . . axle mount.” It is evident that such a reading is internally inconsistent (i.e., two components cannot be mounted to each other directly and indirectly simultaneously) and thus incorrect.

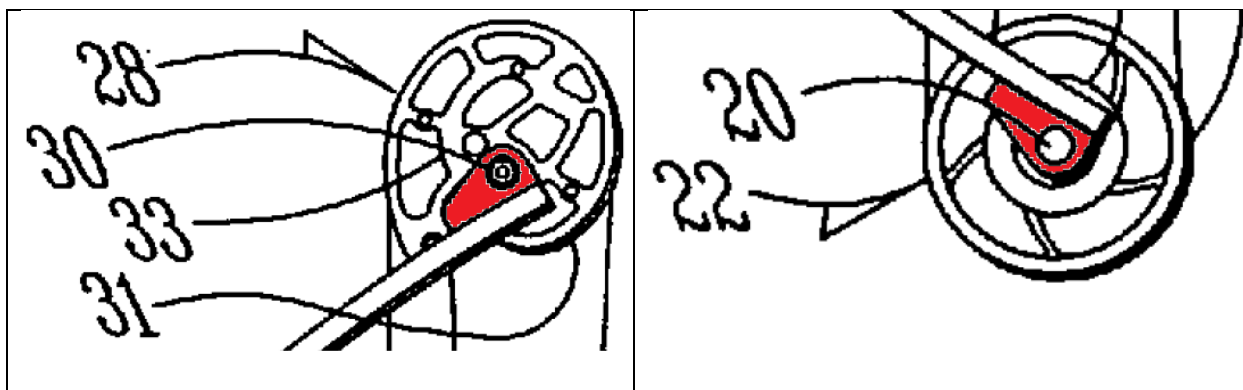
23. Furthermore, as demonstrated above, this patent family uses “mounted to” and “attached to” synonymously. Claim 1 of the ‘936 Patent recites “first and second bow limbs attached to a riser.” But claim 1 of the ‘073 Patent recites a crossbow that has “first and second flexible limbs attached to a center rail,” though its specification explains that the “[l]imbs 420 are attached to the riser 404,” which itself is “mounted at the distal end 406” of the center rail 402. Ex. 1028, 9:10-11, 10:34-35. And none of the figures show a crossbow with limbs attached directly to

the center rail – all are mounted to the riser, which is mounted to the center rail.

Thus, the riser 404 is an intervening component.

24. These related patents, which I understand are part of the ‘015 Patent’s intrinsic evidence, further confirm my opinion that mounting, as used in claim 1, can be done through intervening components and is not restricted exclusively to direct mounting.

25. Additionally, when the Examiner rejected pending claims of the ‘015 Patent during prosecution, he cited U.S. Patent 7,708,001 (“Kempf ‘001,” Ex. 1008) as disclosing string guides “mounted to” the respective limbs. Ex. 1002, 105-06; Ex. 1008, Fig. 1, 2:9-29. Those string guides 22, 28 of Kempf ‘001 are not directly “mounted to” their respective limbs. Rather, the string guides 22, 28 receive respective axles 20, 30, which are themselves received in their respective mounting brackets, which are then secured to the respective limbs 18, 16. Excerpts of Kempf ‘001’s Fig. 1 showing the string guides are shown below, with the unnumbered mounting brackets shown in red:



This prosecution history further confirms that the Examiner understood this indirect connection of the string guides to the limbs (through intervening components) to meet the “mounted to” claim term.

26. Mr. Teater testified that he would not know what the word “indirectly” meant, and what indirect mounting means, unless it were defined. Ex. 1034, 99:18-100:12. If true, then this further demonstrates that he is unqualified to testify from a POSA’s perspective, as a POSA would readily know what indirect mounting means, as I explained above (namely, not directly; through intervening components).

27. My previous declaration (Ex. 1016) addressed Ravin’s argument from the related district court case, which Ravin repeated in its Preliminary Response and post-institution Response, that this claim term must be construed “to allow only rotation about a fixed axis.” The related ‘073 Patent likewise discloses “a center rail 402 with a riser 404 mounted at the distal end 406” Ex. 1028,

9:10-11. It also discloses that an “arrow rest 750 is *mounted to* distal end 776 of the center rail 402” *Id.* at 18:5-6 (emphasis added). And its claim 31 recites “an optical scope *mounted to* a scope mount on the crossbow” (emphasis added). There is no indication that any of these mounted components must rotate (but only about one fixed axis); indeed, as I explained previously, such movement would severely compromise the operation and accuracy of the crossbow. Thus, it is my opinion that a POSA would not construe the two-word claim term “mounted to,” which is used throughout the claims and specifications of this patent family, as requiring rotation, but only about a single axis, prohibiting all other movement.

B. “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 . . . to a drawn configuration”

28. In discussing the draw string, claim 1 of the ‘015 Patent recites that the string is “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 . . . to a drawn configuration.” The claim language alone is clear regarding what is “a reverse draw configuration” – having “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 . . . to a drawn configuration.”

29. The specification and drawings confirm this construction – that the “reverse draw configuration,” as used in the ‘015 Patent, simply refers to the draw string being on the down-range side of the string guides when the bow is in a released (or uncocked) position, where the string is drawn toward the up-range side of the string guides during cocking. For example, Figs. 1-3 (which are labeled as prior art) show the draw string 30 resting on the down-range side of the string guides 22A, 22B in the uncocked or released position 32 and then being drawn to the up-range side of the string guides during cocking; the specification calls this the reverse draw configuration. Ex. 1001, 1:41-46 (referencing Figs. 1-3). The same is shown in Figs. 4-6, with the specification likewise calling it the reverse draw configuration 92. *Id.* at 3:46-4:1 (referencing Figs. 4-6). Fig. 10 shows the string guide system 152 on a vertical bow 150 that the specification explains is in the reverse draw configuration 174 – the draw string 162 is likewise on the down-range side of the string guides 158A, 158B when in the released position 176 but will travel toward the up-range side 180 of the bow 150 when being cocked. *Id.* at 5:20-26 (referencing Fig. 10).

30. The prosecution history confirms this construction. For example, when the Examiner rejected pending claims of the '015 Patent, he cited Kempf '001 as disclosing this claim term. Ex. 1002, 105-06; Ex. 1008, 2:30-53, Figs. 1, 3. Those figures of Kempf '001 show a bowstring 32 resting on the down-range side of the string guides 22, 28 in a released position (Fig. 1) and then being drawn to the up-range side when the bow is being drawn (Fig. 3).

31. The Examiner also cited U.S. Patent App. Pub. 2011/0030666 ("Darlington," Ex. 1013) during prosecution. Ex. 1002, 115. Darlington discloses various embodiments of crossbows in Figs. 1, 9, and 13, and then discloses modifications of those embodiments in Figs. 4, 12, and 16 that Darlington expressly calls "reverse draw," where the difference is that the bowstring 32 is moved from the up-range side while at rest (in the forward- or conventional-draw configurations) to the down-range side. Ex. 1013, [0021] and [0042] (referencing Fig. 4), [0029] and [0054] (referencing Fig. 12), [0033] and [0059] (referencing Fig. 16).

32. In its post-institution Response, Ravin appears to argue for the first time that a "reverse draw configuration" requires the *limbs* to face down-range rather than toward the shooter (as opposed to just the configuration of the draw string on the string guides). For example, the Response states that U.S. Patent

App. Pub. 2011/0308508 (“Islas”) discloses a forward-draw configuration and shows Islas’s Fig. 1. Resp. 67-68, 70. Then the Response shows a “modified” version of Islas’s Fig. 1 that the Response says is a reverse-draw configuration. *Id.* at 71-73. But instead of just flipping the bowstring orientation on Islas’s string guides, the Response also inverts Islas’s limbs so that they face away from the shooter (rather than toward the shooter like Islas’s Fig. 1 shows).

33. As I explained during my August 24, 2023 deposition, some in this field of art use “reverse draw” in the sense of having limbs facing forward (away from the shooter), such that the string guides at the ends of the limbs are by the down-range side of the crossbow. Ex. 1030, 40:2-8. This meaning is consistent with Ravin’s modification of Islas in its Response.

34. However, an alternative use of “reverse draw” in this field of art is in the sense of having the bowstring rest on the down-range side of the string guides, regardless of the limb orientation. *Id.* at 40:2-20. The ‘015 Patent uses “reverse draw configuration” in this sense, as explained above.

35. Fig. 10 is expressly noted as showing the “reverse draw configuration 174” even though its limbs 154A, 154B extend from the handle 156 toward the shooter. Ex. 1001, 5:20-35. Figs. 1-6 are likewise labeled as in the “reverse draw configuration” (*id.* at 1:33-46, 3:46-4:2) even though they show no limbs,

confirming that this term within this '015 Patent does not depend on the limb orientation. And, as noted above, the Examiner cited Kempf '001 during prosecution as meeting the “reverse draw configuration” limitation, even though all bows in that reference have limbs extending from the riser in the shooter’s direction. Ex. 1008, Figs. 1, 3-4.

36. Darlington helpfully illustrates several versions of crossbows: (a) a version with limbs extending from the riser in the shooter’s direction, where the bowstring rests on the up-range side of the string guides (and is drawn in the same up-range direction), as shown in Figs. 1, 9, and 13; (b) a version with limbs extending from the riser in the shooter’s direction, where the bowstring rests on the down-range side of the string guides (but is drawn in the up-range direction), as shown in Figs. 4, 12, and 16; (c) a version with limbs extending from the riser away from the shooter, where the bowstring rests on the up-range side of the string guides (and is drawn in the same up-range direction), as shown in Fig. 17; and (d) a version with limbs extending from the riser away from the shooter, where the bowstring rests on the down-range side of the string guides (but is drawn in the up-range direction), as shown in Fig. 18. Versions (b) and (d) are expressly called “reverse draw,” even though their limb orientations vary. Ex. 1013, [0021], [0029], [0033], [0035], [0042], [0054], [0059], [0061]. Darlington differentiates

versions (c) and (d) from versions (a) and (b) by calling the former “reverse limb” or “limb forward” configurations. *Id.* at [0061].

37. Mr. Teater testified that in 2013 (when the ‘015 Patent was applied for) “reverse draw” meant having the limbs oppose or extend away from the archer. Ex. 1034, 129:6-25. But that is incorrect, as just illustrated by Darlington, which was published in 2011.

38. Even Ravin’s Response seems to implicitly acknowledge that the “reverse draw configuration” does not need to have the limbs extend away from the shooter. *See, e.g.*, Resp. 53, 71 (citing Darlington [0015] and [0041]-[0042] (which describe the embodiments shown in Figs. 1-4, all of which have their limbs extend from the riser toward the shooter) in relation to this limitation).

IV. UNPATENTABILITY ANALYSIS

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

39. My previous declaration (Ex. 1016) explained how U.S. Patent App. Pub. 2012/0125302 (“Stanziale ‘302”) anticipates claim 1 of Ravin’s ‘015 Patent. Ravin’s arguments on this Ground appear to be limited to just two limitations, thus implicitly conceding all others.

1. String Guides “mounted to” their Respective Limbs

40. Ravin’s Response argues that Stanziale ‘302 does not disclose the limitation of string guides “mounted to” their respective limbs. Resp. 11-18. But this argument depends on “mounted to” being construed to require direct mounting, allowing only rotation of the string guides about a fixed axis and no other movements. As I explained above, that construction is incorrect. Ravin’s Response does not have an alternative argument on this claim limitation under TenPoint’s proposed construction.

41. Ravin’s discussion on this claim limitation discusses alleged “degrees of freedom.” Resp. 13-18. I note that this phrase appears nowhere in the ‘015 Patent, and certainly not in claim 1.

42. Ravin errs in asserting that Stanziale ‘302’s string guides have three degrees of freedom with respect to the limbs. Ravin views the string guides’ rotation about pivot 45 (about pivot axis 450, which Ravin labels the Z axis) as one degree of freedom, their movement along the longitudinal direction 201 (which Ravin labels the X axis) as a second degree of freedom, and their lateral movement (along Ravin’s labelled Y axis) as a third degree of freedom. But the Response and supporting Teater Declaration are badly mistaken.

43. Any POSA would readily see that the so-called X-axis and Y-axis movements are not independent (and thus not distinct degrees of freedom). That is because the string guides 50 are connected to their respective limbs 10 by the rigid triangular levers 40 (with the three sides of the triangle being branches 41, 42, 43), which have their pivots 46 connected via a bar 47. Ex. 1007, Figs. 1-5, 9-10, [0080], [0111]-[0112]. That configuration means that if a string guide is moved along Ravin's indicated X axis, the string guide will also be forced to move along Ravin's indicated Y axis (and vice versa) because it would be pivoting about pin 38. *See id.* at Figs. 1-5, 10-11, [0075]-[0077], [0084], [0088], [0114]. It is impossible to move either string guide in an X axis without affecting the Y axis (and vice versa), so these are not distinct degrees of freedom.

