

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

RAVIN CROSSBOWS, LLC
Petitioner

v.

MCP IP, LLC,
Patent Owner

Case No. IPR2024-00522
Patent No. 8,683,989

Case No. IPR2024-00523
Patent No. 9,354,017

Case No. IPR2024-00524
Patent No. 9,909,831

DECLARATION OF CHARLES F. REINHOLTZ, Ph.D.

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I, Charles F. Reinholtz, Ph.D., of New Smyrna Beach, Florida, declare that:

I. INTRODUCTION AND SCOPE OF WORK

1. I have been retained by Fish & Richardson P.C. as an expert witness on behalf of MCP IP, LLC (“MCP” or “Patent Owner”). I understand that Ravin Crossbows, LLC (“Ravin” or “Petitioner”) is requesting that the Patent Trial and Appeal Board (“PTAB” or “Board”) institute an *inter partes* review (“IPR”) proceeding of U.S. Patent No. 8,683,989 (“the ’989 patent”), U.S. Patent No. 9,354,017 (“the ’017 patent”), and U.S. Patent No. 9,909,831 (“the ’831 patent”).

2. I have been asked to provide my independent analysis of the ’989 patent, the ’017 patent, and the ’831 patent in light of the prior art publications cited below.

3. I am not, and never have been, an employee of Petitioner. I received no compensation for this declaration beyond my normal hourly compensation based on my time actually spent analyzing the ’989 patent, the ’017 patent, the ’831 patent, the prior art publications and other materials cited below, and the issues related thereto. My compensation is not in any way contingent on the content of my analysis or the outcome of any IPR or other proceeding involving the ’989 patent, the ’017 patent, and the ’831 patent.

II. QUALIFICATIONS

4. A summary of my background and qualifications as a technical expert for this case is provided below. A more detailed listing of my qualifications and background are provided in my curriculum vitae (“CV”), which is attached hereto as Appendix A. Among other things, my CV includes a list of works that I have published in at least the last 10 years. I am also attaching Appendix B, which provides information about my expert witness experience, with case numbers where available.

5. I am currently Emeritus Professor of Mechanical Engineering at Embry-Riddle Aeronautical University, Daytona Beach, Florida. In that role I continue to teach classes, serve on committees and advise students in a voluntary capacity. I served as Professor and Chair of the Department from 2007 until 2017. In 2017 I stepped down as Department Chair, but I continued to serve as a professor until 2022.

6. From 1983 to 2007, I was a faculty member in the Department of Mechanical Engineering at Virginia Polytechnic Institute and State University (Virginia Tech) in Blacksburg, Virginia, most recently serving as Alumni Distinguished Professor from 2002 to 2007. In my time at Virginia Tech, I also served as the Assistant Department Head, W.S. White Chair for Innovation in Engineering Education and ABET Review Chair, among other appointments.

7. I received a Bachelor of Science degree in Mechanical Engineering from the University of Florida in 1976, a Master of Engineering from the University of Florida in 1980, and a Doctor of Philosophy in Mechanical Engineering from the University of Florida in 1983.

8. I have received numerous awards for accomplishments in these roles, including being named a Fellow to the American Society of Mechanical Engineers, being awarded the Outstanding Faculty Member Award, receiving the Dean's Award for Excellence in Teaching, and being inducted into the Virginia Tech Academy of Teaching Excellence. My work in the classroom consists of both teaching and mentoring. I teach or have taught classes relating to the following subjects: cams and cam design, mechanisms, robotics, unmanned and autonomous vehicle systems, and various engineering design courses. I have also been primary advisor to seventy-six master's degree and thirteen Ph.D. students over the course of my teaching career.

9. In 1978, I worked for Burroughs Corporation as a Design Engineer in Orlando, Florida. My job responsibilities included designing consumer products for the printing industry. I also have significant experience working in industry part time during summers and course breaks while I was a Professor.

10. I have significant experience in the design, fabrication, modification and implementation of mechanisms and mechanical devices like those involved in

this litigation. My publications include a popular textbook, “Mechanisms and Dynamics of Machinery,” published in 1987 focused on the analysis, design and application of cams, gears, linkages and similar devices. These mechanisms are the basis for the design of the devices in the art related to the Asserted Patents. A number of my industrial research projects, conference papers and journal articles also directly address these topics.

11. In particular, I have extensive experience in the design of cam-based mechanism, including both conventional cam and follower systems such as those used in internal combustion engines, and in the design of “wrapping” cams such as those used in compound bow. I have published extensively on these topics. In a wrapping cam, a cable, belt or chain partially wraps the cam, and the shape of the cam is used to control forces and mechanical advantage.

12. In 1992 I published what I believe to be a seminal paper providing the first analytical tools for synthesizing wrapping cams to control forces, torques and mechanical advantage. This paper, entitled "Synthesis of Wrapping Cams," was first published in the Proceedings of the 22nd ASME Mechanisms Conference, DE-VOL 46, September 1992, pp. 337-343. It received the Procter and Gamble Best Paper Award at that conference. The paper was later republished in the

Journal of Mechanical Design, Transactions of the ASME, Vol.116, No. 2, June 1994¹.

13. I have also supervised multiple master's theses and PhD dissertations on the design of wrapping cam, including a master's thesis on design of compound bows (Palmer, Matthew, Kinematics of Beam-Flexure Four-Bar Linkages with Applications in a Compound Bow, Virginia Tech, 12/96).

14. Additionally, I am a named inventor on two U.S. patents (one on a type of capstan called a Snubber Profile). I have authored or co-authored numerous publications in the field of mechanical engineering, machines, and/or mechanisms, and have worked, consulted, and testified in numerous patent cases. All my publications are listed in my attached CV.

15. Based on my experience and education, and the acceptance of my publications and professional recognition by societies in my field, I believe that I am qualified to opine as to the knowledge and level of skill of one of ordinary skill

¹ Tidwell, P. H., Bandukwala, N., Dhande, S. G., Reinholtz, C. F. and Webb, G, "Synthesis of Wrapping Cams," Journal of Mechanical Design, Transactions of the ASME, Vol.116, No. 2, June 1994 (revised version of 1992 ASME conference publication.)

in the art at the time of the alleged invention of the '989 patent, the '017 patent, and the '831 patent (which I further describe below).

III. MATERIALS CONSIDERED

16. In preparing this declaration, I have considered the specification, including the claims, and prosecution history of the '989 patent, the '017 patent, and the '831 patent. I have also considered my own knowledge and experience, including my experiences in the field of the '989 patent, the '017 patent, and the '831 patent (*see* paragraphs ¶¶10-15 above). The following list identifies relevant documents that I have reviewed and considered in the course of preparing this declaration:

- Petition for *Inter Partes* Review of U.S. Patent No. 8,683,989 Case No. IPR2024-00522 (the "'989 Pet.")
 - **EX1001 (IPR2024-00522)**: U.S. Patent No. 8,683,989 B1 to McPherson ("the '989 patent")
 - **EX1002 (IPR2024-00522)**: Prosecution History of the '989 Patent
 - **EX1003 (IPR2024-00522)**: Declaration of Joshua Lange, P.E.
- Petition for *Inter Partes* Review of U.S. Patent No. 9,354,017 (the "'017 Pet.")
 - **EX1001 (IPR2024-00522)**: U.S. Patent No. 9,354,017 B1 to McPherson ("the '017 patent")
 - **EX1002 (IPR2024-00522)**: File History of the '017 Patent
 - **EX1003 (IPR2024-00522)**: Declaration of Joshua Lange, P.E.

- Petition for *Inter Partes* Review of U.S. Patent No. 9,909,831 (the “’831 Pet.”)
 - **EX1001 (IPR2024-00524):** U.S. Patent No. 9,909,831 B1 to McPherson (“the ’831 patent”)
 - **EX1002 (IPR2024-00524):** Prosecution History of the ’831 Patent
 - **EX1003 (IPR2024-00524):** Declaration of Joshua Lange, P.E.
- **EX1004:** U.S. Patent No. 8,205,607 B1 (“Darlington”)
- **EX1005:** U.S. Patent Application Publication No. 2008/0135032 A1 to Islas (“Islas”)
- **EX1006:** U.S. Patent No. 6,470,870 to Schaar
- **EX1007:** Browning Compound Bow User Guide
- **EX1008:** Bear Archery Owner’s Manual
- **EX1009:** US Patent Application Publication No. 20100154769
- **EX1010:** U.S. Patent No. 7,997,259 B2 to Wilson
- **EX1011:** U.S. Patent Application Publication No. 20090288650 A1
- **EX1012:** Diamond Archery Nuclear Ice Instructions
- **EX2001:** U.S. Provisional Patent Application No. 61/247,473 (“’473 Provisional”)
- **EX2002:** *Inside Archery* Bow Report – 2009 Mission Menace (“*Menace*”)
- **EX2003:** *Inside Archery* Bow Report – Mathews McPherson Series Monster (“*Monster*”)
- **EX2004:** U.S. Patent Application No. 12/248,467 as filed (“’467 Application”)
- **EX2005:** U.S. Patent Application Publication No. 2010/0089375 (“’375 Pub.”)

- **EX2006:** Declaration of Mathew McPherson (“McPherson Decl.”)
- **EX2012: Deposition of Joshua Lange - Transcript**
- **EX2016:** Declaration of Jerrod Hoff
- **EX2017:** Second Declaration of Jeffrey A. Ozanne
- Mission Menace bow: serial number 937455 (“Menace ’455”) manufactured prior to June 30, 2009
- Mission Menace bow: serial number 940817 (“Menace ’817”) manufactured prior to June 30, 2009.
- Mathews McPherson Series Monster bow: serial number 986775 (“Monster ’775”) manufactured prior to June 30, 2009.
- **EX2020:** Animation of Darlington Cam Rotation.
- **EX2021:** Animation of Islas Cam Rotation.

17. I understand that the teaching of the prior art is viewed through the eyes of a person of ordinary skill in the relevant art (“POSITA”). My analysis in this declaration is thus based on the perspective of a POSITA having the level of knowledge and skill described below (§20) at the relevant time of the inventions of the ’989 patent, the ’017 patent, and the ’831 patent.

18. In particular, I understand that the ’989 patent was filed September 20, 2010, the ’017 patent was filed Mar, 31, 2014, ’831 patent was filed May 26, 2016. All three patents claim priority to the ’473 Provisional (EX2001) filed on September 30, 2009. For purposes of my analysis in this declaration, I have applied the timeframe around this date (September 30, 2009) as the relevant

timeframe of the inventions of the '989 patent, the '017 patent, and the '831 patent (and the relevant timeframe from which I considered the perspective of a POSITA).

IV. LEGAL STANDARDS

19. In preparing my analysis, I have applied the legal standards described below, which were provided by counsel for MCP.

20. It is my understanding that assessing the validity of a U.S. patent based on a prior art analysis requires two essential steps. First, one must construe the terms of the patent claims to understand what meaning one of ordinary skill in the art would give the terms. Second, after the claim terms have been construed, one may then assess validity by comparing a patent claim to the “prior art.” I understand that the teaching of the prior art is viewed through the eyes of a POSITA. For the limited purpose of this declaration, I have applied Mr. Lange’s opinion of the definition of a POSITA. EX1003 (IPR2024-00522, IPR2024-00523, IPR2024-00524) para. 25-28. However, I may reconsider the definition at a later point.

A. Interpretation of Claim Terms

21. For purposes of my analysis in this IPR proceeding, I have interpreted the terms appearing in the patent claims according to their plain and ordinary meaning. I understand that the case that explains how to interpret patent claims is

Phillips v. AWH Corp., 415 F.3d 1303, 1312-13 (Fed. Cir. 2005) (*en banc*). I understand, according to *Phillips*, that the structure of the claims, the specification, and the patent prosecution history are used to construe a claim, and the “ordinary meaning” of a claim term is its meaning that would have been recognized by a POSITA after reading the entire patent. Moreover, *Phillips* provides that even treatises and dictionaries may be used, albeit under limited circumstances, to determine the meaning attributed by a POSITA to a claim term at the time of filing. For example, *Phillips* cautions against heavy reliance on the dictionary divorced from the intrinsic record of the patent, such as the patent’s specification and file history. I have followed this approach in my analysis.

22. I also understand that the words of the claims should be interpreted as they would have been interpreted by a POSITA at the time the invention was made.

B. Obviousness

23. I understand that a patent claim is invalid as obvious if the subject matter of the claimed invention “as a whole” would have been obvious to a POSITA. In determining the differences between a prior art reference (or a proposed combination of prior art references) and the claims, the question of obviousness is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. I also

understand that an assertion of obviousness should be supported by articulated reasoning with rational underpinning to support the legal conclusion of obviousness. I further understand that there must be a motivation to combine the prior art references to achieve the invention.

24. It is my understanding that an assessment that an alleged invention is obviousness may be based on various factors including (1) whether a combination of teachings was merely the predictable result of using prior art elements according to their known functions, or whether it was the result of true inventiveness; (2) whether there is some teaching or suggestion in the prior art to make a modification or combination of elements recited in the claim at issue; (3) whether the alleged invention applies a known technique that had been used to improve a similar device or method in a similar way; and (4) whether the alleged invention would have been obvious to try, meaning that the alleged invention was one of a relatively small number of possible approaches to a problem with a reasonable expectation of success by those skilled in the art.