44. Furthermore, once the bowstring 31 is received in the string guides 50, all of the alleged degrees of freedom collapse into just one – the position of the bowstring 31. When the bowstring 31 is drawn, that rotates the string guides 50 (i.e., about Ravin's Z axis), winding up the power cables 32, which pull the string guides 50 toward the proximal end 205 of the stock 2 (i.e., along Ravin's X axis) causing them (through the rigid triangular levers 40) to also move laterally (i.e., along Ravin's Y axis). This is the same single degree of freedom as disclosed in all embodiments in the '015 Patent, where drawing the draw string causes all of the

respective motions of the string guides (i.e., rotation about their axles and lateral movement toward or away from the other string guide, as well as small movements in the perpendicular direction toward or away from the shooter). For these reasons, Mr. Teater was completely wrong when he testified that the disclosed Stanziale ‘302 embodiment *with the draw string and power cables attached* still has three degrees of freedom. Ex. 1034, 200:18-201:2.

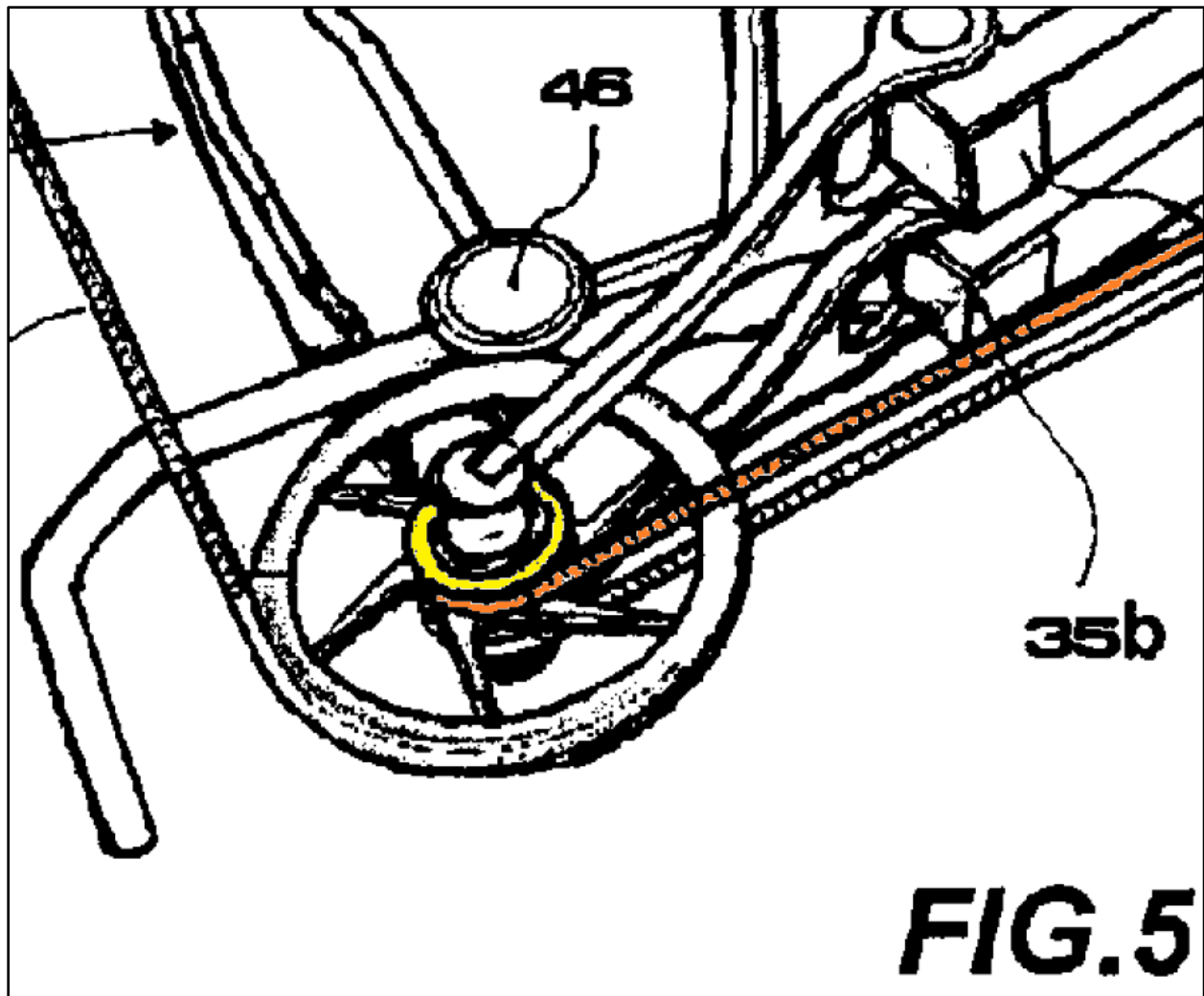
2. Power Cables Displaced “away from” the Respective Planes of Rotation of the Draw String Journals along the Axes

45. The other claim limitation that Ravin argues is missing from Stanziale ‘302 is the first and second power cables being displaced along the respective axes “away from” the respective planes of rotation of the respective draw string journals. Resp. 19-22. But Ravin is again mistaken.

46. To clarify, Ravin does not (because it cannot) dispute that Stanziale ‘302 discloses power cable journals 521 that are helical in nature and thus extend along their respective axes 450 in a direction perpendicular to the respective planes of rotation of the draw string journals 511, where the power cable journals 521 “wind a plurality of turns” of the power cables 32 that “are progressively coiled adjacent to each other” along the axis of rotation 450. Ex. 1007, [0105]-[0106], Figs. 3, 5, 9, 11. In other words, Ravin does not dispute that Stanziale ‘302 discloses power cables “wrap[ping] onto the first and second helical, [sic] power

cable take-up journals and [being] displaced along the first and second axes [relative to] the first and second planes of rotation of the first and second draw string journals, respectively,” as recited by claim 1. Ravin’s sole challenge is the *direction* of displacement, namely, “away from” the planes of rotation (as required by claim 1), or toward those planes. To that extent, Ravin argues that Stanziale ‘302’s Fig. 3 discloses displacement toward the planes of rotation. Resp. 19-20.

47. But while Stanziale ‘302’s specification does not discuss this aspect in great detail, Fig. 5 shows the opposite of Ravin’s argument: power cables winding “away from” the bowstring planes of rotation. As shown below in the annotated portion of Fig. 5 (which shows the crossbow in the fully unloaded condition, after the crossbow is discharged, Ex. 1007, [0154], when the power cables 32 would be maximally unwound off their journals 521), the leading edge of the upper power cable 32 (shown in orange) is on the *bottom* of the journal 521, such that it will wind *upwardly* along the journal (shown in yellow) as the bow is drawn (to the condition shown in Figs. 3-4), *away* from the draw string journal 511 plane of rotation. This expressly discloses the “away from” claim limitation, which is not “missing” from Stanziale ‘302.



48. If Stanziale '302 is deemed to disclose both displacement configurations (away from and toward the planes of rotation, in view of Figs. 3 and 5), this does not detract from the fact that the “away from” configuration is indeed disclosed. And a POSA would immediately envisage implementing any of these two configurations, especially the “away from” configuration, which would help avoid interference between the power cables 32 and the draw string 31.

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

49. My previous declaration (Ex. 1016) explained how Stanziale ‘302 renders obvious claim 1 of Ravin’s ’015 Patent.

50. Ravin challenges the motivation to modify Stanziale ‘302’s crossbow to have the power cables displace “away from” the respective draw string planes of rotation. Resp. 23-27. In the Institution Decision, the Board seemed receptive to this argument (which Ravin also made in its Preliminary Response) that Stanziale ‘302 insufficiently discloses the power cables displacing “away from” the respective planes of rotation. Specifically, the Board opined that the predicate factual determination for the “obvious to try” rationale was not adequately addressed. Dec. 17-18. However, a POSA would have ample motivation to make this modification.

51. Stanziale ‘302 discloses that the journals 521 that receive the power cables 32 are helical and thus wind (about the axis of rotation 450) a plurality of turns of the cable, one adjacent the other. Ex. 1007, [0106], [0124]-[0128], Figs. 1-4, 9, 11. In other words, when the crossbow is drawn, the power cables 32 received in the journals 521 are displaced along the axis of rotation 450 by virtue of the helical journals 521.

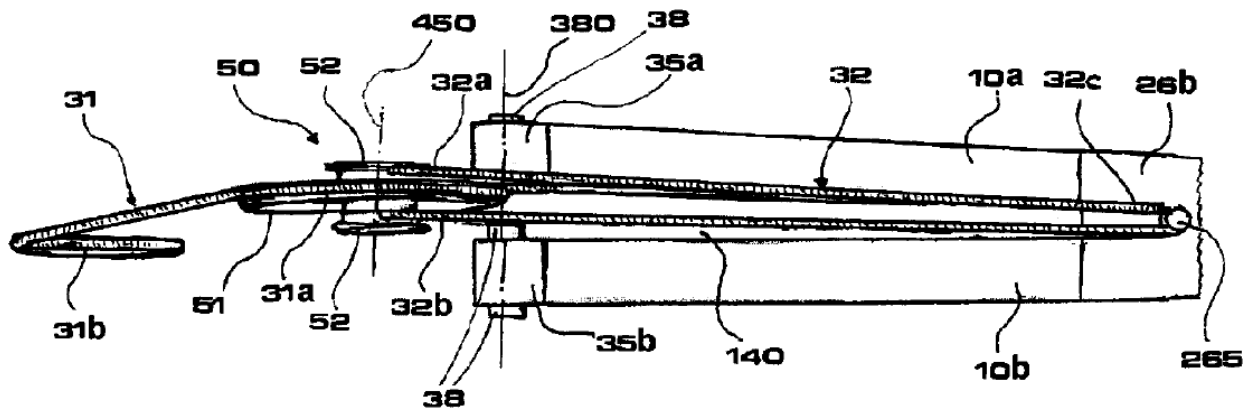


FIG. 11

52. The rotation axis 450 of the power cable journals 521 is also the rotation axis 450 of the draw string journals 511 (i.e., the two journals 521, 511 share a common axis of rotation 450). *Id.* at [0099], [0102], [0105], [0121], [0127], Figs. 1, 3, 9, 11. Mr. Teater agreed on this point. Ex. 1034, 205:3-206:15.

53. Each draw string journal 511 has a plane of rotation (e.g., formed by the wound string 31) perpendicular to the axis of rotation 450. Ex. 1007, [0105], [0121]-[0122], [0164], Figs. 1-4, 9, 11.

54. Thus, because (a) the journals 521 receiving the winding power cables 32 are helical in design, (b) the power cable journals 521 and draw string journals 511 share a common axis of rotation 450, and (c) the draw string journal planes of rotation are perpendicular to the axis of rotation 450, then the power cables 32 must necessarily be displaced along the axis of rotation 450 perpendicular to the

planes of rotation. The only remaining question is regarding the direction of displacement. And even on this question, there are only two possible options (by virtue of the common rotation axis): toward the planes of rotation or away therefrom. Mr. Teater agreed on this point. Ex. 1034, 213:8-10. With only two available options and one of them required to be chosen (i.e., the required predicates met), a POSA would find it obvious to try each in an effort to optimize a particular crossbow design. Mr. Teater agreed on this point. *Id.* at 213:11-21.

55. A POSA would still further have a reason to particularly have the cables be displaced “away from” the planes of rotation (rather than toward), as explained in my previous declaration (Ex. 1016). Namely, because the power cable journals 521 are on both (i.e., opposite) sides of the draw string journal 511 (that forms the plane of rotation), having the cables 32 extend away from the plane of rotation would avoid interference with the draw string 31. Ex. 1007, Fig. 11. This additionally confirms that the claimed limitation (of cable extension “away from” the planes of rotation) would be obvious.

56. Ravin argues that modifying Stanziale ‘302 would allegedly result in cam lean, increased vibration, and cam de-synchronization. Resp. 24-27. But Ravin does not explain why, or even allege that, these alleged drawbacks would not occur if the power cables were displaced *toward* the planes of rotation (as

opposed to “away from” them). Furthermore, Ravin’s discussion on these points is completely speculative; it has no engineering merit as it lacks specificity.

57. Crossbows have existed for many years with configurations that may be prone to induce some cam lean. For example, many of the references cited in this IPR disclose crossbows without upper and lower power cables to balance the forces. *See, e.g.*, Ex. 1008, Fig. 4; Ex. 1011, Figs. 17-20; Ex. 1012, Figs. 1-8; Ex. 1013, [0004]-[0005], [0060], Figs. 13-18; Ex. 1014, Fig. 1; Ex. 2007, 8 (describing “other crossbows”). Even the ‘015 Patent discloses just one power cable per string guide and would thus also be prone to cam lean. Ex. 1001, Figs. 3, 6-9C, 11-12. (As an aside, Mr. Teater admitted that his Declaration is simply wrong in ¶90 when it says that the written description refers to “the upper and lower power cables” – those phrases do not appear anywhere in the ‘015 Patent. *See* Ex. 1034, 202:13-204:12.) But just because the forces on a string guide are not perfectly balanced does not mean that any cam lean would be so large as to render the crossbow unusable – the above-cited references (and Ravin’s own patent) demonstrate to the contrary.

58. Neither Ravin’s Response nor the Teater Declaration establishes that any potential cam lean in the modified Stanziale ‘302 crossbow would be so large as to actually result in fracture and “catastrophic failure” of the bow. Ravin argues

that Stanziale ‘302’s limbs “are not robust enough to survive the contemplated degree of torque.” Resp. 25. But as already noted, Ravin nowhere calculates or explains the “contemplated degree of torque.” Furthermore, Stanziale ‘302 does not specify particular dimensions for its limbs or insist on the specific material they must be made from (see Ex. 1007, [0061]), so any speculation regarding their robustness is exactly that – rank speculation. Crossbow designers have been more than capable of determining and selecting design parameters and specifications for the crossbow components to take into account such concerns as cam lean. Crossbow manufacturers and users have tolerated cam lean just fine, so even *if* Stanziale ‘302’s crossbow were prone to some cam lean, that would in no way motivate a POSA away from the described modification.

59. However, in contrast to Ravin’s ‘015 Patent, Stanziale ‘302 discloses upper and lower power cables 32 (on opposite sides of the draw string journal 511), which *are* able to balance the forces and thus avoid cam lean. A POSA would readily surmise that having both power cable journals 521 wind away from the draw string journal 511 would maintain that balance.

60. As to Ravin’s argument that having the power cables extend “away from” the planes of rotation would result in “added weight” and increased risk of de-synchronization (Resp. 26-27), that is simply false. As explained already,

Stanziale '302 discloses that its crossbow has helical power cable journals 521 that are co-axial with the draw string journal 511. Thus, the power cables *must* necessarily be displaced either *away from* the draw string plane of rotation, or *toward* it. Simply determining the *direction* of the already-present helical journals does not in any way add any weight to the crossbow or thereby affect synchronization. I also note that Ravin did not calculate or explain the exact degree of de-synchronization or its likelihood (i.e., how great is that alleged risk).

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

61. My previous declaration (Ex. 1016) explained how WIPO Int'l Pub. WO 2011/158062 ("Stanziale '062") anticipates claim 1 of Ravin's '015 Patent. Ravin's arguments on this Ground appear to be limited to just two limitations, thus implicitly conceding all others.

1. String Guides "mounted to" their Respective Limbs

62. Ravin's Response argues that Stanziale '062 does not disclose the limitation of string guides "mounted to" their respective limbs. Resp. 27-33. But this argument depends on "mounted to" being construed to require direct mounting, allowing only rotation of the string guides about a fixed axis and no other movements. As I explained above, that construction is incorrect. Ravin's

Response does not have an alternative argument on this claim limitation under TenPoint's proposed construction.

63. Ravin's discussion on this claim limitation also discusses alleged "degrees of freedom," Resp. 31-33, which I addressed above for Stanziale '302. Ravin errs in asserting that Stanziale '062's string guides have three degrees of freedom with respect to the limbs. Ravin views the string guides' rotation about pivot 147 (about pivot axis 150, which Ravin labels the Z axis) as one degree of freedom, their movement along the longitudinal direction 201 (which Ravin labels the X axis) as a second degree of freedom, and their movement along the lateral direction 203 (which Ravin labels the Y axis) as a third degree of freedom. But the Response and supporting Teater Declaration are again mistaken.

64. Any POSA would readily see that the so-called X-axis and Y-axis movements are not independent (and thus not distinct degrees of freedom). That is because the arms 620 (to which the string guides 145-146-147 are secured) pivot about axis 693 (via pivot 623). *See* Ex. 1011, Figs. 17-21, 27:15-19, 28:25-28. That configuration means that if a string guide is moved (through movement of the arm 620) along Ravin's indicated X axis, the string guide will also be forced to move along Ravin's indicated Y axis (and vice versa) because it would be pivoting

about pivot 623. It is impossible to move either string guide in an X axis without affecting the Y axis (and vice versa), so these are not distinct degrees of freedom.

65. Furthermore, once the bowstring 31 is received in the string guides 145-146-147, all of the alleged degrees of freedom collapse into just one – position of the bowstring 31. When the bowstring 31 is drawn, that rotates the string guides (i.e., about Ravin’s Z axis), winding up the power cables 37, which pull the string guides toward the proximal end 205 of the stock 2 (i.e., along Ravin’s X axis) and also laterally (i.e., along Ravin’s Y axis). This is the same single degree of freedom as disclosed in all embodiments in the ‘015 Patent, where drawing the draw string causes all of the respective motions of the string guides. For these reasons, Mr. Teater was completely wrong when he testified that the disclosed Stanziale ‘062 embodiment *with the draw string and power cables attached* still has three degrees of freedom. Ex. 1034, 201:16-21.

2. Power Cables Displaced “away from” the Respective Planes of Rotation of the Draw String Journals along the Axes

66. The other claim limitation that Ravin argues is missing from Stanziale ‘062 is the first and second power cables being displaced along the respective axes “away from” the respective planes of rotation of the respective draw string journals. Resp. 34-36.

67. To clarify, Ravin does not (because it cannot) dispute that Stanziale ‘062 discloses power cable journals 1461 that are helical in nature and thus must extend along their respective axes 150 in a direction perpendicular to the respective planes of rotation of the draw string journals 1451, where the power cable journals 1461 “wind a plurality of turns” of the power cables 37. Ex. 1011, 17:8-9. In other words, Ravin does not dispute that Stanziale ‘062 discloses power cables “wrap[ping] onto the first and second helical, [sic] power cable take-up journals and [being] displaced along the first and second axes [relative to] the first and second planes of rotation of the first and second draw string journals, respectively,” as recited by claim 1. Ravin’s sole challenge is the *direction* of displacement, namely, “away from” the planes of rotation (as required by claim 1), or toward those planes. Ravin (supported by the Teater Declaration) appears to be arguing that, in light of the alleged lack of detail about these helical journals, a POSA would be helpless in implementing them and would thus freeze up and not implement them at all. Resp. 34-35.

68. If a person would not know how to implement the journals that are clearly and expressly taught by Stanziale ‘062, that person is simply unqualified as a POSA.

69. Furthermore, as explained above, there would be, at most, only two directions in which the power cables 37 of Stanziale '062's crossbow could be coiled (by virtue of the helical power cable journals 1461 being co-axial with the draw string journals 1451): either upwards along the axis of rotation 150 (toward the draw string journals 1451) or downwards along the axis of rotation 150 (away from the draw string journals 1451). This is assuredly not a boundless or limitless choice. Even though Stanziale '062 does not expressly state that the power cables 37 coil away from the draw string planes of rotation, a POSA would immediately envisage that there can only be two displacement arrangements, one of which is "away from" those planes, and the implementation of this configuration would be a routine matter.

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

70. My previous declaration (Ex. 1016) explained how Stanziale '062 renders obvious claim 1 of Ravin's '015 Patent.

71. Ravin in a single paragraph cursorily challenges the motivation to modify Stanziale '062's crossbow to have the power cables displace "away from" the respective draw string planes of rotation. Resp. 36-37. In the Institution Decision, the Board seemed receptive to this argument (which Ravin also made in

its Preliminary Response), similar to Stanziale '302. Dec. 22. However, a POSA would have ample motivation to make this modification.

72. Stanziale '062 discloses that the journals 1461 that receive the power cables 37 are helical and thus wind (about the axis of rotation 150) a plurality of turns of the cable, one adjacent the other. Ex. 1011, 16:2-4, 16:33-17:9, 28:10-21, 29:17-21, Figs. 17-18, 22. In other words, when the crossbow is drawn, the power cables 37 received in the journals 1461 are displaced along the axis of rotation 150 by virtue of the helical journals 1461.

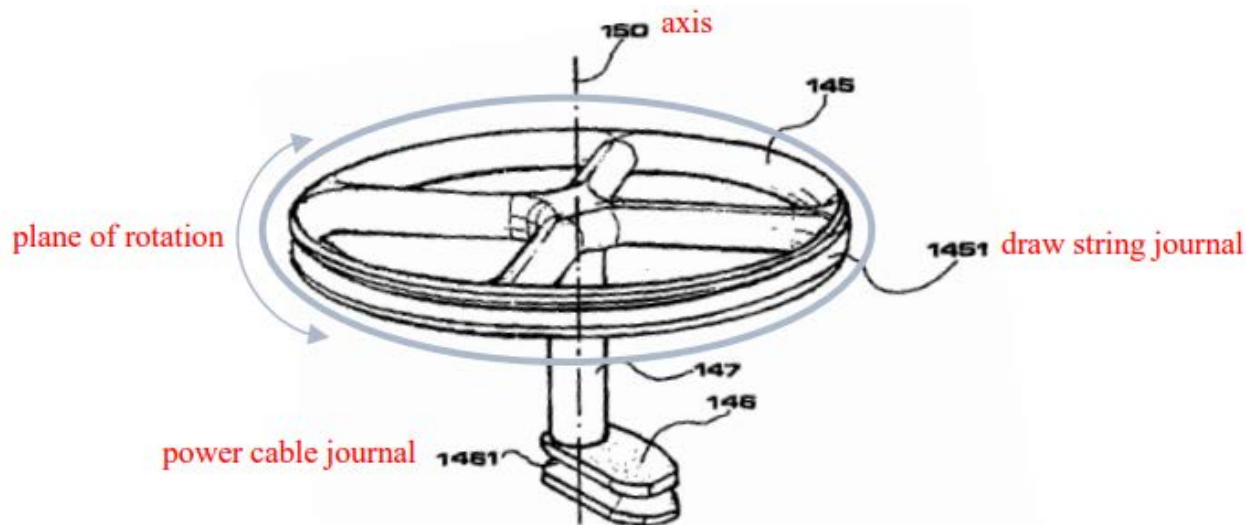


FIG.22

73. The rotation axis 150 of the power cable journals 1461 is also the rotation axis 150 of the draw string journals 1451 (i.e., the two journals 1461, 1451

share a common axis of rotation 150). *Id.* at 27:34-28:9, 28:17-21, Figs. 17, 19-20, 22. Mr. Teater agreed on this point. Ex. 1034, 211:2-11.

74. Each draw string journal 1451 has a plane of rotation (e.g., formed by the wound string 31) perpendicular to the axis of rotation 150. Ex. 1011, 16:20-22, 27:34-28:9, 28:17-21, Figs. 17, 19-20, 22.

75. Thus, because (a) the journals 1461 receiving the winding power cables 37 are helical in design, (b) the power cable journals 1461 and draw string journals 1451 share a common axis of rotation 150, and (c) the draw string journal planes of rotation are perpendicular to the axis of rotation 150, then the power cables 37 must necessarily be displaced along the axis of rotation 150 perpendicular to the planes of rotation. The only remaining question is regarding the direction of displacement. And even on this question, just like with Stanziale ‘302, there are only two possible options: toward the planes of rotation or away therefrom. Mr. Teater agreed on this point. Ex. 1034, 213:8-10. This is assuredly not a boundless or limitless choice. With only two available options and one of them *required* to be chosen, a POSA would find it obvious to try each for the purpose of design optimization, confirming that the claimed limitation (of cable extension “away from” the planes of rotation) would be obvious. Mr. Teater agreed on this point. *Id.* at 213:11-21.

76. Ravin's cursory argument vaguely refers to concerns of unplanned forces, warping, vibration, and stability. Resp. 37. But neither the Response nor the Teater Declaration calculates the amount of such forces or warping, the level of vibration, or effect on stability, nor do they compute the likelihood that such events "may" "potentially" happen, so responding to such conclusory and unspecific speculations is difficult. Nor does Ravin argue that such concerns would not exist if the power cables were displaced toward the planes of rotation (as opposed to "away from" them). On these points, Ravin refers back to its discussion with respect to Stanziale '302, so my reply with respect thereto likewise applies here. A POSA is more than capable of determining and selecting design parameters and specifications for the crossbow components to take into account such concerns as cam lean and vibration when implementing the helical journals on Stanziale '062's crossbow.

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

77. My previous declaration (Ex. 1016) explained how WIPO Int'l Pub. WO 2011/141771 ("Stanziale '771") anticipates claim 1 of Ravin's '015 Patent. With respect to this Ground, Ravin challenges just a single limitation, thus implicitly conceding all others.

78. Ravin's Response argues that Stanziale '771 does not disclose the limitation of string guides "mounted to" their respective limbs. Resp. 38-43. But this argument depends on "mounted to" being construed to require direct mounting, allowing only rotation of the string guides about a fixed axis and no other movements. As I explained above, that construction is incorrect. Ravin's Response does not have an alternative argument on this claim limitation under TenPoint's proposed construction.

79. Ravin's discussion on this claim limitation also discusses alleged "degrees of freedom," *id.*, which I addressed above for Stanziale '302. Ravin errs in asserting that Stanziale '771's string guides have three degrees of freedom with respect to the limbs. Ravin views the string guides' rotation about pivot 147 (about pivot axis 150, which Ravin labels the Z axis) as one degree of freedom, their movement along the longitudinal direction 201 (which Ravin labels the X axis) as a second degree of freedom, and their lateral movement along the transversal direction 203 (which Ravin labels the Y axis) as a third degree of freedom. But the Response and supporting Teater Declaration are again mistaken.

80. Any POSA would readily see that the so-called X-axis and Y-axis movements are not independent (and thus not distinct degrees of freedom). That is because the arms 32 (to which the string guides 145-146-147 are secured) pivot

about axis 83 (via pins 274a, 274b). See Ex. 1012, Figs. 3, 7-9, 10D, 10:8-13, 11:18-23, 18:7-11. That configuration means that if a string guide is moved (through movement of the arms 32) along Ravin's indicated X axis, the string guide will also be forced to move along Ravin's indicated Y axis (and vice versa) because it would be pivoting about pins 274a, 274b. It is impossible to move either string guide in an X axis without affecting the Y axis (and vice versa), so these are not distinct degrees of freedom.