25. I understand that in assessing obviousness, one must be careful to avoid hindsight-based reasoning since true inventions might seem obvious after the fact. I understand that obviousness is to be assessed from the perspective of a POSITA and that the decision-maker should not consider what is known today or what is learned from the teaching of the patent.

26. I understand that assessments of obviousness are supported by certain factual findings regarding the allegedly claimed invention and the prior art. These factual findings include: (1) the scope and content of the prior art; (2) the difference or differences, if any, between the claim of the patent and the prior art; (3) the level of ordinary skill in the art at the time the claimed invention was made; and (4) the objective indicia of non-obviousness (if available), also known as “secondary considerations.”

27. I understand that the secondary considerations include:

- commercial success of a product due to the merits of the claimed invention;
- a long felt need for the solution provided by the claimed invention;
- unsuccessful attempts by others to find the solution provided by the claimed invention;
- copying of the claimed invention by others;
- unexpected and superior results from the claimed invention;
- acceptance by others of the claimed invention as shown by praise from others in the field or from the licensing of the claimed invention;
- teaching away from the conventional wisdom in the art at the time of the invention;
- independent invention of the claimed invention by others before or at about the same time as the named inventor thought of it; and
- other evidence tending to show obviousness.

28. It is my understanding that, in order to establish a secondary consideration, the evidence must demonstrate a nexus between that secondary consideration and the alleged invention.

V. OVERVIEW OF THE '989 PATENT, THE '017 PATENT, AND THE '831 PATENT

29. The '989 Patent, the '017 patent, and the '831 patent share a common written description and figures. For convenience, in the below paragraphs, the '989 Patent is referenced. The referenced figures and quotations are also found in the '017 patent and the '831 patent.

30. The '989 Patent describes a unique design for a compound bow cam. The cams of the '989 Patent have a terminal post where the “wrapping” or “take up” end of a power cable terminates at the periphery of the cam, see e.g., '989 Patent, FIG. 1 (element 32). A traditional archery bow cam design positions a corresponding terminal near the center of the cam. *See e.g.*, EX1004, FIG. 4D (element 56); '989 Pet., 20-21; '017 Pet., 18-19; '831 Pet., 17-19.

[T]he location of the terminal post 32 and the shape of the capstan 30 result in the power cable 24 wrapping around the capstan 30 in a direction away from the axle 18 before terminating on the post 32. In some embodiments, the cable wraps around the capstan 30 in a direction opposite the direction of cam 10 rotation as the bowstring 20 is drawn. As shown in FIG. 1, the cam 10 will rotate in a first rotational direction 76 (e.g. clockwise) when drawn,

and the power cable 24 wraps around the capstan 30 and extends toward the terminal post 32 in a second rotational direction 78 (e.g. counter-clockwise) that is opposite the first rotational direction as the power cable 24 is traversed from the elongate straight portion 28 toward the terminal portion 36. '989 Patent, 4:33-45.

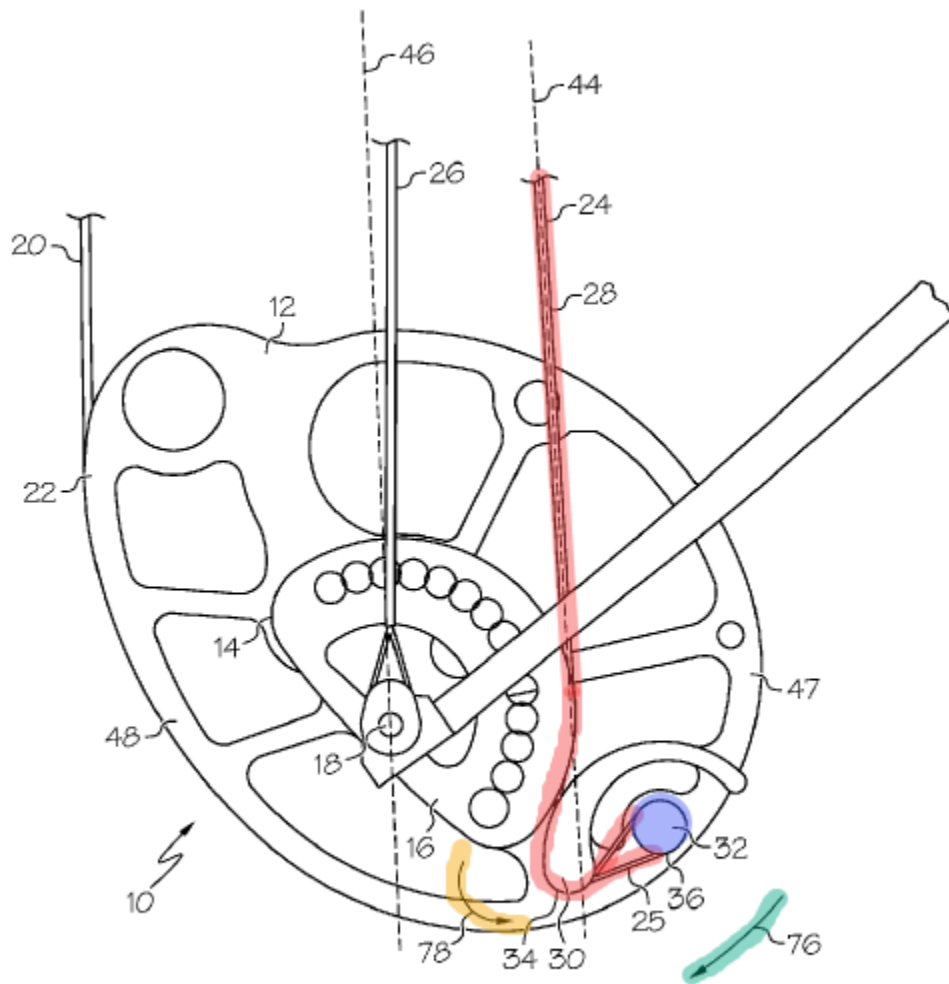


FIG. 1

'989 Patent, FIG. 1 (annotated).

31. As illustrated in the annotated '989 Patent FIG. 1 above, the power cable take-up-end wraps around the capstan (30) to be affixed to the terminal in a direction 78 that is reverse (opposite) to the direction 76 that the cam rotates when the bow is drawn. This wrap direction can be called a “reverse wrap” because the power cable is wrapped in the direction that is the reverse of the cam draw rotation direction. It is my opinion that several features recited in the independent claims resulting from the “reverse wrap” were unique among the prior art of the time. In particular:

- In the brace position, the “reverse wrap” positions the terminal post 32 and the cam’s axle 18 on opposite sides of a plane formed by the straight portion 28 of the power cable 24 that extends toward the opposite bow cam. *See e.g.*, '989 Patent, col. 4:46-48, FIG. 1, claim 1.
- The “reverse wrap” positions the cam’s capstan 30 closer to power cable 24 than the terminal post 32 when the bow is drawn, thus, providing “added draw capability.” *See e.g.*, '989 Patent, col. 5:15-21, FIGS. 2, 5, claims 11, 19.
- In the brace position, the power cable wraps around the capstan in a counter-clockwise direction, and when the bow is drawn, the cam rotates in a clockwise direction. *See, e.g.*, '017 Patent, col. 4:41-47, FIG. 1, claim 1.

- In the brace position, the “reverse wrap” positions the terminal post and the cam track on opposite sides of the capstan. *See, e.g.*, ’831 Patent, FIG. 1, claim 1.
- The “reverse wrap” positions the terminal 32 further from the bow’s axle plane 46 than the capstan 30. *See e.g.*, ’989 Patent, col. 4:57-59, claim 12; ’017 Patent, col. 4:59-61, claim 12; ’831 Patent col. 4:66 – 5:2, claim 11.

VI. OPINIONS REGARDING THE MISSION MENACE BOW AND THE MCPHERSON SERIES MONSTER BOW.

32. It is my opinion that the 2009 model year Mission Menace bow and the 2009 Mathews McPherson Series Monster bow embodied the claim limitations of the ’989 patent, the ’017 Patent, and the ’831 Patent. I reached this conclusion after analyzing the Menace bow review by Bill Krenz in the December 2008 issue of *Inside Archery* and the Monster bow review by Bill Krenz in the June 2009 issue of *Inside Archery*. EX2002; EX2003. Additionally, I have physically handled and analyzed two Mission Menace bows (serial numbers 937455 (“Menace ’455”) and 940817 (“Menace ’817”)), and one Mathews McPherson Series Monster bow (serial number 986775 (“Monster ’775”)) that were manufactured prior to June 30, 2009. EX2017, ¶¶3-5; EX2016, ¶¶17-18, 24-25. I compared the disclosures in the *Inside Archery* articles and the features of the

Menace '455, the Menace '817, and the Monster '775 to the claims of the '989 Patent, the '017 Patent, and the '831 Patent from the perspective of a POSITA.

A. The Inside Archery review articles of the Menace Bow and the Monster Bow disclose embodiments of the '989, '017, and '831 Patents.

33. In the Menace review article, Mr. Krenz praised the Mission Menace's performance. Based on this, it is clear that Mr. Krenz believed the bow worked and performed well. EX2002, 42-43. For example, Mr. Krenz says "The 2009 Mission Menace is a remarkable bow system that offers new, and particularly young and growing, bowhunters an inviting and versatile bow that can indeed grow with them from their very first days afield well into their adult bowhunting." EX2002, 42. Mr. Krenz positively reviewed the bow's adjustability, and its performance at its different adjustments. *Id.*

How It Shoots

I had an archery dealer recently tell me that he was tired of so-called youth compounds that were nothing more than cut-down adult bows. "Such bows are often too heavy, noisy, full of handshock and very poor performers," he explained.

The 2009 Mission Menace is none of those things. To begin with, the new Menace weighs just 2.9 pounds. That's light. And it's just 31 inches from axle to axle so it's also compact.

Maybe never before has such a sweet-shooting, affordable, performance-minded bow been offered specifically for new bowhunters. The 2009 Mission Menace is astoundingly pleasant to shoot. There's little or no hand shock and the bow is quiet as a whisper. For a beginner bow, that's spectacular.

EX2002, 42-43.

34. The Menace article also includes a chart listing draw weight and arrow speeds for several of the Menace bow's adjustable draw lengths (reproduced below) further demonstrating that the bow operated across each of its adjustments. In the Menace article, Mr. Krenz stated "The new Menace is also packed with performance, the type of performance that can bring big smiles in the backyard or down a trophy buck in the field. See accompanying Arrow Speed chart." EX2002, 43. Based on this, it is clear that Mr. Krenz felt that the bow performed well at

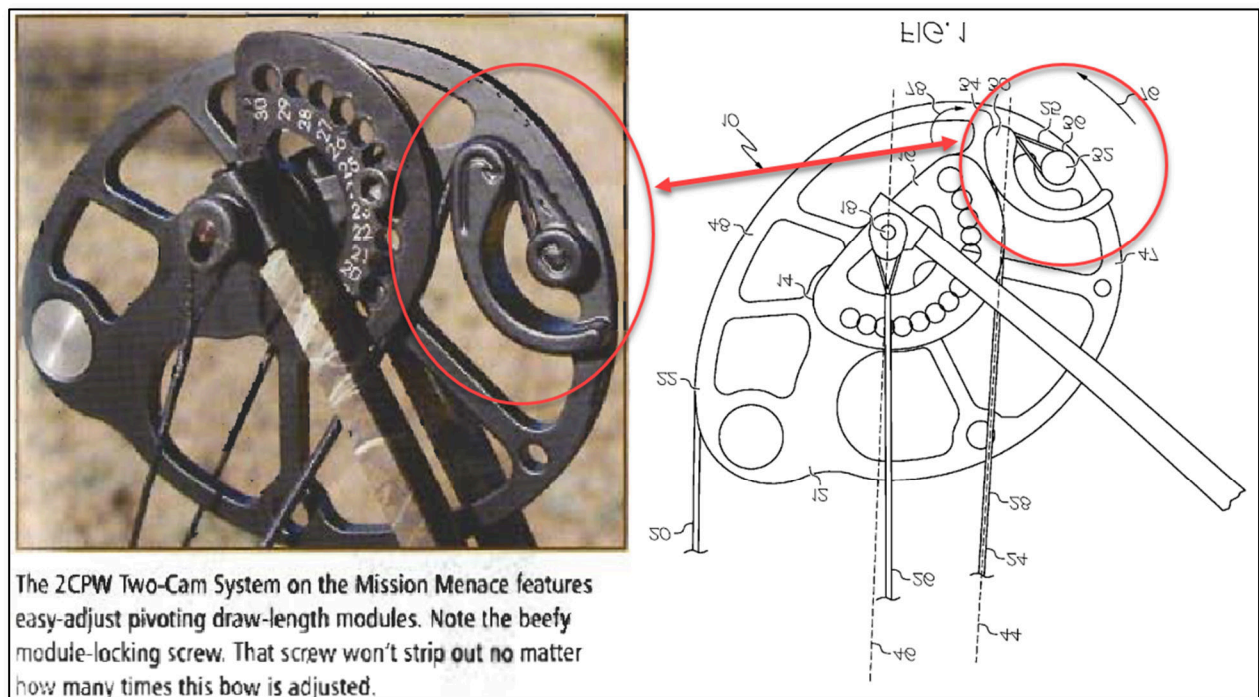
each of the adjustment settings, and that the arrow speeds listed in the chart were acceptable.

Arrow Speed				
2009 Mission Menace				
DRAW LENGTH	DRAW WEIGHT	ARROW	ARROW WEIGHT	ARROW SPEED
20 INCHES	38 POUNDS	19" 1816 ALUMINUM	326 GRAINS	145 FPS
		21" 1714 ALUMINUM	264 GRAINS	155 FPS
25 INCHES	48 POUNDS	24" 1916 ALUMINUM	396 GRAINS	191 FPS
		24" 1816 ALUMINUM	376 GRAINS	196 FPS
30 INCHES	52 POUNDS	28" 400 CARBON	391 GRAINS	248 FPS
		28" 400 CARBON	366 GRAINS	255 FPS

EX2002, Arrow Speed Chart.

35. It is my opinion that the cams of the Menace bow pictured in the Menace article are substantively the same as the cams illustrated in FIGS. 1-3 of the '989 Patent because the cams pictured in the Menace article have substantively the same shape and features as the cam illustrated in FIGS. 1-3 of the '989 Patent. The image below shows the cam photograph from the Menace article side by side with FIG. 1 from the '989 Patent. FIG. 1 from the '989 Patent has been rotated to approximately match the orientation of the cam in the photograph. As shown by the photograph, the Menace bow had the same "reverse wrap" power cable

configuration (circled in red in both images) as described in the '989 Patent. This is because the power cable of the cam in the Menace article photograph wraps outward toward the periphery of the cam, which is the same direction that the power cable is wrapped in FIG. 1 of the '989 Patent. I note that the adjustable cam module in the photograph is at a different setting than the adjustable cam module shown in FIG. 1 of the '989 Patent.



EX2002, 43; '989 PATENT, FIG. 1.

36. Mr. Krenz also praised the Mathews McPherson Series Monster bow in the Monster review article. EX2003, 30-31. For example, Mr. Krenz states, “The McPherson Series Monster is one of the fastest, most efficient dual-cam compound bows ever produced.” EX2003, 30. Mr. Krenz continues: “At the shot,

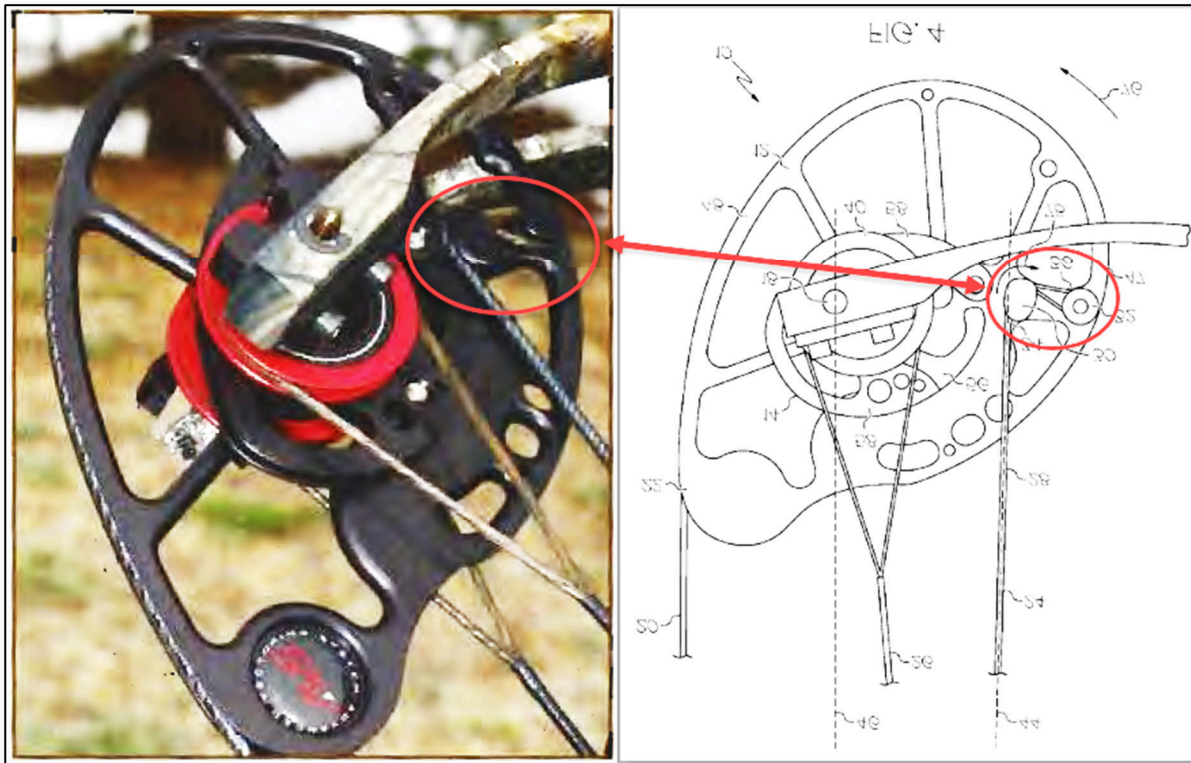
the Mathews Monster is surprisingly quiet and shock-free.” Id. “Arrow speed with the Mathews Monster is simply astonishing. Just a few years ago archery engineers would have told you that it wasn’t possible to build a bow this fast while being this shootable.” EX2003, 30-31. Based on this review, it is clear that Mr. Krenz felt that the Monster bow worked and performed well. The Monster article included a chart (reproduced below) comparing arrow speed for various arrows. This chart demonstrates the high arrow speeds of the Monster bow touted by Mr. Krenz.

Arrow Speed 2009 Mathews Monster set at 29 inches (by factory) and adjusted to 70 pounds				
28-INCH ARROWS	SHAFT: GRAINS/IN	ARROW: TOTAL WEIGHT	KINETIC ENERGY	ARROW SPEED
EASTON XX78 ALLOY 2512	10.3	448 GR.	92.0	304 FPS
EASTON FULL METAL JACKET 400	10.2	426 GR.	91.5	311 FPS
CARBON EXPRESS ARAMID KV 350	9.8	415 GR.	90.9	314 FPS
CARBON TECH WHITETAIL 65/80	9.5	411 GR.	91.1	316 FPS
CARBON EXPRESS MAXIMA HUNTER 350	8.9	398 GR.	90.5	320 FPS
EASTON ST AXIS N-FUSED 400	9.0	392 GR.	90.3	322 FPS
BEMAN ICS HUNTER ELITE 400	8.4	390 GR.	90.3	323 FPS
GOLD TIP XT HUNTER 55/75	8.2	385 GR.	89.8	324 FPS
PSE RADIAL X WEAVE HUNTER 300	8.1	376 GR.	89.8	328 FPS
EASTON LIGHTSPEED 400	7.4	363 GR.	89.4	333 FPS
GOLD TIP ULTRALIGHT PRO 400	7.4	361 GR.	89.4	334 FPS
CARBON TECH CHEETAH 400	6.4	346 GR.	88.8	340 FPS
HIGH COUNTRY SPEED PRO MAX	5.5	303 GR.	88.2	362 FPS

Bow weighed with an Easton Bow Force Digital Scale. All tests conducted with a Spot-Hogg Hooter Shooter Portable Shooting Machine and a Competition Electronics Pro Chronograph.

EX2003, Arrow Speed Chart.

37. It is my opinion that the cams of the Monster bow pictured in Mr. Krenz's review article are substantively the same as the cams illustrated in FIGS. 4-6 of the '989 Patent. The cams pictured in the Monster article have substantively the same shape and features as the cam illustrated in FIGS. 4-6 of the '989 Patent. The image below shows the photograph of the cam from the Monster article side-by-side with FIG. 4 of the '989 Patent. FIG. 4 of the '989 Patent is rotated to match the orientation of the cam in the photograph. It is clear from these images that the Monster bow had the same "reverse wrap" power cable configuration (circled in red) as described in the '989 Patent because in both the photograph and FIG. 4 of the '989 Patent the power cable wraps outward toward the periphery of the cam.



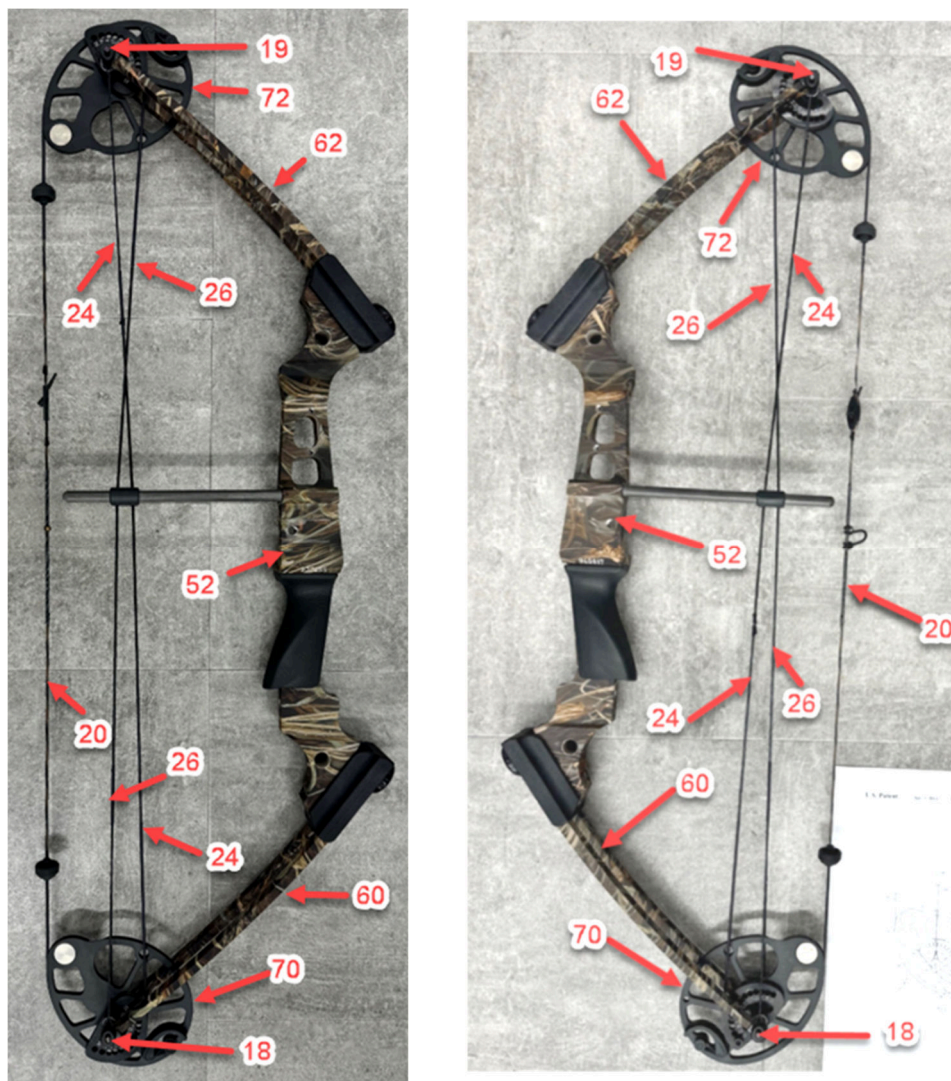
EX2003, 30; '989 Patent, FIG. 4.

B. The Menace '455 and Menace '817 bows embody the '989, '017, and '831 Patents.

38. It is my opinion that the cams of the Menace '455 and the Menace '817 are substantively the same as the cams pictured in FIGS. 1-3 of the '989 Patent, the '017 Patent, and the '831 Patent. It is also my opinion that the Menace '455 and the Menace '817 bows are substantively the same as the Menace bow depicted and described in the *Inside Archery* Menace bow review article.