81. Furthermore, once the bowstring 31 is received in the string guides 145-146-147, all of the alleged degrees of freedom collapse into just one – position of the bowstring 31. When the bowstring 31 is drawn, that rotates the string guides (i.e., about Ravin's Z axis), winding up the power cables 37, which pull the string guides toward the proximal end 205 of the stock 2 (i.e., along Ravin's X axis) causing them (via the pivoting arms 32) to also move laterally (i.e., along Ravin's Y axis). This is the same single degree of freedom as disclosed in all embodiments in the '015 Patent, where drawing the draw string causes all of the respective motions of the string guides. For these reasons, Mr. Teater was completely wrong when he testified that the disclosed Stanziale '771 embodiment *with the draw string and power cables attached* still has three degrees of freedom. Ex. 1034, 202:2-7. As one qualified to testify from a POSA's perspective, I am unaware of

any crossbow design that has more than one degree of freedom for the system of stock, riser, limbs, cams, cables, and bowstring. That is, each crossbow I have ever examined only has a single degree of freedom for the entire discharge system (excepting the position of the trigger and the safety).

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

82. My previous declaration (Ex. 1016) explained how Stanziale ‘771 renders obvious claim 1 of Ravin’s ’015 Patent if certain claim limitations were challenged.

83. Ravin challenges the motivation to modify Stanziale ‘771’s crossbow to have the power cables displace “away from” the respective draw string planes of rotation. Resp. 44. But there is no need to resort to obviousness for this limitation because Stanziale ‘771’s figures actually disclose the power cables being displaced “away from” the draw string journal planes of rotation, which even Ravin does not dispute.

84. For example, comparing Figs. 4 (uncocked) and 5 (cocked) shows the power cable 37 (red) wrap around the helical power cable journal 1461 and extend downwards along the axis 150, away from the draw string 31 within the plane of rotation of the co-axial draw string journal 1451 as the crossbow is drawn:

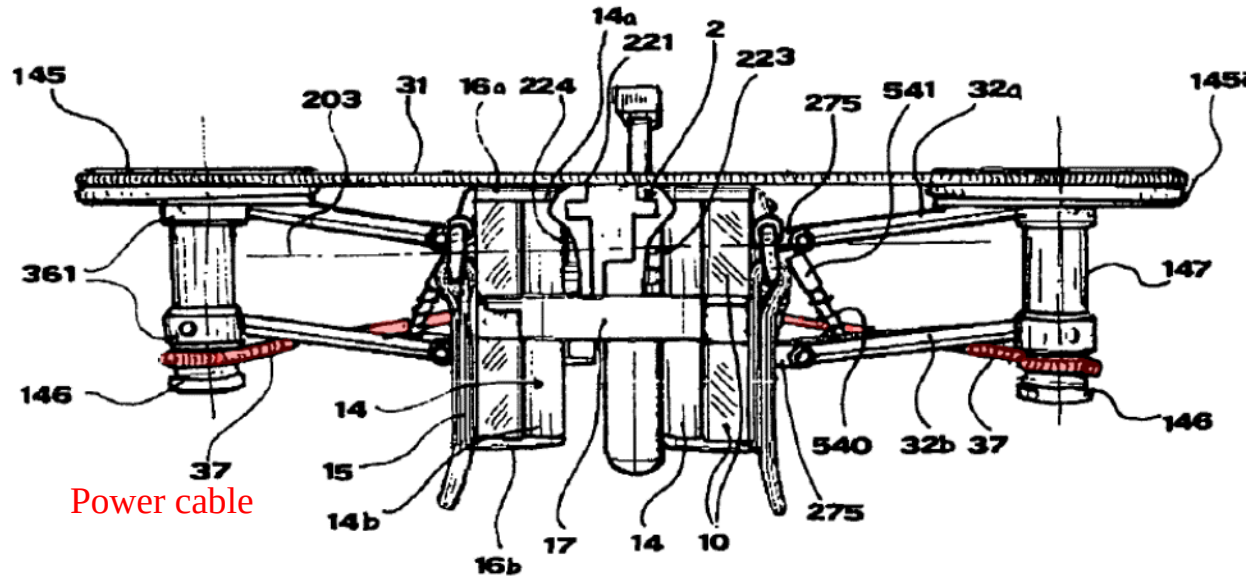


FIG. 4

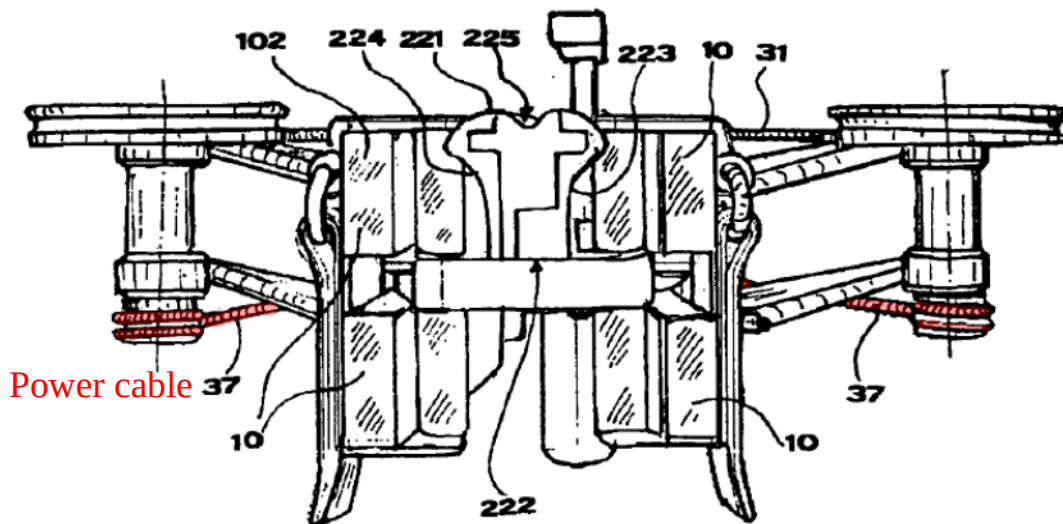
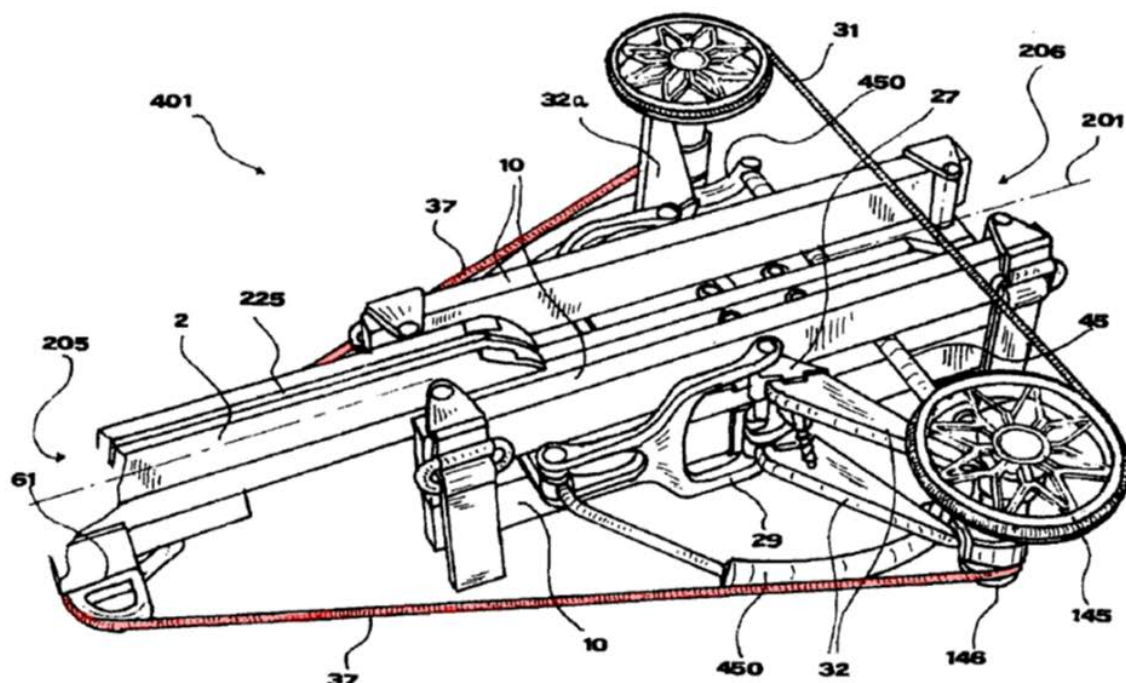


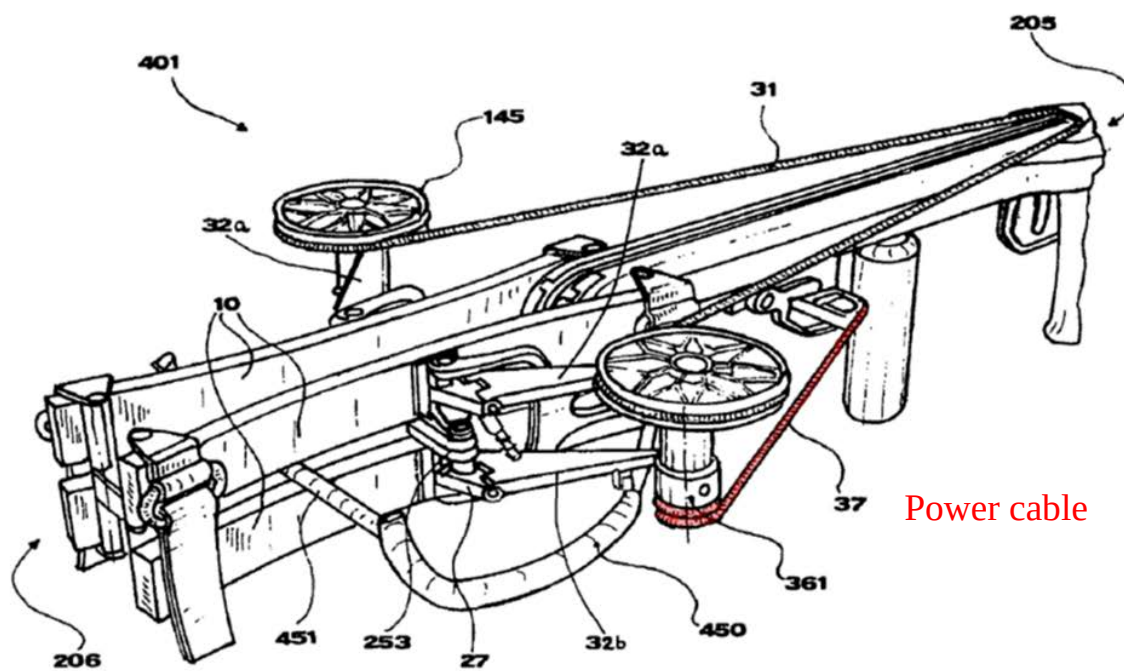
FIG. 5

85. Comparing Figs. 11 (uncocked) and 12 (cocked) of Stanziale '771 confirms the same – that the power cable 37 (red) wraps around the helical power cable journal 1461 and extends downwards along the axis 150, away from the draw string plane of rotation as the crossbow is drawn:



Power cable

FIG.11



Power cable

FIG.12

For these reasons, I disagree with Mr. Teater's initial testimony that he (as a proxy for a POSA) is unable to tell that the cable 37 wraps downwardly. Ex. 1034, 215:19-23. I believe that he correctly changed his answer subsequently to agree that the cable likely moves downwardly, though he appears to have changed it yet again afterwards. *Id.* at 216:3-11, 21-25, 217:8-219:12.

86. If there were any doubt on this point (which there is not), it would nevertheless be obvious to displace the power cables "away from" the draw string journal planes of rotation, or at least to try this as one of the only two wrapping directions available to a helical journal.

87. The Stanziale '771 journals 1461 that receive the power cables 37 are helical and thus wind (about the axis of rotation 150) a plurality of turns of the cable, one adjacent the other. Ex. 1012, 16:34-17:5, Figs. 5, 8-10A, 12. In other words, when the crossbow is drawn, the power cables 37 received in the journals 1461 are displaced along the axis of rotation 150 by virtue of the physical geometry of the helical journals 1461.

88. The rotation axis 150 of the power cable journals 1461 is also the rotation axis 150 of the draw string journals 1451 (i.e., the two journals 1461, 1451 share a common axis of rotation 150). *Id.* at 16:2-5, 18-20, 17:22-26, 18:2-6, 25:11-23, Figs. 1-10A, 11-13, 18-19.

89. Each draw string journal 1451 has a plane of rotation (e.g., formed by the wound string 31) necessarily perpendicular to the axis of rotation 150. *Id.* at 25:11-23, Figs. 1-4, 18-19.

90. Thus, because (a) the journals 1461 receiving the winding power cables 37 are helical in design, (b) the power cable journals 1461 and draw string journals 1451 share a common axis of rotation 150, and (c) the draw string journal planes of rotation are perpendicular to the axis of rotation 150, then the power cables 37 must necessarily be displaced along the axis of rotation 150 perpendicular to the planes of rotation. The only remaining question is regarding the direction of displacement. And even on this question, there are only two possible options: toward the planes of rotation or away therefrom. Mr. Teater agreed on this point. Ex. 1034, 213:8-10. With only two available options and one of them *required* to be chosen, a POSA would find it obvious to try each (as Mr. Teater agreed, *id.* at 213:11-21), as one direction - or the other direction – could conceivably or likely provide an incremental benefit for any conceptual crossbow design, confirming that the claimed limitation (of cable extension “away from” the planes of rotation) would be obvious even if it were not already expressly disclosed by Stanziale ‘771.

91. Ravin’s cursory argument on this Ground is essentially the same as for Ground 4, vaguely referencing concerns of unplanned forces, warping, vibration, and stability, Resp. 44, so my reply thereto likewise applies here. Neither the Response nor the Teater Declaration calculates the amount of such forces or warping, the level of vibration, or effect on stability, nor do they compute the likelihood that such events “may” “potentially” happen, so responding to such conclusory speculations is difficult. Nor does Ravin argue that such concerns would not exist if the power cables were displaced toward the planes of rotation (as opposed to “away from” them, which Stanziale ‘771 expressly discloses). A POSA would be more than capable of determining and selecting design parameters and specifications for the crossbow components to take into account such concerns as cam lean and vibration when implementing the helical journals on Stanziale ‘771’s crossbow.

G. Grounds 7-8: Claim 1 is Obvious over Darlington and either Norkus or Park.

92. My previous declaration (Ex. 1016) explained how claim 1 of Ravin’s ’015 Patent is obvious over Darlington and either U.S. Patent 7,57,289 (“Norkus”) (Ground 7) or U.S. Patent App. Pub. 2012/0312287 (“Park”) (Ground 8). I understand that the Board’s Institution Decision also found a reasonable likelihood that claim 1 is unpatentable on each of these Grounds.

93. While Ravin's Response spends over a dozen pages on these Grounds under various headings (Resp. 45-61), they all appear to be focused on the motivation to combine the references.

94. I disagree that Darlington "expressly teaches away" from implementing helical power cable journals that would displace the power cables away from the bowstring planes of rotation. Resp. 46. Because Darlington does not appear to disclose helical power cable journals, it cannot "expressly" teach away from them. I also disagree that it even implicitly teaches away from them.

95. One misunderstanding (or perhaps mischaracterization) of Ravin's that should be corrected is Darlington's alleged overriding aim of increasing accuracy. Darlington's abstract states: "The invention 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 and/or wherein the power stroke has been extended by positioning the bowstring farther from the string catch." Ex. 1013 (emphasis added). Darlington's goal is "an improved compound archery crossbow." *Id.* at [0001]. One such disclosed improvement is the reverse draw configuration (where the bowstring is positioned horizontally between cams and the riser), which allows the power stroke to be increased, "which results in better performance." *Id.* at [0015]. Thus, while

Darlington discloses numerous ideas that can improve a crossbow on various fronts (only one of which is improved accuracy), not all of them are absolutely required to be implemented on every single embodiment. In other words, by its own disclosure, Darlington's aim (of an improved crossbow) would be met even if the sole improvement was an increased power stroke.

96. Another clarification is regarding Darlington's teachings of the power cables and bowstring being "substantially parallel." Darlington's overhead views (Figs. 1, 4-5, 9, 12-13, 16-18) show crossbows in the uncocked position, where the taut bowstring and power cables appear as lines. But if the crossbows were cocked, the bowstring would form a V-shape (rather than a single line) where each part would be at an angle to intersect the power cables (from an overhead perspective) and thus not be parallel (or even "substantially" parallel) to them. What Darlington instead means is that the *planes* of the power cables 28, 30 and bowstring 32 (e.g., when viewed from the side, as best shown in Figs. 2, 6, and 10) are substantially parallel. *Id.* at [0046].

97. Additionally, Darlington describes this "substantially parallel" relationship only with respect to the shoot-through configuration but not the shoot-over configuration. *Id.* at [0008]-[0011], [0041], [0043], [0046], [0053]. The side view of the shoot-over configuration is shown in Fig. 14, where the power cables

28, 30 are shown as intersecting each other, as well as both of them being displaced away from the bowstring 32 near the channel 58 but drawing towards the bowstring near the string guides 102, 104. This distinction confirms the above discussed “substantially parallel” relationship. Therefore, Ravin’s arguments involving the “substantially parallel” phrase simply do not apply to the disclosed shoot-over embodiments.

98. Moreover, Ravin argues that this “substantially parallel” relationship avoids twisting forces and torque. Resp. 45, 47. But if the upper and lower power cable journals in Darlington’s shoot-through configurations (where this relationship applies) were made helical and displaced the power cables away from the bowstring (per the teachings of Norkus and Park), the forces on the string guides and thus limbs would remain balanced (because the power cables and bowstring would remain substantially parallel) and thus avoid any twisting forces and torque. Furthermore, having the cables be displaced away from the bowstring 32 (i.e., the upper cable 28 displaced vertically upwards, and the lower cable 30 displaced vertically downwards) would provide additional clearance for the arrow to pass between the cables. *See* Ex. 1013, [0014], [0043], [0050]. This provides still additional motivation to displace the power cables “away from” the bowstring in such a configuration.

99. Ravin is simply wrong in its assertion that Darlington *requires* the distance between each cable and bowstring to always remain fixed, as Darlington contains no such requirement. Instead, Darlington simply states that if the torques on the cam axles are “effectively neutralized” (which Darlington teaches to do by balancing the forces applied to the top of the axles and to the bottom of the axles in the shoot-through configuration), then that “substantially eliminates twisting forces on the limbs.” *Id.* at [0046]; *see also id.* at [0046] (discussing the “symmetry [that] substantially equalizes the load on each side” of the axles, thus eliminating torque). So having both power cables 28, 30 in a shoot-through configuration extend away from the bowstring 32 using helical journals would most assuredly *not* result in twisting forces and torque, contrary to Ravin’s assertion.

100. Turning to Darlington’s shoot-over configurations, the patent application text acknowledges that they “*may* result in twisting forces being exerted on the limbs.” *Id.* at [0060] (emphasis added). As a first observation, Darlington does not claim with certitude that twisting forces will indeed result. And secondly, while the disclosed embodiments discuss the desirability of “reducing the torque produced on the limbs” (*id.*), Darlington nowhere insists on total elimination of such torque or twisting forces; in other words, while Darlington teaches the desirability of reducing such twisting, it is by no means an absolute

requirement that is to be achieved at all costs and at any sacrifice, contrary to Ravin's allegations.

101. For example, Darlington nowhere discloses the specific amount of torque produced on the limbs of the disclosed crossbows or any amounts that are "deemed to be acceptable" (Resp. 52), nor does Darlington disclose the specific amount of reduction of such torque corresponding to any specific reduction of distance between the bowstring grooves and the power cable grooves (i.e., the correlation between torque and "closeness" of the cables and bowstring), which shows that Darlington is not overly concerned about this aspect. Contrary to Ravin's allegations, Darlington nowhere requires the "orientation of the power cables and drawstring [to be] consistent throughout the draw cycle" in the shoot-over configurations. Resp. 51. So if the power cables were displaced away from the bowstring (by utilizing helical power cable journals), there is no indication that the resulting torque would be so large as to make the crossbow unusable. Indeed, since Darlington itself recognizes that the shoot-over configuration "may result in twisting forces" (Ex. 1013, [0066], Ex. 1035, 331:9-14 (Mr. Teater appears to acknowledge that not every Darlington design requires keeping everything parallel))), a POSA would understand that in those configurations, it is the

increased *power stroke* and *power* (not increased accuracy) that is Darlington's goal. Ex. 1013, abstract.

102. Still further on this point, the bowstring 32, which discharges the arrow, is located above both power cables 28, 30 (hence, the name "shoot-over configuration). *Id.* at Fig. 14, [0057]. Because both power cables are anchored on one side of the bowstring (as opposed to both sides, as in the shoot-through configuration) and must be further deflected away from the bowstring near channel 58, the resulting forces on the axles would be greater on the bottom of the axles than the top. *Id.* at [0005]-[0006], [0060]; *cf. id.* at [0048] (symmetry equalizes loads and eliminates torque). Simply displacing the power cables "away from" the bowstring would still maintain the cables underneath the bowstring – the cables would never cross over and above the bowstring. So contrary to Ravin's assertion (Resp. 52), these forces never "vary[] direction."

103. Turning to Ravin's arguments about Darlington's hybrid-groove cams and synchronization (*id.* at 56-57), that cam design is merely one out of several different cam designs disclosed by Darlington. *See, e.g.*, Ex. 1013, [0003] (two-groove cams and three-groove cams), [0006] (hybrid two-groove cams), [0008] (three-groove cams), [0016] (two-groove cams), [0017] (hybrid two-groove cams), [0040] (three-groove cams), [0051] (two-groove cams), [0056] (hybrid two-groove

cams). Darlington discloses that slaving the cams to each other (namely, having a first cam take up a first end of a first cable while a second cam lets out the second end of the first cable, and having the second cam take up a first end of a second cable while the first cam lets out the second end of the second cable) synchronizes them, which can prevent the possibility of nock point shifting thus improving accuracy. *Id.* at [0045]. And Darlington discloses several cam designs to accomplish synchronization. *Id.* at [0044]-[0045], Figs. 1-8 (three-groove slaved cams); *id.* at [0056], Figs. 13-16 (hybrid two-groove slaved cams).

104. But Darlington also discloses an unsynchronized design. *Id.* at [0051], [0055], Figs. 9-12 (two-groove non-slaved cams). And Darlington states that this design “provide[s] substantially the same advantages as those described” for the previously described three-groove slaved-cam design, even though it does not provide synchronization. *Id.* at [0055]. This confirms that synchronization is not a critical feature that Darlington insisted on having, contrary to Ravin (Resp. 56). Several other prior art references also disclose designs that do not slave their cams, which shows that synchronization was not deemed to be absolutely essential in this field. *See* Ex. 1015, Fig. 1, [0005], [0013]; Ex. 1007, Figs. 1-4; Ex. 1011, Figs. 17-18; Ex. 1010, Fig. 7, 3:30-36. Mr. Teater agreed that his Declaration was

inaccurate in asserting that Darlington insists that its cams “must be synchronized.”
Ex. 1034, 268:9-269:25.

105. Furthermore, after disclosing various additional embodiments, Darlington states that “any of the configurations illustrated in FIGS. 1-18 can be modified and combined as required to provide any of the benefits discussed above.” *Id.* at [0061]. As an example, Darlington then proceeds to describe an embodiment that utilizes three-groove cams (previously disclosed in the shoot-through configuration of Figs. 1-7) in a shoot-over configuration. *Id.* at [0061]. Thus Ravin is again incorrect when it claims that a hybrid two-groove cam system is “essential” to implement a shoot-over configuration (Resp. 56-57). This underscores Darlington’s teaching that various design features have corresponding advantages, and that a POSA can and would be able to combine and modify them as needed, without any particular feature being deemed essential or absolutely critical. Thus a POSA wishing to further increase the power stroke of Darlington’s crossbows (which Darlington already says is desirable) using helical power cable journals (as taught by Norkus or Park) would simply take Darlington’s unsynchronized two-groove cam design (as shown in Figs. 9-12), placing both power cables underneath the bowstring (i.e., to have a shoot-over design, as taught

by Figs. 13-18 and [0061]), and make the power cable journals helical to allow greater cam rotation. This is a straightforward case of obviousness.

106. On the topic of tradeoffs between various advantages, I already explained above that Darlington does not in fact require improved accuracy in each configuration; that is merely one of several possible advantages that Darlington discloses that could result depending on which features of the several disclosed configurations are implemented. And as I explained, neither is synchronization always required by each of Darlington's disclosed embodiments. As any POSA knows (whether in 2013 or today), there is a multitude of different crossbows offered by various manufacturers, and almost every manufacturer itself offers several models, where each model has different characteristics. Often there are tradeoffs between the various characteristics (e.g., cost, speed, weight, size, accuracy, etc.). Different consumers choose these tradeoffs differently, which is why so many different bows were and are available on the market. Mr. Teater, for example, testified that while speed is not a primary selling point for him, it is for many others. Ex. 1034, 271:20-272:8. A POSA would readily know that some consumers place their priority on maximum power, even at the cost of other characteristics, so a manufacturer aiming to fill that target need would certainly prioritize increased power stroke, even if doing so might sacrifice some accuracy.

If a person does not recognize this common-sense reality, such a person does not qualify as a POSA.

107. Turning to Ravin's argument that Darlington's crossbow would need some further adjustments to implement the helical journals taught by Norkus and Park (Resp. 54), this argument apparently assumes that a POSA would just disassemble the cams from Norkus's (or Park's) bow and physically swap them for Darlington's cams. But any person who sincerely believed that does not qualify as a POSA. In the first place, it is the *teaching* of a helical power cable journal (from Norkus or Park) that is to be applied to Darlington's cams, not the bodily swapping of the exemplary cams that are illustrated within the references. Second, any POSA would know that if the crossbow cams now allowed a longer power stroke than previously allowed, a crossbow would need to be appropriately adjusted to actually utilize the longer power stroke; otherwise, it is merely a capability that is not utilized. Darlington does not specify how long the power strokes of the existing embodiments are or the length of their barrels or stocks, and thus it does not place an upper limit on those dimensions. A POSA would readily know how to make the appropriate adjustments to take advantage of the longer power stroke (which Darlington encourages, e.g., Ex. 1013, abstract) that the helical power cable journals would allow. Mr. Teater confirms this in his testimony that he would be

able to figure out how to implement Norkus's helical power cable journals on Darlington's crossbow. Ex. 1034, 159:3-11.