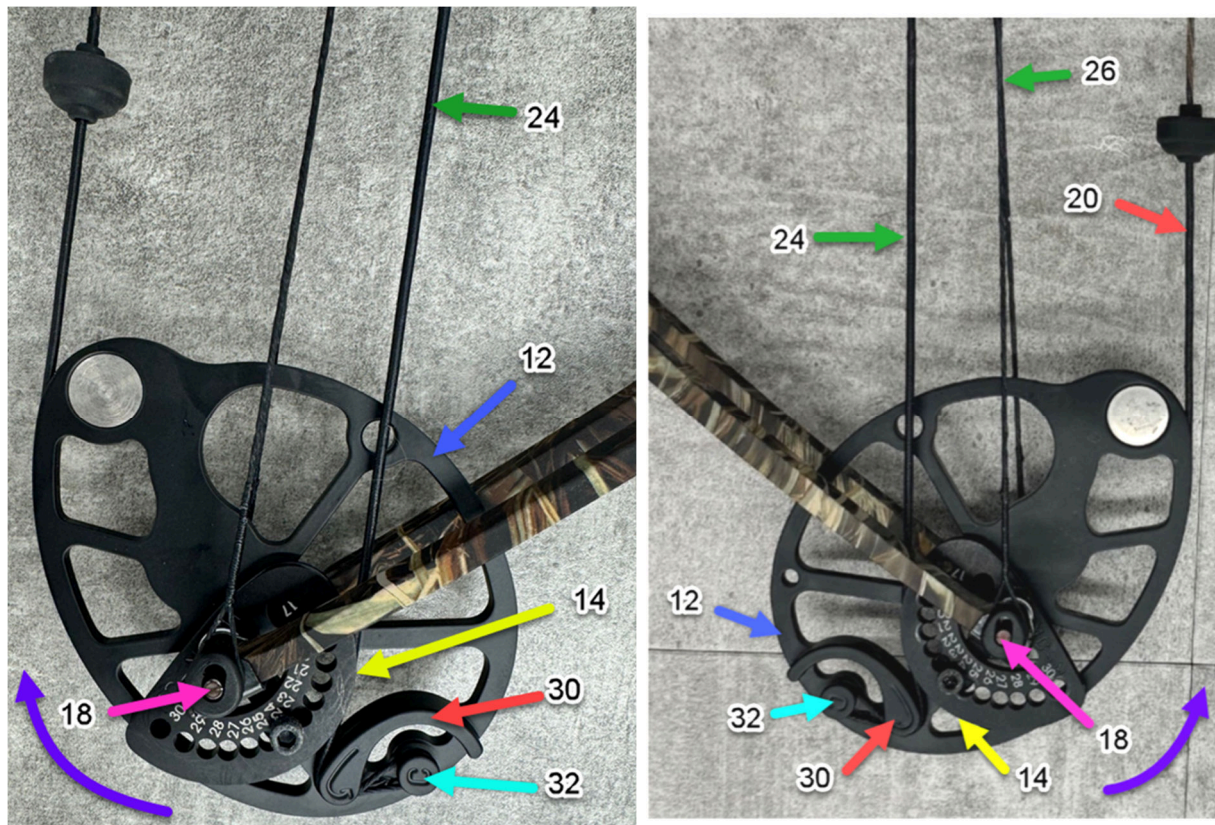
39. The Menace '455 is a right-handed bow in a camouflage design. The Menace '817 is a left-handed bow in a camouflage design. The Menace '455 and the Menace '817 are mirror images of each other as a consequence of being

designed for right-handed users and left-handed users, respectively. The figure below shows full bow photographs of both bows in a brace condition. Each of the Menace '455 (left photo) and the Menace '817 (right photo) include a riser (52), two limbs (60, 62), and two cams (70, 72) that are each supported by an axle (18, 19). A drawstring (20) and power cables (24, 26) are connected at each end to the cams (70, 72).



EX2017, Appendix A, Photo 2 (annotated); Appendix B, Photo 2 (annotated).

40. The annotated figure below shows close-up images of the lower cams (70) from the Menace '455 and Menace '817 in the brace condition. Each of the lower cams (70) include a cam track (14), a capstan (30), and a terminal (32). Traversing the power cable (24) from the straight portion toward the cam (70), the power cable (24) resides in the cam track (14), is wrapped around the capstan (30), and is anchored on the terminal (32), which is on an outer peripheral structure (14) of the cam (70). The purple arrow shows the direction that the cam (70) will rotate when drawn from the brace condition. The power cable (24) wraps around the capstan (30) in the opposite direction from the rotational direction of the cam (70) when drawn from the brace condition.



EX2017, Appendix A, Photo 5 (annotated); Appendix B, Photo 5 (annotated).

41. Mr. Ozanne attached videos to his second declaration showing the Menace '455 and the Menace '817 being drawn from the brace condition to the drawn condition. EX2017, **Menace 455 Full Bow.mp4**, **Menace 455 Lower Cam.mp4**, **Menace 817 Full Bow.mp4**, **Menace 817 Upper Cam.mp4**.

42. In the video **Menace 455 Full Bow.mp4**, the full Menace '455 bow is shown being held by a user in the brace condition. The user then draws the bow by pulling on the drawstring. As the user pulls the drawstring away from the riser, the cams rotate. The power cables are wrapped around the cams as the cams rotate thereby storing energy in the limbs of the bow. The draw length module of the bow is adjusted to the maximum draw of 30 inches. At full draw, the power cables are in contact with the flat portion of the draw length module, and rotation of the cam stops just before the capstan contacts the power cable. This corresponds closely to the fully drawn configuration shown in Fig 2 of the '989 patent. At the end of the video, the field of view is zoomed into the lower cam showing the lower cam in the drawn condition.

43. The video **Menace 455 Lower Cam.mp4** shows a zoomed in view of the lower cam of the Menace '455 being drawn from the brace condition to the drawn condition. The video begins with the cam in the brace condition. As a user pulls back on the drawstring (the user is out of frame), the cam rotates in a

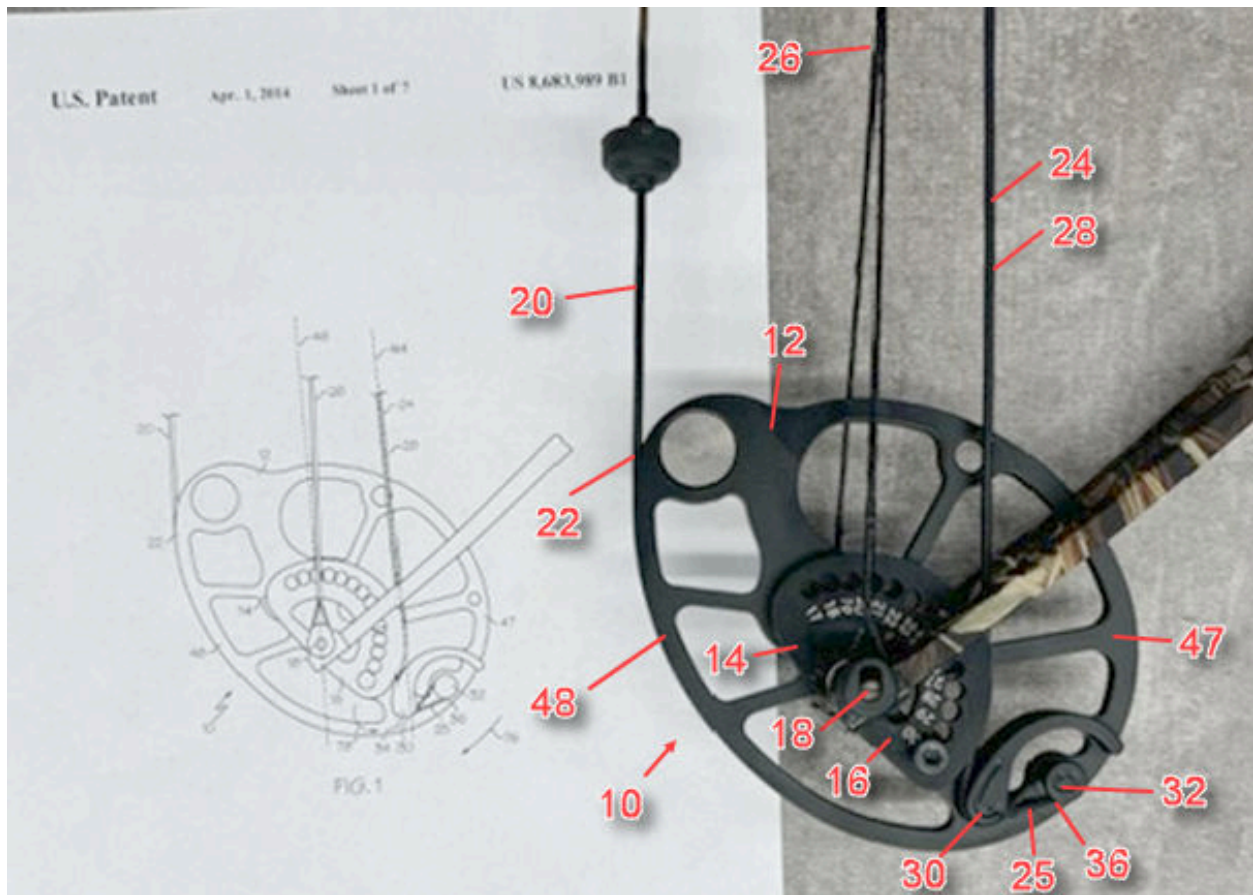
clockwise direction. As the cam rotates, the power cable is wrapped around the cam module. In the drawn condition, the rotation of the cam stops and the power cable is in contact with the flat portion of the cam module.

44. The video **Menace 817 Full Bow.mp4** shows the full Menace '817 bow being drawn. The video begins with a user having pulled the drawstring away from the riser. As the user continues to pull the drawstring, the cams rotate wrapping the power cables around the cam modules. In the drawn condition, the cam rotation stops and the power cables are in contact with the flat portion of the draw module on each cam. At the end of the video, the field of view is zoomed into the upper cam showing the upper cam in the drawn condition.

45. The video **Menace 817 Upper Cam.mp4** shows a zoomed in view of the upper cam of the Menace '817 rotating from an initial position (near the brace condition) to the drawn condition. At the start of the video, the drawstring has been pulled back from the brace condition by a small amount as indicated by the slight angle of the drawstring with respect to a vertical reference. A user (out of frame) pulls the drawstring away from the riser causing the cam to rotate in a clockwise direction. As the cam rotates, the power cable is wrapped around the cam module storing energy in the limbs of the bow. In the drawn condition, the cam rotation stops and the power cable is in contact with the flat portion of the cam module.

46. Because both the Menace '455 and the Menace '817 are substantively the same and include the same overall features, photographs of the Menace '455 and the Menace '817 can be used interchangeably. When photographs from one bow are used, similar photographs from the other bow could have also been used.

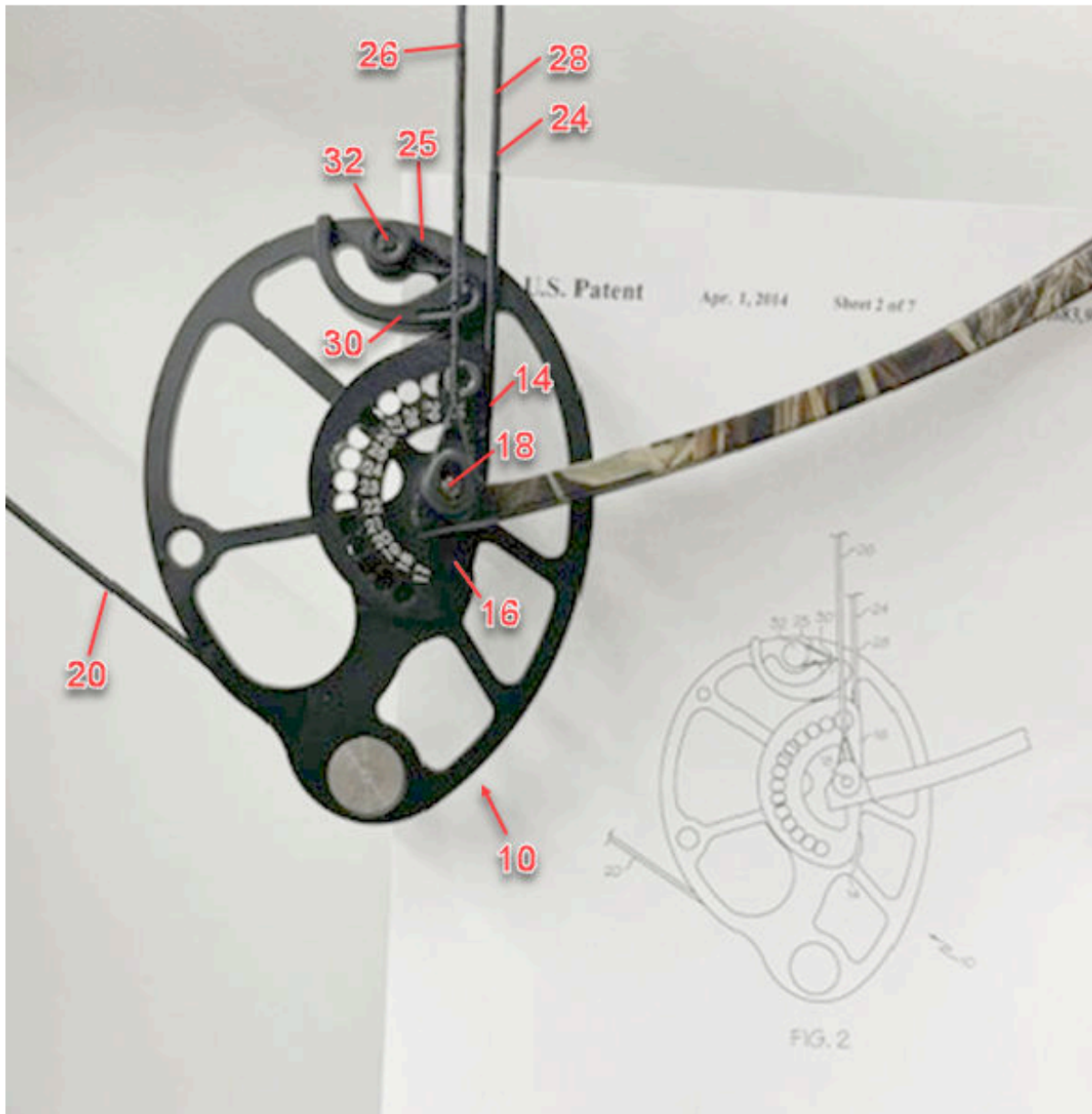
47. The figure below is a photograph of the lower cam of the Menace '455 in the brace condition side-by-side with FIG. 1 of the '989 Patent. The photograph has been annotated with element numbers corresponding to the element numbers in the '989 Patent. The cam of the Menace '455 includes each of the features depicted in FIG. 1 of the '989 Patent. The adjustable module (16) of the cam has been adjusted to be in the same position as shown in FIG. 1 of the '989 Patent. The cam of the Menace '455 in the brace condition is substantially the same as the illustration of FIG. 1 of the '989 Patent.



EX2017, Appendix A, Photo 6 (annotated)

48. The figure below is a photograph of the lower cam of the Menace '455 in the drawn condition side-by-side with FIG. 2 of the '989 Patent. The photograph has been annotated with the same element numbers as used in the '989 Patent. In the drawn condition, the cam of the Menace '455 is substantially the same as the illustration in FIG. 2 of the '989 Patent. In this position, the capstan (30) nearly contacts the straight portion of the power cable (24). The reverse wrap of the power cable around the capstan has added some draw capability. For example, if the terminal (32) were positioned on the opposite

side of the capstan (30) and the power cable (24) was wrapped in the same rotational direction that the cam rotates when drawn from the brace condition, the cam would have a decreased rotational capability before the capstan would interfere with the power cable.



EX2017, Appendix A, Photo 11 (annotated)

49. Because of the similarity between the Menace '455 and FIGS. 1 and 2 of the '989 Patent, it is my opinion that the production cams of the Menace bow embody FIGS. 1-3 of the '989 Patent.

50. The figure below shows a photograph of the upper cam of the Menace '455 side-by-side with the cam photograph in the Menace bow review article from the December 2008 issue of *Inside Archery*. The cam in the Menace article and the cam of the Menace '455 include substantially the same features. For example, the adjustable module, capstan, and terminal circled in red on each cam are substantially the same. The power cable wraps around the capstan in the same direction on each cam. It is my opinion that the Menace '455 is substantially similar to the Menace bow reviewed in the article. Because the drawstring is clearly visible on the Menace '455, the cams in the article and on the Menace '455 are in the same position. Furthermore, the power cables shown in the cam photograph in the article are clearly tight and under tension and the limbs are flexed. This is in stark contrast with Appendix A, Photo 12 from EX2017 which shows the Menace '455 bow unstrung. In that photo the limbs are unflexed, the power cables are slightly loose, and the upper cam is rotated such that the drawstring exit location is tilted upwards more so than when strung and in the brace condition. It is my opinion that the cam photograph of the *Inside Archery*

Mission

The Mission Menace showed of 38 pounds. When I les up to a draw length um draw weight auto-8 pounds. At a full 30 ounds on my Menace r-stopping 52 pounds, whunter's arm increases length of the Mission ard to keep pace with w weight also automati h the archer's growing

Menace is a remarkable e, and particularly young s an inviting and versa-d grow with them from id well into their adult ch that a parent, or any rly embrace.

recently tell me that he ath compounds that were own adult bows. "Such nois, full of handshock," he explained.

Menace is none of those : new Menace weighs just . And it's just 31 inches so compact.

(the parent company of duced the concept of a n to the archery world, erimeter weights did in s was noticeably de crease e, while also some what p to this point, Mathew y offered that patented ology in auto-can bow gh, Mission Archery is w bows with perimeter stems. Those bows are and the new bowhunter- ce.

ore has such a sweet-performance-minded bow

Specifications
2009 Mission Menace

Axle-to-Axle Length 31 inches
Back Height 7.25 inches
Riser Geometry 1 inch relief
Max Weight 2.8 pounds
Letoff 70 percent
Draw Lengths 17 to 30 inches
Draw Weights 16-52 pounds
Cam(s) Realtree Tree Advantage Max 4 HD

For more information, Circle #220, log onto missionarchery.com or call (800) 269-2719.

Draw Length & Maximum Draw Weight
2009 Mission Menace

Draw Length	Maximum Draw Weight
17 inches	25.8 pounds
18 inches	30.8 pounds
19 inches	36.3 pounds
20 inches	40.8 pounds
21 inches	43.3 pounds
22 inches	46.8 pounds
23 inches	47.2 pounds
24 inches	48.3 pounds
25 inches	49.8 pounds
26 inches	49.8 pounds
27 inches	50.3 pounds
28 inches	51.0 pounds
29 inches	51.8 pounds
30 inches	52.4 pounds

Sample bow weighed with digital draw-weight scale.

Arrow Speed
2009 Mission Menace

Draw Length	Draw Weight	Arrow	Arrow Weight	Arrow Speed
20 inches	38 pounds	19" 1816 Aluminum	375 grains	145 fps
		21" 1714 Aluminum	264 grains	155 fps
25 inches	48 pounds	24" 1916 Aluminum	296 grains	191 fps
		24" 1816 Aluminum	376 grains	196 fps
30 inches	52 pounds	28" 400 Carbon	391 grains	248 fps
		28" 400 Carbon	366 grains	255 fps

Bow weighed with a Bow Force Digital Scale. All tests conducted with a Spitz-King Heister-Shuster Portable Shooting Machine and a Compensator Electronics Pro Chronograph.

17-30 inches, the 2009 Mission Menace is a bowhunter's dream. It's done in just one snap. Removing the scoring screw and cam and turning the clearly visible color-coded draw-length setting. No tools required. It's done in just one snap.

Weight Increase

New length... draw weight... automatically up... accompanying Draw Length & Maximum Draw Weight chart... arrows, he or she... Menace grows...

been offered specifically for new bowhunters. The 2009 Mission Menace is an affordable, pleasant to shoot. There's little or no shock and the bow is quiet as a whisper. A beginner bow, that's spectacular.

The new Menace is also packed with performance, the type of performance that can bring big smiles in the backyard or down a trophy buck in the field. See the accompanying Arrow Speed chart.

Key Features at Light and Compact

A light and compact bow, the Mission Menace weighs a mere 2.9 pounds and measures just 31 from axle to axle. That means it's easy to shoot, handle and get behind.

Youth-to-Adult Draw Length Range

Versatility is the watchword for the Menace. With an astounding draw-length range of

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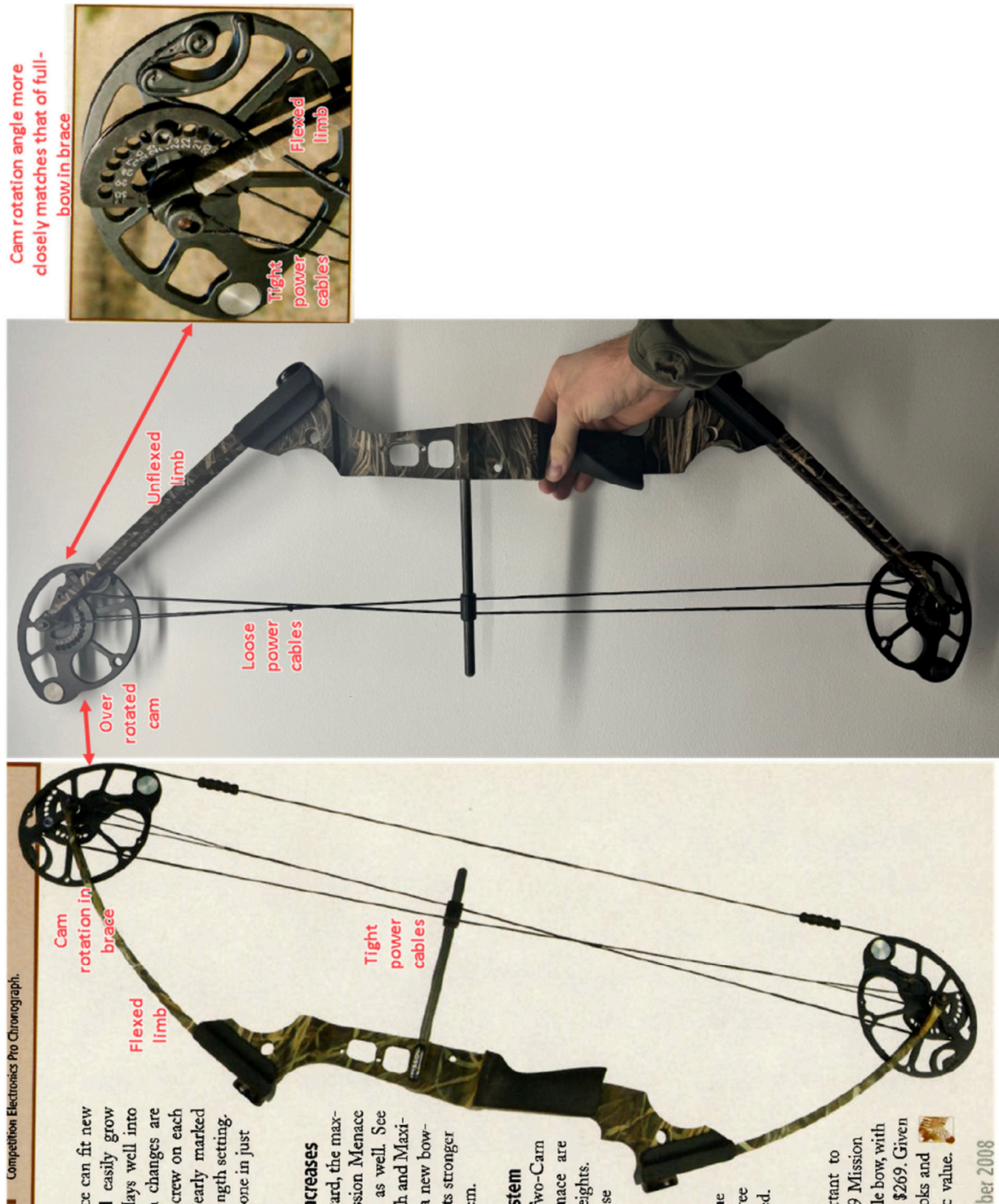


Photo 12: Menace '455 unstrung.

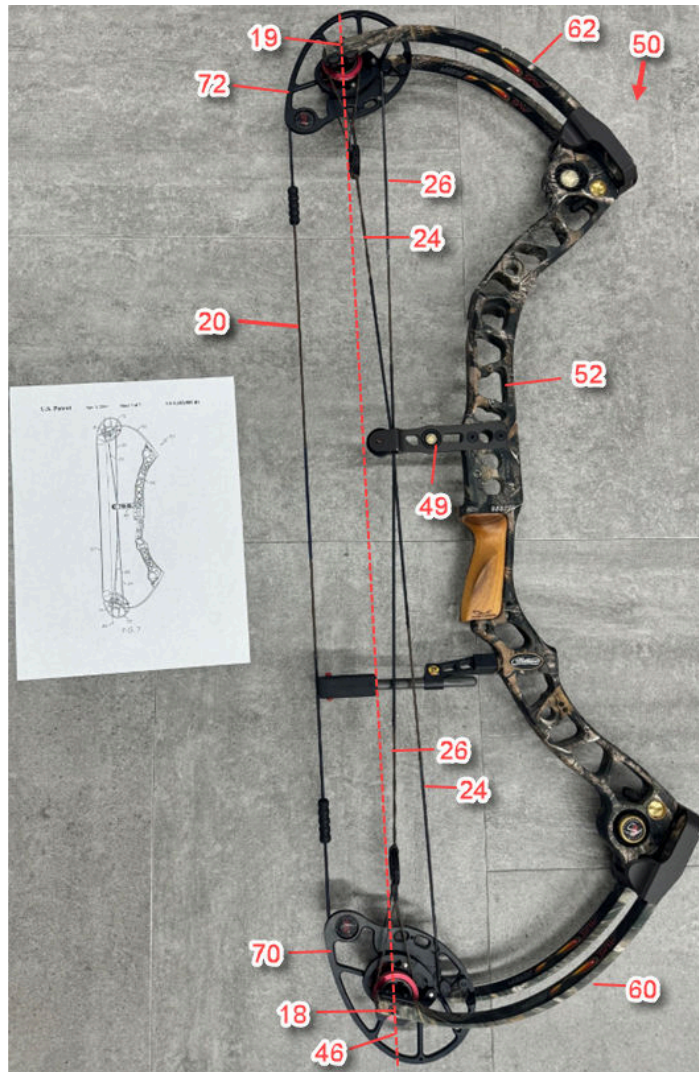
EX2002, full bow photo; EX2017, Appendix A, Photo 12; EX2002, cam photo
(annotated)

51. Because the Menace bow shown in the *Inside Archery* review article, the Menace '455, and the Menace '817 are substantially the same, photographs of any of these bows can be used as representative of the initial production model of the Menace bow to highlight features of the Menace bow. Where a photograph from one bow is used, a similar photograph of a different one of the bows could also have been used.