108. One last comment deserves a brief mention regarding Norkus. Mr. Teater in his deposition unduly focused on the offset of the higher "coils" of the power cable journals 30 shown in the side view of the close-up of Norkus's Fig. 7 (on the left side), arguing that this "angular displacement" (i.e., not perfectly centered) is "in complete opposition of Darlington." Ex. 1035, 333:13-334:9. I believe that this is a frivolous argument, as any POSA would simply recognize the lack of perfect centering as simply a draftsman's lack of attention to exact detail (rather than an intentional desire to have the upper helical coils slope off-center), especially given that some of the lines and numbers are simply written in by hand and the drawings appear rather primitive in their detail, with the additional knowledge that patent drawings are often not to scale. Norkus's specification simply mentions that the journals 30 "are helical in shape," Ex. 1010, 3:6, and nowhere emphasizes that they must be off-centered, which it would have expressly described had such off-centering actually been desired or required.

H. Grounds 9-11: Claim 1 is Obvious over Kempf '871 in View of Norkus, Park, or Stanziale '302.

109. My previous declaration (Ex. 1016) explained how claim 1 of Ravin's '015 Patent is obvious over U.S. Patent 7,836,871 ("Kempf '871") and Norkus

(Ground 9), Kempf '871 and Park (Ground 10), and Kempf '871 and Stanziale '302 (Ground 11). Ravin's main arguments on these Grounds appear to be limited to two claim limitations, thus implicitly conceding all others.

1. “second draw string journal” and “second . . . power cable take-up journal”

110. I previously discussed the relevant technological field, including vertical bows and crossbows and cams used on them to secure, wind, and unwind the bowstring and any power cables, and I explained how Kempf '871 (the primary reference in these Grounds) discloses two string guides, each of which has a draw string journal and a power cable take-up journal. Ravin does not dispute that Kempf '871 discloses two string guides, nor does it contest that one of them (the pulley 28) *does* disclose a “first draw string journal” (called outer track) 30 and a “first” “power cable take-up journal” (called inner track) 32. Rather, its argument (supported by the Teater Declaration) appears to be that the *other* disclosed string guide (the cam 36) of Kempf '871 has neither a draw string journal nor a power cable journal. Resp. 62-65. I strongly disagree with this frivolous argument.

111. Ravin appears to make this argument only because Kempf '871 has no express callout number and arrow pointing to the cam's outer track (receiving the bowstring 48) and to the cam's inner track (receiving the cable 44). But just because these callout numbers and arrows are missing from the explanatory figures

(in contrast to those shown for the pulley 28) does not mean that the underlying structural features are actually absent from the crossbow.

112. Claim 1 of Kempf '871 recites, *inter alia*, two string guides, “a first string coupled to said first string guide and to said second string guide,” and “a second string coupled from a first contact on said first string guide . . . to a second contact on said second string guide” *See also* Ex. 1014, 2:59-67. Claim 10 (which depends on claim 1) recites that “said first string guide is a cam.” Thus, Kempf '871 discloses two string guides (one of which is a cam) that are “coupled” to two strings (i.e., bowstring and power cable).

113. Kempf '871 characterizes archery cams as known prior art. *Id.* at 1:9-27. It cites, for example, to U.S. Patent 6,267,108, which discloses cams on a vertical bow and a crossbow. Kempf '871 shows one example of a cam's construction in Fig. 3, but it also notes that the cam “may be constructed in a manner known in the art,” which further reinforces that cams would be well-known to a POSA. Ex. 1014, 4:5-7.

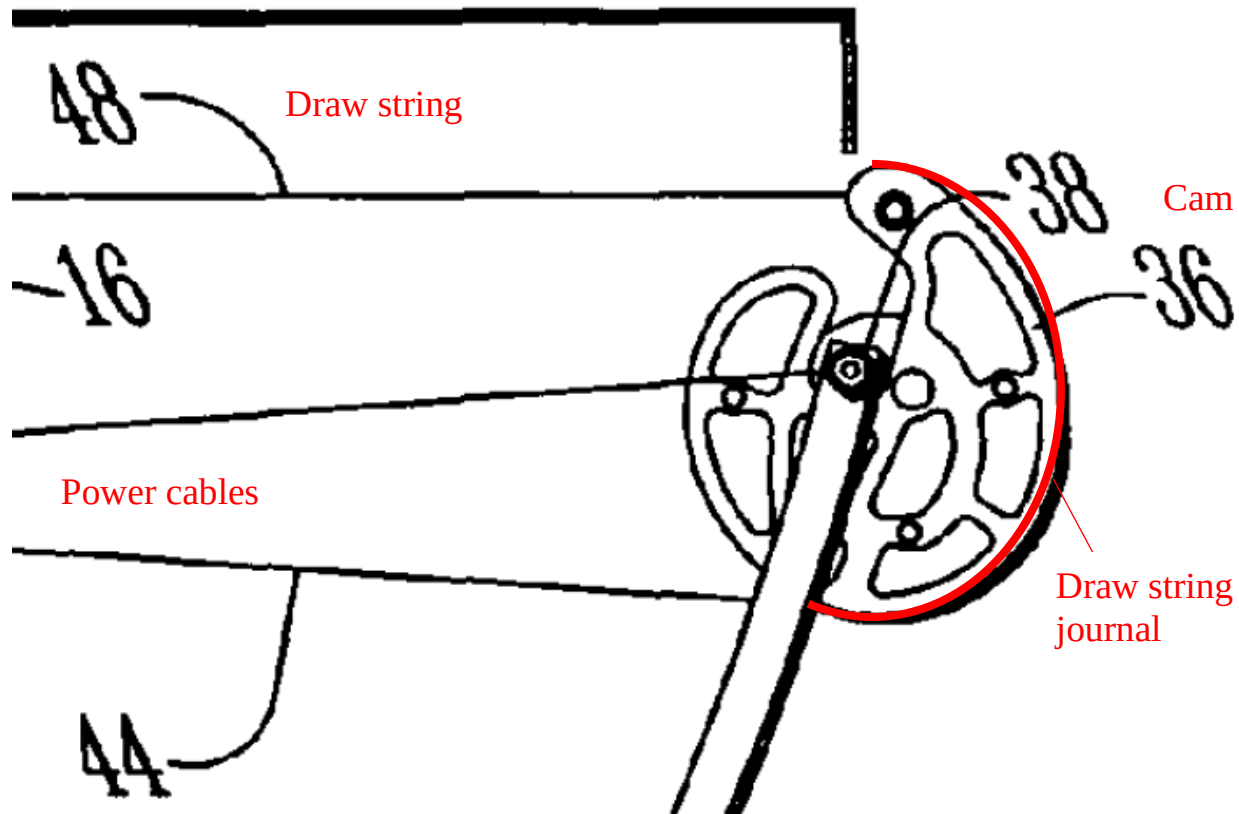
114. Kempf '871 also explains that the string guides “may be coupled to a bowstring (48) and, if desired, one or more cables [44] in any manner known in the art” *Id.* at 4:13-15. Again, this reinforces that a crossbow cam receiving a bowstring and a power cable is well-known to a POSA, and a POSA would also

know how this is accomplished (i.e., through journals, also known as tracks, grooves, and guides). The attachment of flexible cables to a rotatable string guide without a peripheral track, groove, or guide was not and is not a manner known in the art. Even Mr. Teater conceded that he has never seen a cam in the history of compound bows or crossbows that did not have a groove for the cables. Ex. 1034, 223:20-224:9.

115. My previous declaration was able to cite to callout 30 on the pulley 28 to pinpoint this journal because such callout exists in Kempf '871's figures. Because the figures do not include a similar callout for the cam 36, I was unable to cite to a callout number, but a POSA would readily confirm that such a draw string journal is certainly there; archery cams are so constructed, everywhere and always. A POSA would understand that the journal is *necessarily* required in order to receive the bowstring 48, both when static (e.g., in the fully cocked position or fully released position) and when moving (e.g., when being cocked or being discharged).

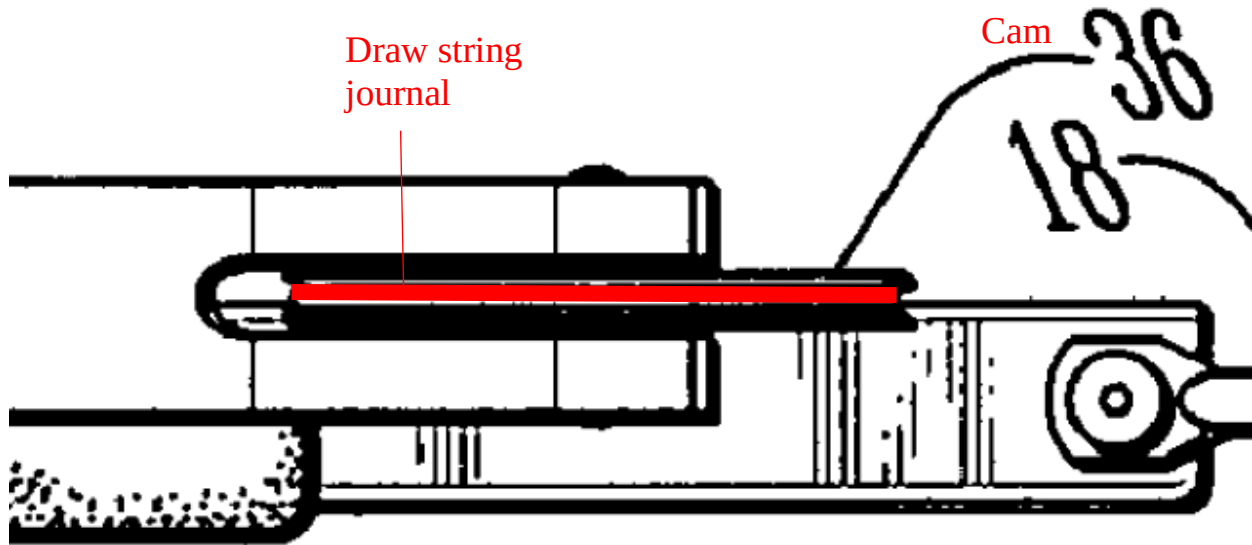
116. The figures of Kempf '871 show the cam receiving the string and cable. For example, looking at the cam 36 in Fig. 1 of Kempf '871, a POSA would understand that its draw string journal would run along the outer perimeter of the

cam, where the bowstring 48 contacts and wraps around the cam, as indicated in red in the below excerpt:



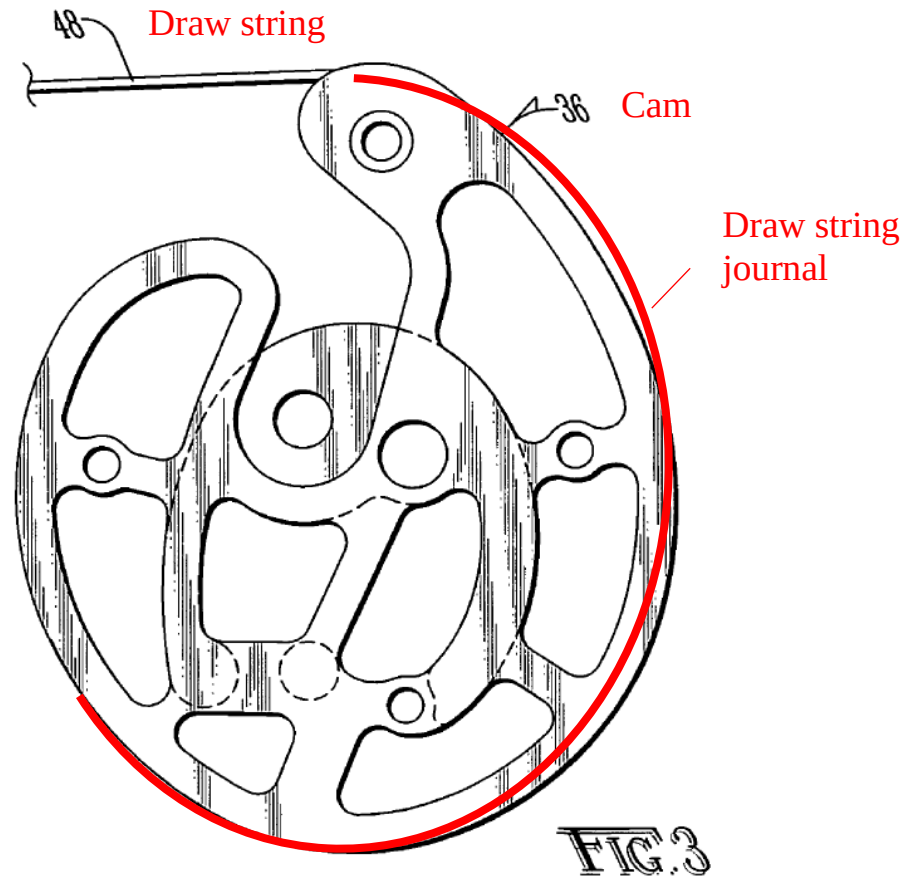
117. A POSA would readily understand that the cam necessarily must have such a journal (i.e., groove or track for the string), because without it, the disclosed string would reliably slip off the cam and not permit the crossbow to be drawn. Neither Ravin's Response nor the supporting Teater Declaration explain how the bowstring can be coupled to Kempf '871's cam 36 without such a journal necessarily being present.