C. The Monster '775 bow embodies the '989, '017, and '831 Patents.

52. It is my opinion the Monster '775 is substantively the same as the bow pictured in FIGS. 4-7 of the '989 Patent, the '017 Patent, and the '831 Patent. It is also my opinion that the Monster '775 is substantively the same as the Monster bow depicted and described in the *Inside Archery* Monster bow review article.

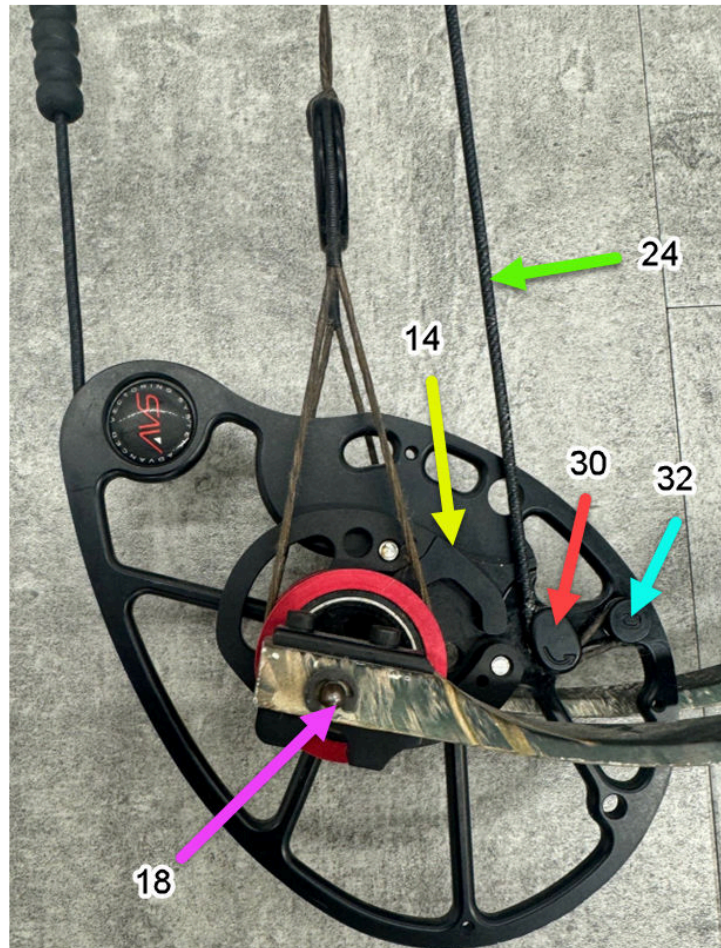
53. The annotated photograph below is a full bow photograph of the Monster '775 bow in the brace condition. The Monster '775 is a right-handed bow with a camouflage print design. The Monster '775 includes a riser (52), two limbs (60, 62), and two cams (70, 72) that are each supported by an axle (18, 19). A drawstring (20) and power cables (24, 26) are connected at each end to the cams (70, 72).



EX2017, Appendix C, Photo 2 (annotated)

54. The annotated photograph below shows a close up view of the lower cam of the Monster '775 bow in the brace condition. The cam includes a cam track (14), a capstan (30), and a terminal (32). The power cable (24) wraps around the capstan (30) and is anchored on the terminal (32). When traversed from the straight portion of the power cable (24) toward the terminal (32), the power cable

(24) wraps in a counterclockwise direction as shown. When drawn in this orientation, the cam would rotate in a clockwise direction.

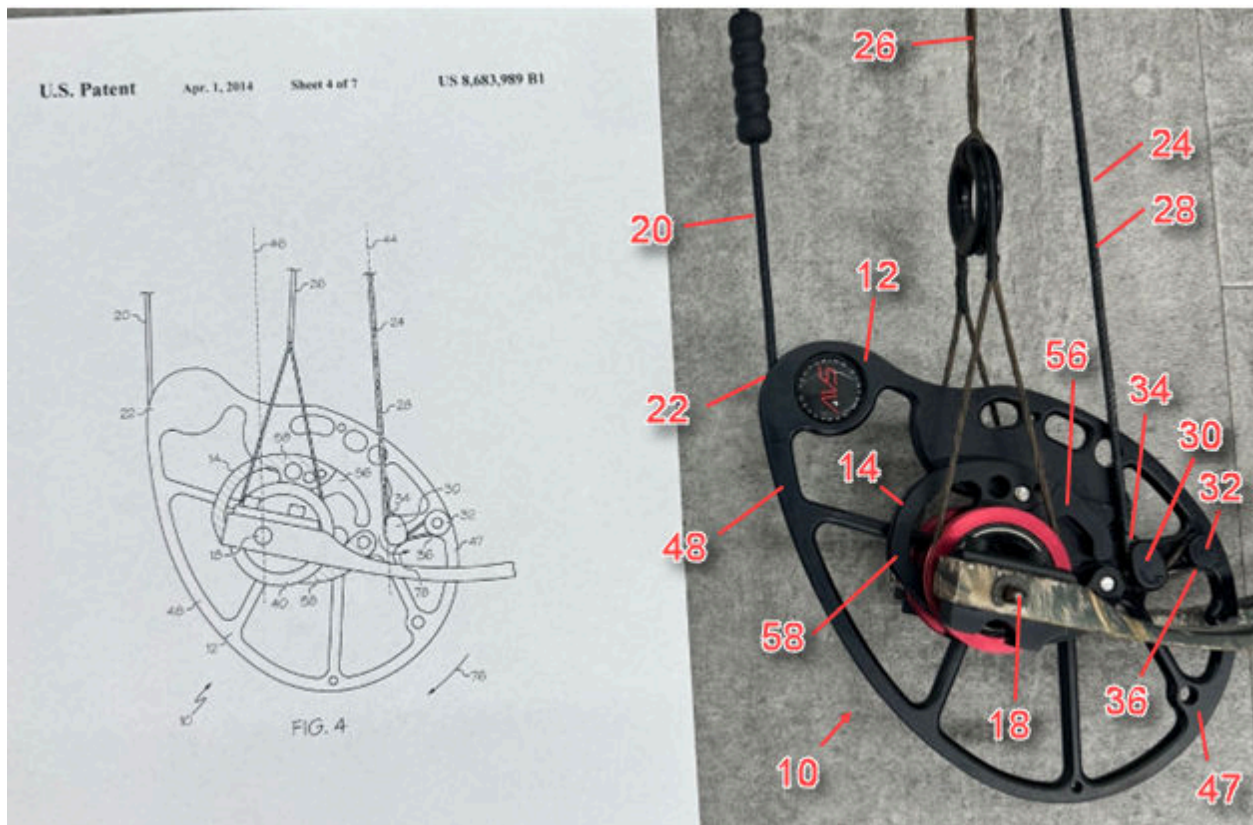


EX2017, Appendix C, Photo 4 (annotated)

55. The video attached to Mr. Ozanne's declaration, EX2017, **Monster Bow.mp4**, shows a zoomed in view of the lower cam of the Monster '775 while the bow is being drawn from the brace condition to the drawn condition. The video starts with the cam in the brace condition. The power cable is initially not in the cam track of the cam module. A user (out of frame) pulls the drawstring away from the riser causing the cam to rotate in a clockwise direction. During the draw,

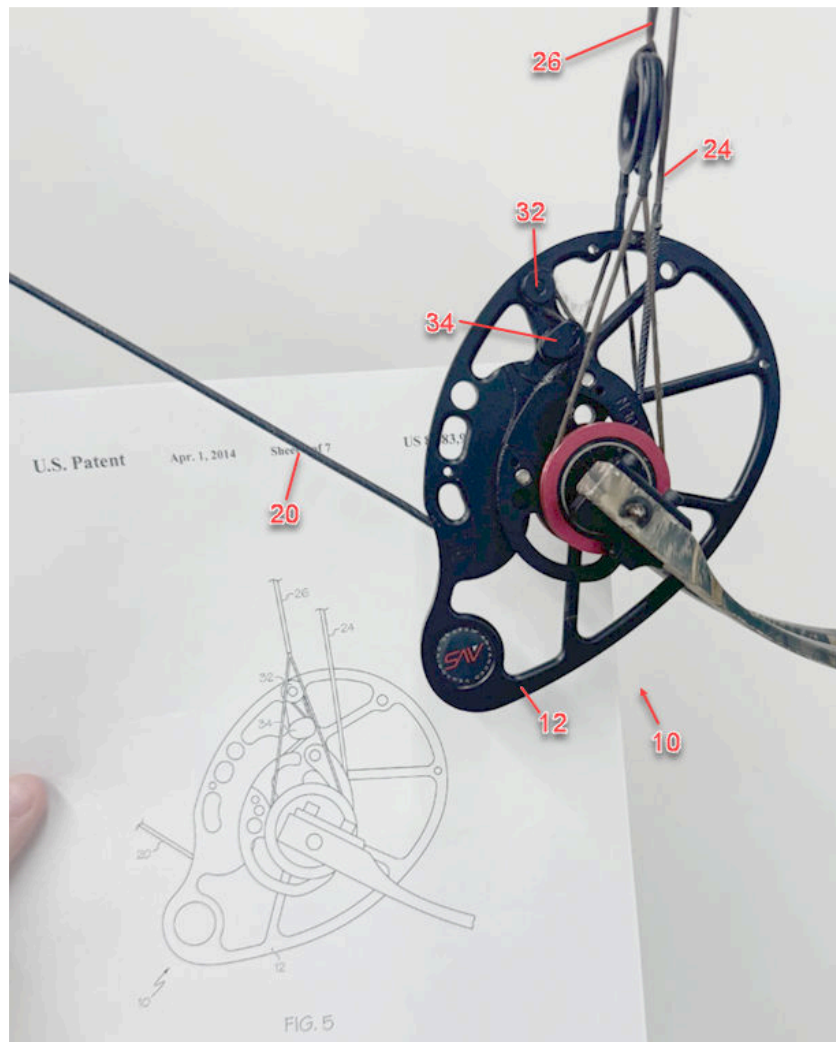
the power cable comes into contact with the cam module with matching velocities and subsequently rides in the cam track. As the cam rotates, the power cable is wrapped around the cam module thereby storing energy in the limbs of the bow. In the drawn condition, the cam stops rotating.

56. The annotated photograph below shows the lower cam of the Monster '775 bow in the brace condition alongside FIG. 4 of the '989 Patent. The cam has been annotated to label the features of the Monster '775 corresponding with the features shown in FIG. 4 of the '989 Patent. The cam of the Monster '775 in the brace condition is substantially the same as FIG. 4 of the '989 Patent.



EX2017, Appendix C, Photo 5 (annotated)

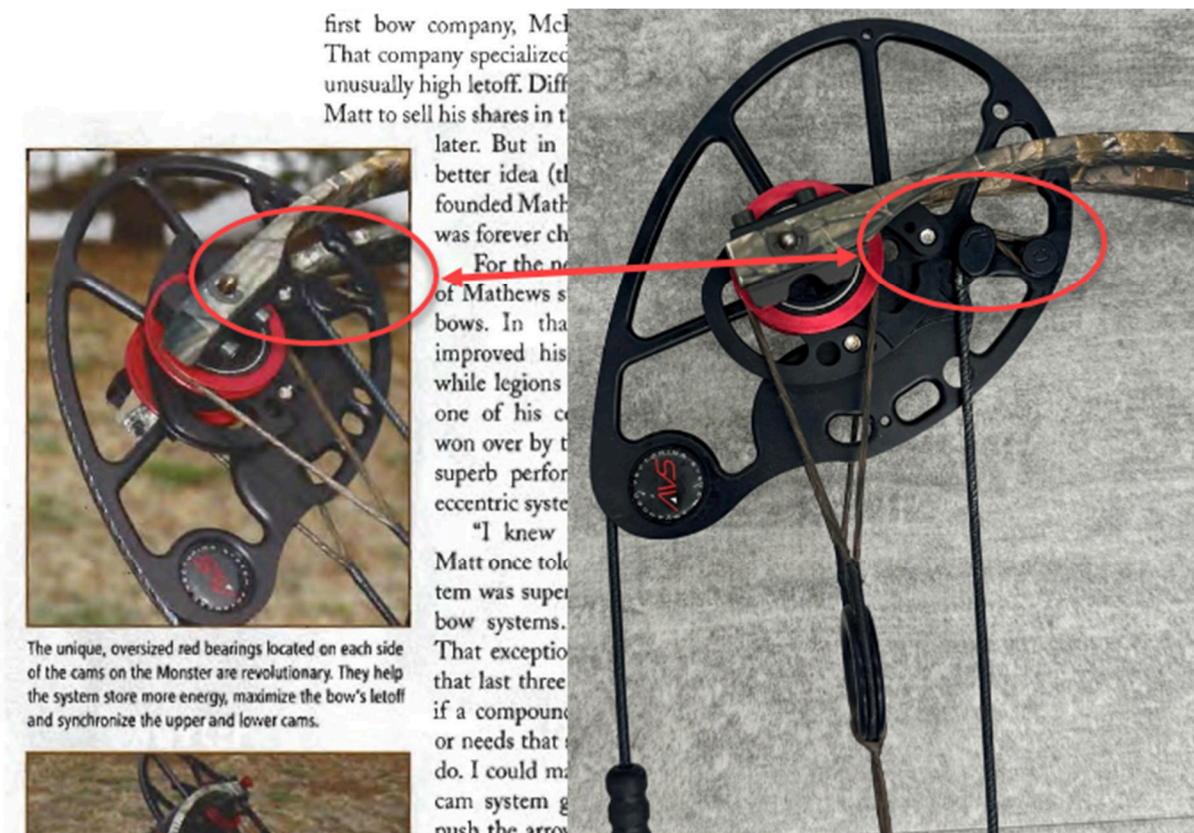
57. The annotated photograph below shows the lower cam of the Monster '775 in the drawn condition alongside FIG. 5 of the '989 Patent. The features of the cam of the Monster '775 have been annotated with the element numbers corresponding to the '989 Patent. The cam of the Monster '775 in the drawn condition is substantially the same as the illustration in FIG. 5 of the '989 Patent.



EX2017, Appendix C, Photo 8 (annotated)

58. Because of the similarity between the Monster '775 and FIGS. 4 and 5 of the '989 Patent, it is my opinion that the production cams of the Monster bow embody FIGS. 4-7 of the '989 Patent.

59. The below figure shows a portion of the Menace review article including a photograph of the upper cam of the Menace bow in the brace condition. EX2003, 30. Alongside the image of the review article is a photograph of the upper cam of the Monster '775 in the brace condition. The bow in the review article and the Monster '775 include substantially the same features. For example, both bows include a capstan and terminal (circled in red) with the power cable wrapping around the capstan to be anchored on the terminal. It is my opinion that the Monster bow reviewed in the *Inside Archery* article is substantially the same as the Monster '775.



EX2003, 30 (annotated); EX2017, Appendix C, Photo 3 (annotated).

60. Because the Monster bow shown in the Inside Archery review article, and the Monster '775 are substantially the same, photographs of either bow can be used as representative of the initial production model of the Monster bow to highlight features of the Monster bow. Where a photograph from one bow is used, a similar photograph of the other bow could also have been used.

'989 Patent Independent Claims with Reference Numbers in Annotated Photographs

Claim 1: An archery bow having a brace condition and a drawn condition, the archery bow comprising:

a riser (52);
 a first limb (60) and second limb (62) supported by the riser;
 a first rotatable member (70) supported by the first limb (60) on a first axle (18), a second rotatable member (72) supported by the second limb (62) on a second axle (19),
 the first rotatable member (70) comprising a drawstring track (9), a cam track (14), a capstan (30) and a terminal (32), wherein said drawstring track (9) is oriented in a first cam plane and said cam track (14) is oriented in a second cam plane offset from said first cam plane,
 a drawstring (20) extending between the first rotatable member (70) and the second rotatable member (72);
 a power cable (24) attached to said terminal (32) and extending toward the second limb (72), said power cable (24) comprising an elongate straight portion located near said first rotatable member (70), a capstan portion in contact with said capstan (30) and a terminal portion in contact with said terminal (32);
 wherein, in the brace condition, the power cable (24) wraps around the capstan (30) in a first rotational direction as the power cable (24) is traversed from the elongate straight portion to the terminal portion; and when the bow is drawn from the brace condition, the first rotatable member (70) rotates in a second rotational direction that is opposite the first rotational direction, wherein, in the brace condition, the elongate straight portion defines a plane, wherein said first axle (18) and said terminal (32) are located on opposite sides of said plane.

Claim 11: An archery bow having a brace condition and a drawn condition, the archery bow comprising:

a riser (52);
 a first limb (60) and a second limb (62) supported by the riser (52);
 a first rotatable member (70) supported by the first limb (60) on a first axle (18), a second rotatable member (72) supported by the second limb (62) on a second axle (19), the first rotatable member (70) comprising a drawstring track (9), a cam track (14), a capstan (30) and a terminal (32), wherein said drawstring track (9) is oriented in a first cam plane and said cam track (14) is oriented in a second cam plane offset from said first cam plane;
 a drawstring (20) extending between the first rotatable member (70) and the second rotatable member (72);

a power cable (24) attached to said terminal (32) and extending toward the second limb (62), said power cable (24) comprising an elongate straight portion located near said first rotatable member (70), a capstan portion in contact with said capstan (30) and a terminal portion in contact with said terminal (32);

wherein, in the brace condition, the power cable (24) wraps around the capstan (30) in a first rotational direction as the power cable (24) is traversed from the elongate straight portion to the terminal portion; and when the bow is drawn from the brace condition, the first rotatable member (70) rotates in a second rotational direction that is opposite the first rotational direction and wherein, in the drawn condition, the capstan (30) is located closer to the elongate straight portion than the terminal (32).

Claim 12: An archery bow having a brace condition and a drawn condition, the bow comprising:

a riser (52);

a first limb (60) and a second limb (62) supported by the riser (52);

a first rotatable member (70) supported by the first limb (60) on a first axle (18), a second rotatable member (72) supported by the second limb (62) on a second axle (19), the first axle (18) and the second axle (19) defining an axle plane, the first rotatable member (70) comprising a drawstring track (9), a cam track (14), a capstan (30) and a terminal (32), wherein said drawstring track (9) is oriented in a first cam plane and said cam track (14) is oriented in a second cam plane offset from said first cam plane;

a drawstring (20) extending between the first rotatable member (70) and the second rotatable member (72), the drawstring (20) extending from the first rotatable member (70) at an exit location;

a power cable (24) attached to said terminal (32) and extending toward the second limb (62), said power cable (24) comprising a capstan portion in contact with said capstan (30) and a terminal portion in contact with said terminal (32);

wherein, in the brace condition, the axle plane divides the first rotatable member (70) to a first part and a second part, the capstan (30) and the terminal (32) located in the first part, the drawstring exit location located in the second part, and a distance between the terminal (32) and the axle plane is greater than a distance between the capstan (30) and the axle plane and wherein, in the brace condition, said power cable (24) comprises an elongate straight portion located

near said first rotatable member (70), the elongate straight portion defines a cable portion plane, said first axle (18) and said terminal (32) are located on opposite sides of said cable portion plane.

Claim 19: An archery bow having a brace condition and a drawn condition, the bow comprising:

- a riser (52);

- a first limb (60) and a second limb (62) supported by the riser (52);

- a first rotatable member (70) supported by the first limb (60) on a first axle (18), a second rotatable member (72) supported by the second limb (62) on a second axle (19), the first axle (18) and the second axle (19) defining an axle plane, the first rotatable member (70) comprising a drawstring track (9), a cam track (14), a capstan (30) and a terminal (32), wherein said drawstring track (9) is oriented in a first cam plane and said cam track (14) is oriented in a second cam plane offset from said first cam plane;

- a drawstring (20) extending between the first rotatable member (70) and the second rotatable member (72), the drawstring (20) extending from the first rotatable member (70) at an exit location;

- a power cable (24) attached to said terminal (32) and extending toward the second limb (62), said power cable (24) comprising a capstan portion in contact with said capstan (30) and a terminal portion in contact with said terminal (32);

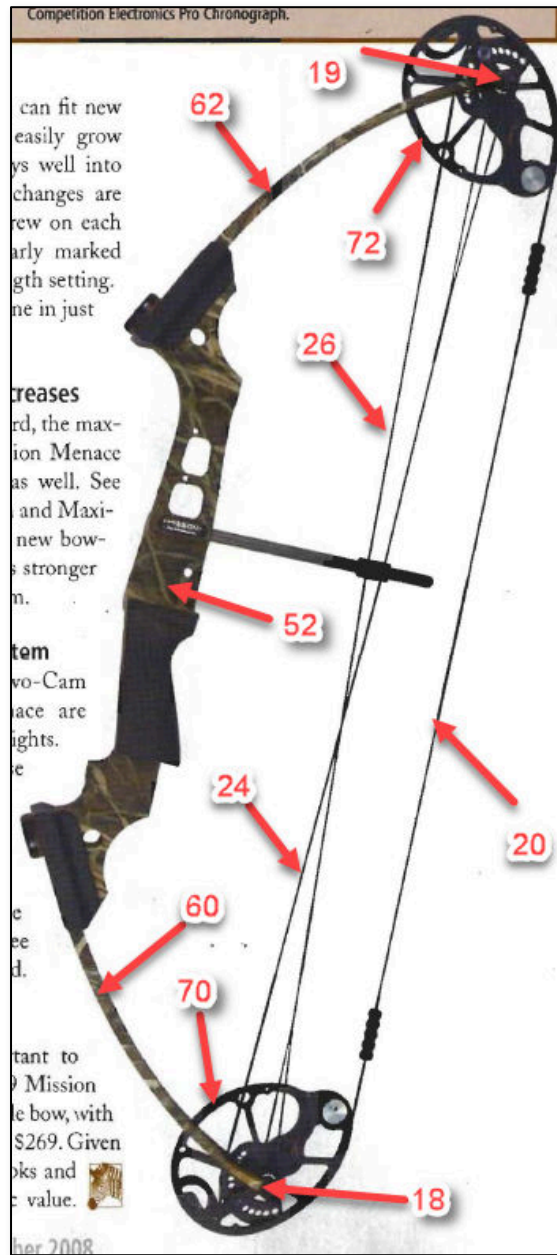
- wherein, in the brace condition, the axle plane divides the first rotatable member (70) to a first part and a second part, the capstan (30) and the terminal (32) located in the first part, the drawstring exit location located in the second part, and a distance between the terminal (32) and the axle plane is greater than a distance between the capstan (30) and the axle plane and wherein, in the drawn condition, said power cable (24) comprises an elongate straight portion located near said first rotatable member (70), the capstan (30) located closer to the elongate straight portion than the terminal (32).

D. The Menace bow embodies all the limitations of claims 1, 3-4, 8-14, and 16-19 of the '989 patent.

61. It is my opinion that the Menace article, the Menace '455, and the Menace '871 demonstrate that the Mission Menace bow embodied all of the limitations of claims 1, 3-4, 8-14, and 16-19 of the '989 Patent.

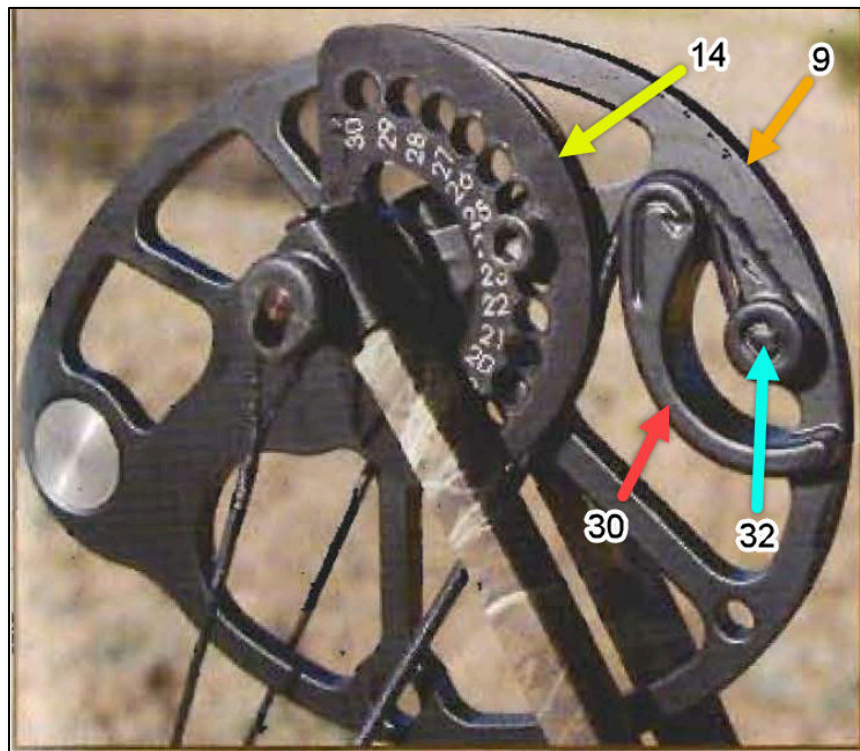
62. The Menace article included photographs of the full Mission Menace bow (shown in a brace condition) and a close up photograph of one of the cams of the Mission Menace bow.