118. The side view of the cam in Fig. 2 (excerpt shown below) shows the draw string journal (indented or recessed between the top and bottom cam surfaces) that necessarily exists to receive the draw string, though no callout number is provided for this feature:

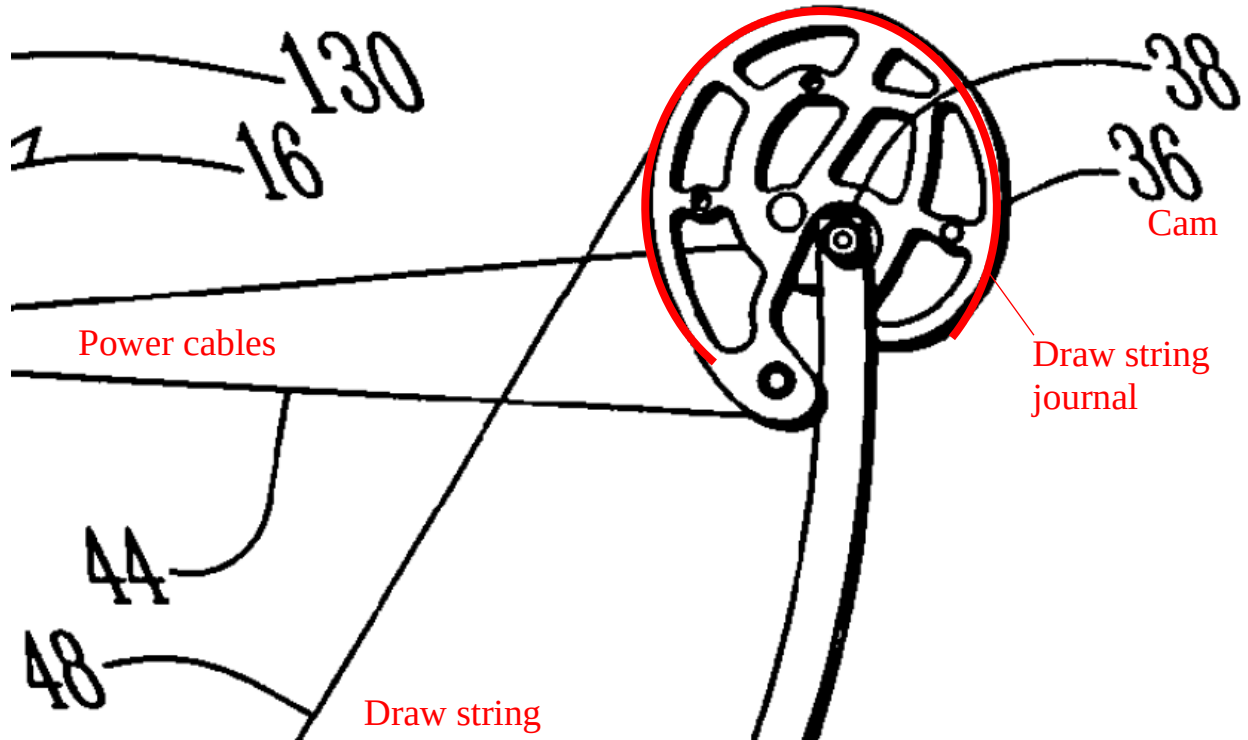


Mr. Teater also appears to have begrudgingly admitted that in this side view the cam “potentially looks U-shaped,” i.e., has a groove. Ex. 1034, 226:11-227:3.

119. Fig. 3 is similar to the excerpt of Fig. 1 shown above and shows where the string 48 would be received and wind on the cam’s journal:



120. Fig. 10 (excerpt of cam shown below) is similar to Fig. 1, except with the cam rotated due to the bowstring being drawn and the crossbow cocked:



121. While none of these figures include a callout number for the bowstring journal, it necessarily is there in order for the crossbow to receive the string and function as disclosed in these figures. Thus Ravin is categorically wrong when it states that the cam of Kempf '871 does not have an outer track for the string.

122. The same is true for the cam's journal that receives the power cable

44. My previous declaration (Ex. 1016) was able to cite to callout 32 on the pulley

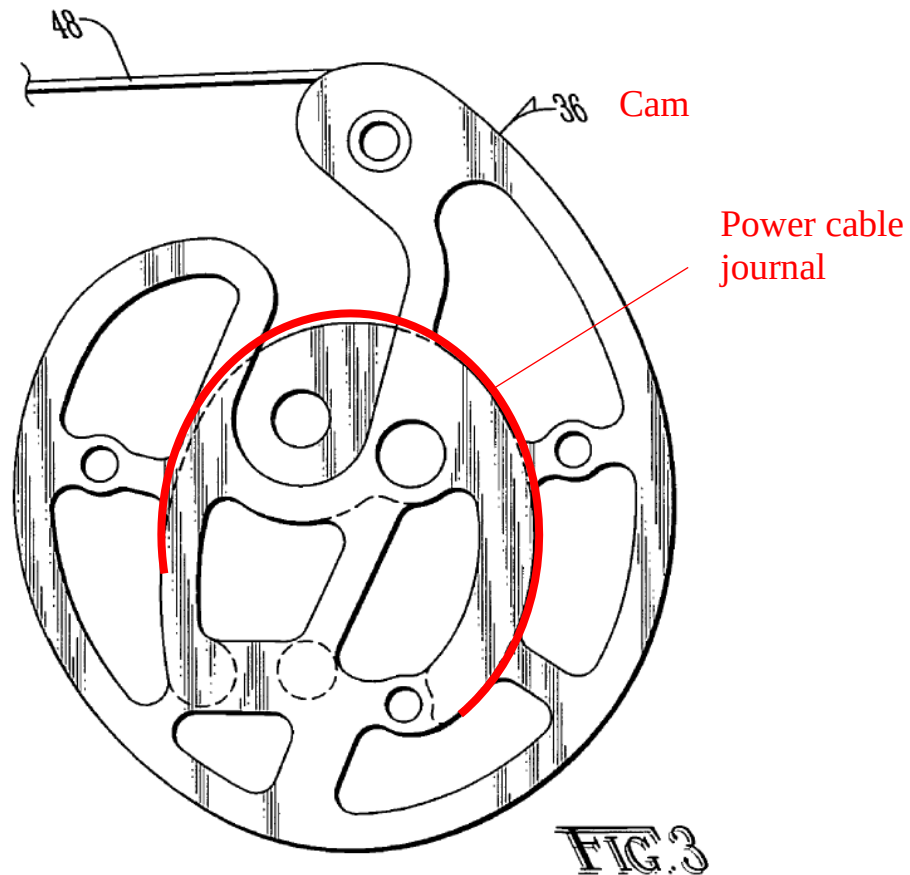
28 to pinpoint this journal because such callout exists in Kempf '871's figures.

Because the figures do not include a similar callout for the cam 36, I was unable to

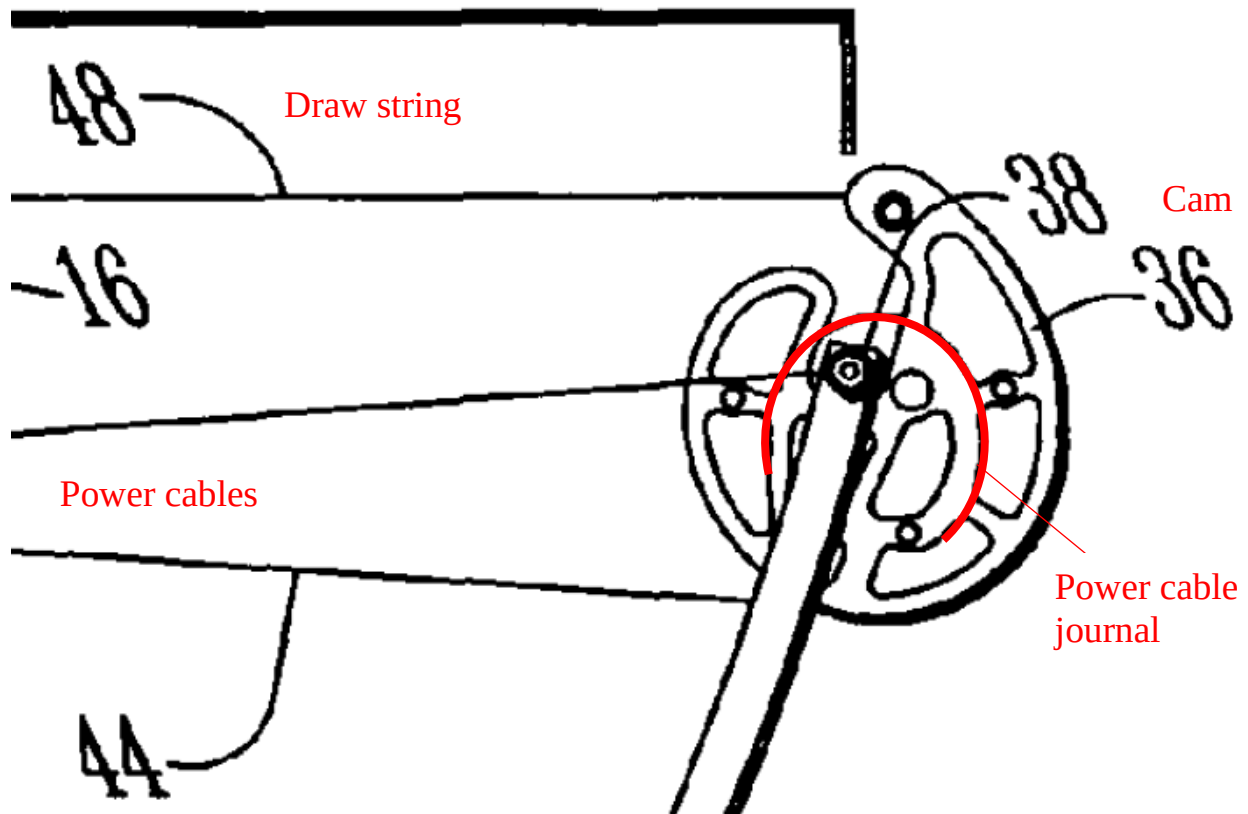
cite to a callout number, but a POSA would readily confirm that such a power

cable journal is certainly there. A POSA would understand that the journal is necessarily required in order to receive the cable 44, both when static (e.g., in the fully cocked position or fully released position) and when moving (e.g., when being cocked or being discharged), as explained above.

123. The cam close-up in Fig. 3 of Kempf '871 further shows the dashed (unlabeled) inner track or journal for receiving the cable 44, which would wrap on the journal:



124. Fig. 1 shows the cam of Fig. 3 on a limb with the other components:



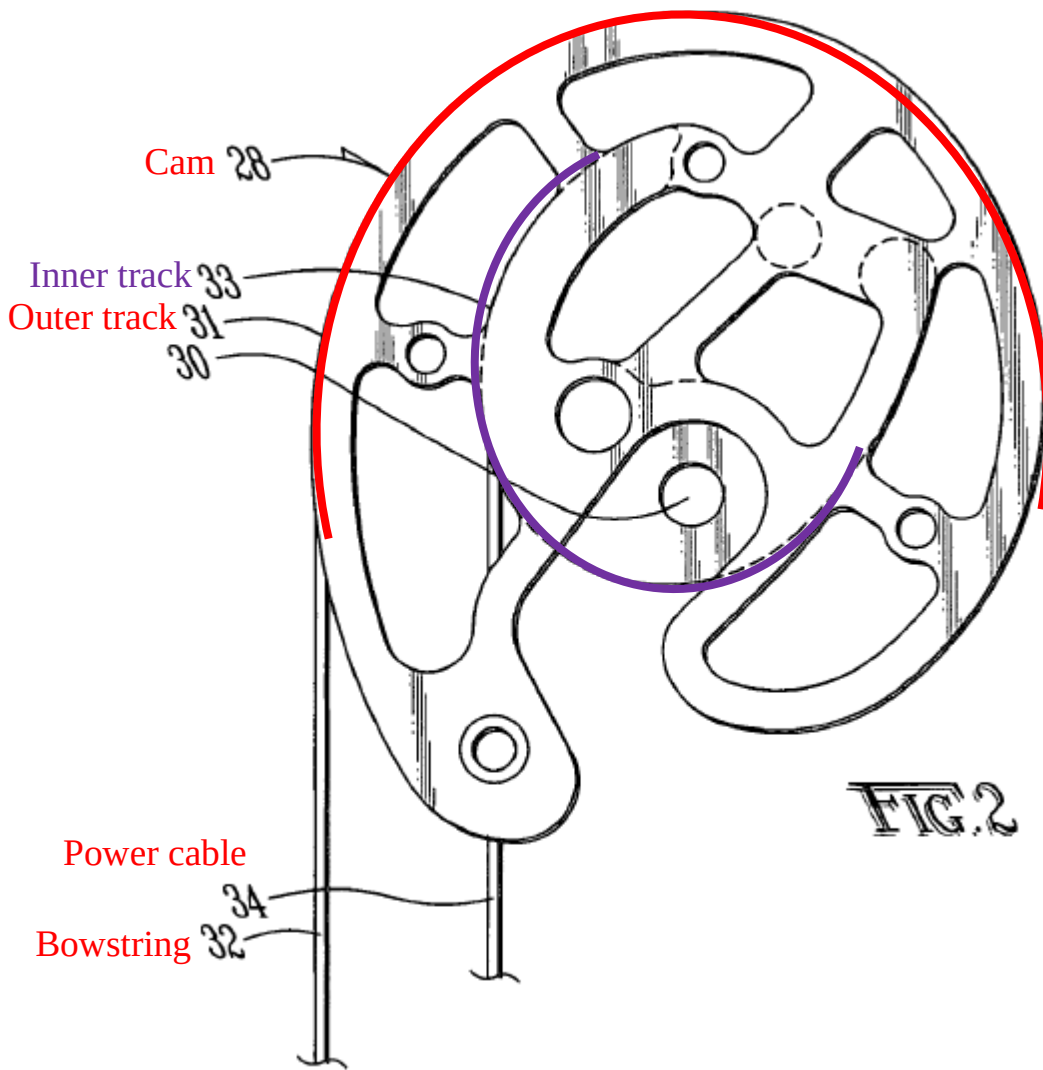
125. A POSA would readily understand that the cam necessarily must have such a power cable journal (i.e., groove or track for the cable), because without it, the disclosed cable would slip off the cam and not permit the crossbow to be drawn. Neither Ravin's Response nor the supporting Teater Declaration explain how the cable can be coupled to Kempf '871's cam 36 without such a journal necessarily being present. While none of these figures include a callout number for the power cable journal, it necessarily is there in order for the crossbow to

receive the cable and function as disclosed in these figures. Thus Ravin is categorically wrong when it states that the cam of Kempf '871 does not have an inner track for the cable.

126. This is further supported by Kempf '001, which was cited during the prosecution of the '015 Patent (as explained above) and lists the same inventor as Kempf '871.

127. Fig. 4 of Kempf '001 and Fig. 10 of Kempf '871 are very similar, as both show cocked crossbows with the same configuration of the string guides (cam and pulley), bowstring, and power cables, the difference being that the limbs of Kempf '001 extend from the riser in a rearward direction (away from the foot stirrup), whereas the limbs of Kempf '871 extend from the riser in a forward direction (toward the foot stirrup).

128. Fig. 2 of Kempf '001 is virtually identical to Fig. 3 of Kempf '871 except rotated 90 degrees and also showing the received power cable 34:



129. Kempf '001 states: "The cam (28) is preferably constructed as shown in FIG. 2, having an outer track (31) and an inner track (33), but may be constructed in any manner known in the art." Ex. 1008, 2:24-27. This express affirmation confirms what a POSA would necessarily understand regarding the same cam shown in Fig. 3 of Kempf '871, namely, that it necessarily has an outer track (i.e., draw string journal) and an inner track (i.e., power cable journal).

130. Moreover, in these three Grounds, the crossbow teachings of Kempf ‘871 are modified by the teachings of helical journals of cams on three separate references (Norkus, Park, and Stanziale ‘302). In each of these three references, the disclosed cams all have draw string journals as well as power cable journals, which is how they receive their respective strings and cables. Ex. 1010, Fig. 7, 1:63-2:3, 2:66-3:7; Ex. 1009, Figs. 4B, 7-8B, 17A-19, 23A-23C, [0011], [0090]-[0091], [0113], [0119]; Ex. 1007, Figs. 9, 11, [0105], [0121], [0126]. Additionally, the cams shown in Figs. 1-3 of the ‘015 Patent and expressly admitted as prior art are disclosed as having draw string journals 48A, 48B and power cable journals (though no callout number is provided for the latter, just like in Kempf ‘871). Ex. 1001, 1:33-54. These references and the ‘015 Patent itself further reinforce that the cam of Kempf ‘871 likewise necessarily has a draw string journal and a power cable journal to receive its string and cable.

131. Thus for the above reasons, a POSA would readily understand that the cam of Kempf ‘871 unquestionably has a draw string journal and a power cable journal, thus meeting the “second draw string journal” and “second” “power cable take-up journal” of claim 1 of the ‘015 Patent.

2. Motivation to Combine References

132. Aside from the above meritless arguments, Ravin spends just two paragraphs generically asserting that a POSA would not be motivated to combine Kempf ‘871 with any of the other three references specified for Grounds 9-11. Resp. 65-66. Ravin concedes that the references “have overlapping teachings regarding ‘the desirability of increasing a crossbow’s draw length or power stroke, which increases its potential power and thus speed,’” but simply asserts that “this is insufficient motivation.” *Id.* at 66. My previous declaration (Ex. 1016) thoroughly explained the motivation to combine the teachings of Kempf ‘871 with the teachings of Norkus, Park, and Stanziale ‘302, and Ravin’s response is merely an undeveloped denial based on Ravin’s say-so.

133. As for the Teater Declaration’s claim that even minor changes would have significant effects (Ex. 2029, 142-44), that justification is wholly unconvincing. It implies that archery designers are paralyzed from making any changes to any products, because even minor ones would (allegedly) drastically change the products’ “function and structural stability.” This assertion is simply unrealistic, as archery products (and specifically crossbows and vertical bows) regularly are modified and improved, as evidenced by the numerous patents and patent applications in the record in this IPR. If anything, this assertion simply

underscores its author's lack of experience and knowledge in this field.

Furthermore, a POSA would see the numerous references disclosing helical string guide journals on different crossbows and vertical bows, would thus realize that they certainly work on various designs, and thus would be motivated (for the previously discussed reasons) to implement them on Kempf '871's design, being more than capable of making the necessary adjustments for such an implementation.

134. As for cam lean, Kempf '871's crossbow does not have both upper and lower power cable journals, so the forces on its string guides already have some "twisting forces." I note that the Teater Declaration does not acknowledge this or calculate what the existing twisting forces are. Simply reconfiguring the existing journals to a helical winding (as opposed to planar) would hardly produce a radical change in the resulting force vectors and magnitudes. I also note that the Teater Declaration does not calculate how much such forces would increase from such a modification. The Teater Declaration further states that "if" those forces "are severe enough," that "may" cause component warping or fracturing, resulting in catastrophic failure. But again, the Teater Declaration fails to calculate (a) whether the twisting forces could indeed get to a level that is "severe enough," (b) the likelihood that they will get to that level, and (c) the likelihood that any specific

components would “catastrophically fail.” In short, these concerns are just melodramatic speculation.

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

135. My previous declaration (Ex. 1016) explained how claim 1 of Ravin’s ‘015 Patent is obvious over Islas, Darlington, and Park.

136. Ravin’s principal argument with respect to this Ground depends on the Islas crossbow being reconfigured to a reverse *limb* configuration, rather than a reverse *draw* configuration. As explained above in §III.B, a reverse draw configuration, as taught by the ‘015 Patent, is not the same as a reverse limb configuration, and it is the former that is recited in claim 1. My previous declaration relied on Darlington’s teachings regarding the reverse draw configuration, contrasting its disclosure of that configuration with the forward/conventional draw configuration, where all contrasting pairs of examples (except one) disclosed limbs extending from the riser toward the shooter (i.e., *not* reverse limb configurations). Ex. 1016 ¶250. Thus, Ravin has no basis for insisting that claim 1 requires a reverse limb configuration in addition to a reverse draw configuration, so the bulk of Ravin’s arguments on this Ground is simply inapposite.

137. As far as modifying Islas's crossbow to have a reverse *draw* configuration (i.e., flipping the orientation of the bowstring on the string guides), that can be done in a straightforward manner, as illustrated by Darlington. A POSA would readily be able to make the necessary compensatory design changes to implement that configuration, as I explained in my deposition. Ex. 1030, 190:11-25.

138. For example, a POSA would move Islas's pylons 32 (to which the power cables 26 are secured) slightly forward along the stock 12 (i.e., away from the trigger 36), such that the bowstring 22 would rest behind (i.e., up-range) the power cables 26, and there would be no interference whatsoever between the bowstring 22 and the upper power cable 26 like Ravin worries. Ex. 2030, 282:22-283:18. Even Mr. Teater agrees. Ex. 1034, 254:9-255:9, 260:11-261:3 (discussing Ex. 1031). Such a crossbow would most assuredly be operable.

139. Ravin also mischaracterizes Darlington as allegedly claiming that "reverse-draw configurations *require* a 'shoot-through configuration.'" Resp. 71 (emphasis added). That is inaccurate because Darlington discloses several other, different reverse-draw configurations that do *not* use a shoot-through configuration. Ex. 1013, Figs. 16, 18, [0056]-[0059], [0061]. A shoot-through

configuration *can* work with a reverse draw configuration, but is not required.

Even the Teater Declaration recognizes this. Ex. 2029 ¶50.

140. Furthermore on this argument about potential interference, claim 1 of the '015 Patent only requires one power cable (and corresponding journal) per string guide (indeed, the '015 Patent does not disclose two power cable journals per string guide), and the claim does not specify whether this journal must be above or below the draw string journal (i.e., either orientation suffices). And when the crossbow is drawn, claim 1 simply requires each power cable to be displaced “away from” the draw string journal plane of rotation, without specifying the exact direction that the power cable must travel (e.g., above or below the plane of rotation). In other words, claim 1 would be met by either of the following configurations: (a) a string guide with only one helical power cable journal, placed *above* the draw string journal, where the power cable would wrap and be displaced *upwardly* (away from the draw string journal), or (b) a string guide with only one helical power cable journal, placed *below* the draw string journal, where the power cable would wrap and be displaced *downwardly* (away from the draw string journal).

141. Islas likewise discloses that only a single power cable journal per string guide could be utilized (as an alternative to the version that uses a pair of

power cable journals per string guide, sandwiching the bowstring journal). Ex. 1015, [0006]. Such a configuration is disclosed in various other references in the record in this case. *See* Ex. 1008, Figs. 1, 3-4; Ex. 1010, Fig. 7; Ex. 1011, Figs. 17-20; Ex. 1012, Figs. 1-8; Ex. 1014, Figs. 1, 10. If Islas's crossbow had only the bottom power cable (that would be displaced downwardly, away from the bowstring plane of rotation, thus meeting Ravin's claim 1), there would be no interference whatsoever between it and the bowstring.

142. Ravin next asserts that Islas's cams cannot rotate in an opposite direction, as would be required for a reverse draw configuration. Resp. 73. That again is incorrect. In Islas's existing crossbow shown in Fig. 1, the right string guide 20 (from the shooter's perspective) rotates clockwise during cocking, while the left string guide 20 rotates counterclockwise during cocking; during these rotations, the bowstring 22 unwinds off the draw string journals 24, while the power cables 26 wind onto the power cable journals 28a, 28b during cocking. If Islas's crossbow were modified to have a reverse draw configuration (as taught by Darlington), the right string guide 20 (from the shooter's perspective) would rotate counterclockwise during cocking, while the left string guide 20 would rotate clockwise during cocking. A POSA would easily design the string guides 20 and their journals such that their rotations would allow the bowstring 20 to unwind off

the string guides 20 and the power cables 26 to wind onto the string guides 20 during cocking; the string guide design would simply be the reverse or opposite of the existing design. See Ex. 1013 (compare cams of Fig. 1 with those of Fig. 4; compare cams of Fig. 9 with those of Fig. 12; compare cams of Fig. 13 with those of Fig. 16; compare cams of Fig. 17 with those of Fig. 18). If a person does not recognize the simplicity of such implementation, that person does not qualify as a POSA in this field.

143. Ravin lastly asserts, in a conclusory fashion, that Darlington's "synchronized cam design" is "incompatible" with the "non-synchronized cam design of Islas," which would allegedly lead a POSA away from combining their teachings. Resp. 74. But Ravin is wrong again. As already explained, Darlington discloses multiple crossbow versions, each of which can be implemented in a reverse draw configuration. Ex. 1013, Figs. 1 and 4, Figs. 9 and 12, Figs. 13 and 16, Figs. 17 and 18. Some of these versions utilize synchronized cams. *Id.* at Figs. 13 and 16, [0060]. Other versions expressly do not utilize synchronized cams. *Id.* at Figs. 9 and 12 (reverse draw configuration), [0055]. Thus Darlington does not insist on utilizing synchronized cams and discloses several versions that work just fine without them; it is simply a matter of choosing between well-known designs with known tradeoffs. (That is why the Teater Declaration is just wrong when it

states in ¶225 that Darlington “emphasizes that its cams and pulleys must be synchronized or slaved to one another.”) In turn, Islas acknowledges synchronized cams, but chooses to utilize a design without synchronization. Ex. 1015, [0005]. Thus, there is nothing “incompatible” between the teachings of Islas and Darlington, and a POSA would readily apply Darlington’s teaching of a reverse draw configuration (which it explains can readily be implemented on a non-synchronized cam design) to Islas’s crossbow.

I, Stephen A. Batzer, having been warned that willful false statements and the like are punishable by fine or imprisonment or both (18 U.S.C. § 1001), do hereby declare under penalty of perjury that all foregoing statements made of my own knowledge are true and that all foregoing statements made on information and belief are believed to be true.

Date: February 13, 2024

Stephen A. Batzer
Stephen A. Batzer, Ph.D., P.E.