63. It is clear from the photograph of the full Mission Menace bow (reproduced and annotated below) that the Mission Menace bow included a riser (52) supporting both a first (60) and a second limb (62). EX2002, 43. Each limb supports a rotating cam (70, 72) on a respective axle (18, 19), with a drawstring (20) extending between the two cams. These parts are clearly similar and visible on the photos of the Menace '455 and '817 cams from EX2017, Appendix A and B.



EX2002, 43 (annotated).

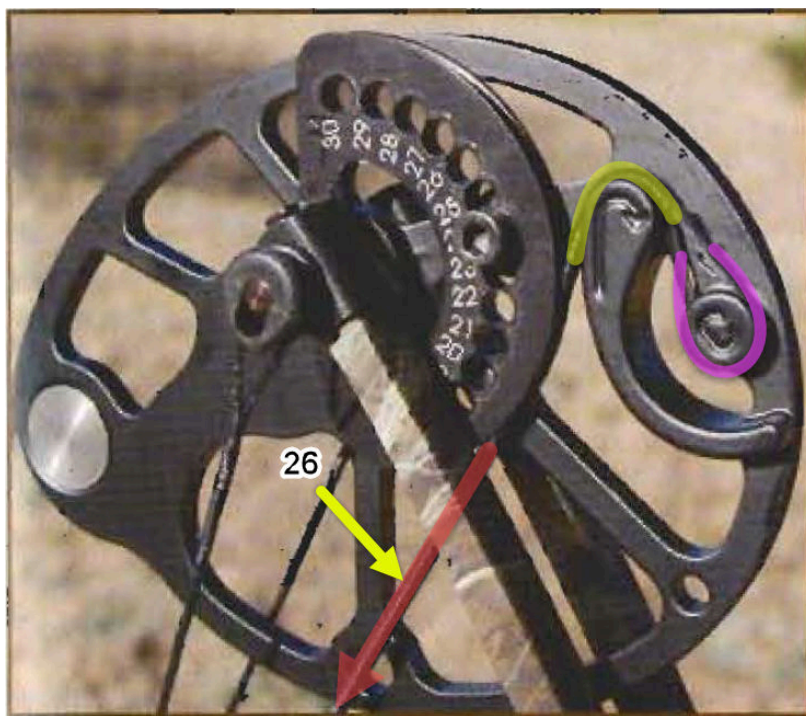
64. It is clear from the photograph of the cam (reproduced and annotated below) that the Menace bow included a drawstring track (9)², cam track (14), capstan (30), and terminal (32). A POSITA would have recognized from the photograph that the cam track (14) is offset in a separate plane from the drawstring track (9) because the drawstring track (9) is a part of the cam, and the cam track (14) is located on a component attached to a surface of the cam. These parts are clearly similar and visible on the photos of the Menace '455 and '817 cams from EX2017, Appendix A and B.



² The drawstring track is not numbered in the '989 patent, but for convenience I have labeled it as element (9) in this declaration.

EX2002, 43 (annotated).

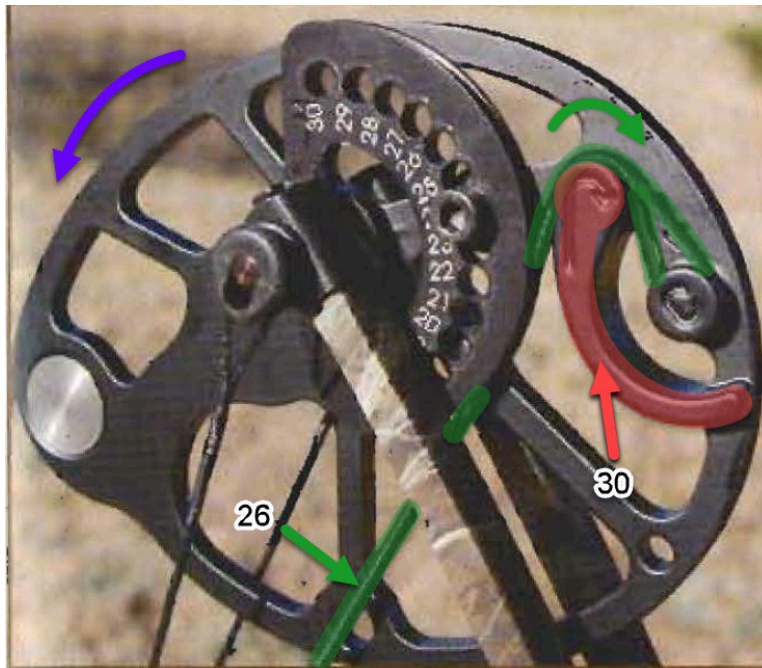
65. From the annotated photograph below, it is clear that the Mission Menace bow had a power cable (26) with a straight portion (red highlighted portion) extending between the first cam and the second cam. A portion of the Mission Menace bow's power cable wraps around the capstan (yellow highlighted portion) and a portion is looped around the terminal (purple highlighted portion). These parts are clearly similar and visible on the photos of the Menace '455 and '817 cams from EX2017, Appendix A and B.



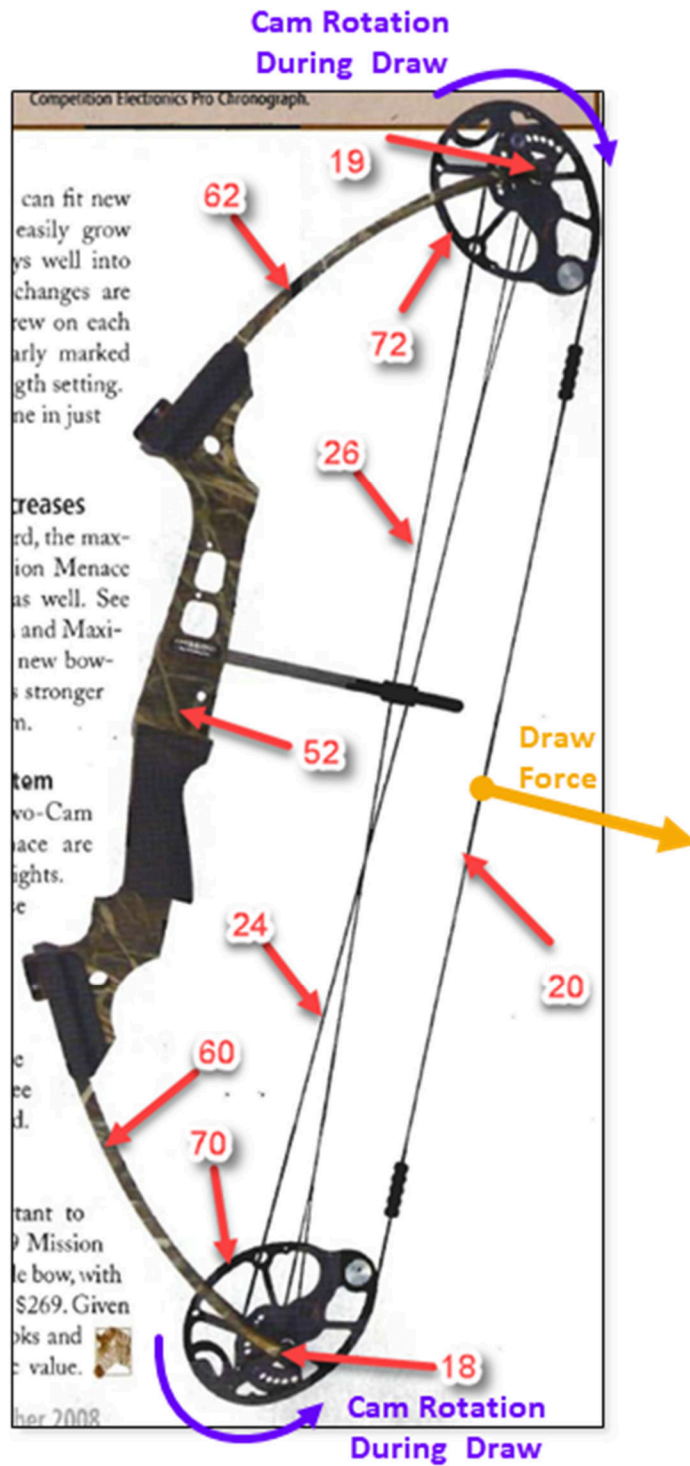
EX2002, 43 (annotated).

66. As shown below, the Mission Menace bow power cable (26) wraps from left to right in a clockwise direction around the capstan (30), as indicated by

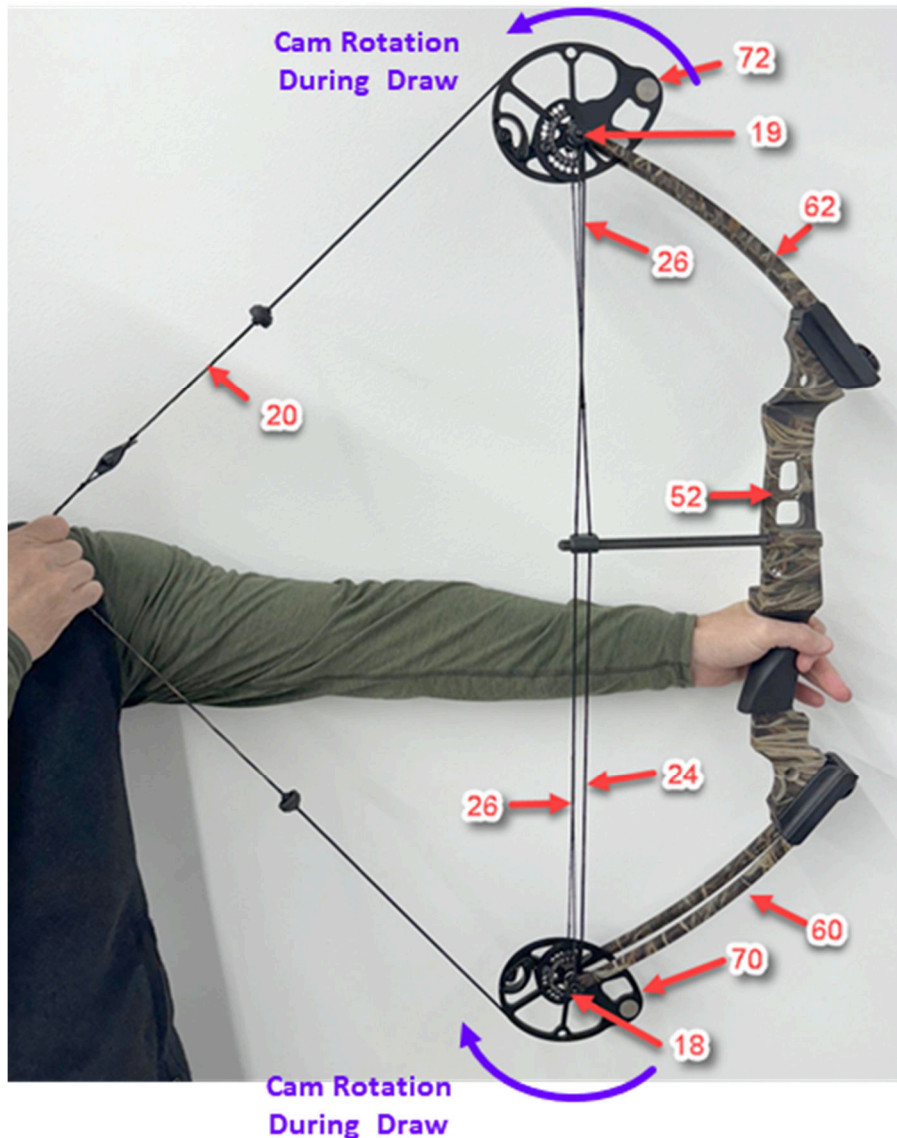
the green arrow. A POSITA would have understood that when the bow is drawn from the brace condition, that the cam would rotate in the opposite direction because the force exerted by the drawstring on the cam when the bow is drawn would be directed along the drawstring, tangential to the cam, in a counterclockwise direction for the cam orientation shown in the image below causing rotation as indicated by the purple arrow. For instance, I have annotated the full Menace bow photograph from Inside Archery to show a draw force (orange arrow) applied to the drawstring. With this force applied the POSITA would have understood that the drawstring's movement in the same direction of the force would cause the cams to rotate as shown by the purple arrows. My understanding is confirmed by the photos of the two production Menace bows in the drawn condition and the video **Menace '455 Full Bow.mp4** attached to Mr. Ozanne's declaration. .Notably, when drawn, the upper edge of the Menace bow's upper cam rotates away from the riser and limbs, and lower edge of the Menace bow's lower cam rotates away from the riser and limbs. So, while the photograph of the Menace '455 at draw is taken from the opposite side as the full-bow photograph in the Bow Report article, one can clearly see that the cam rotation direction is the same relative to the static components of the bow itself. Lastly, the direction of cam rotation can also be confirmed by comparing the full-bow and cam photograph in the Bow Report article to the FIGS. 1-3 of the McPherson patents.



EX2002, 43 (annotated).



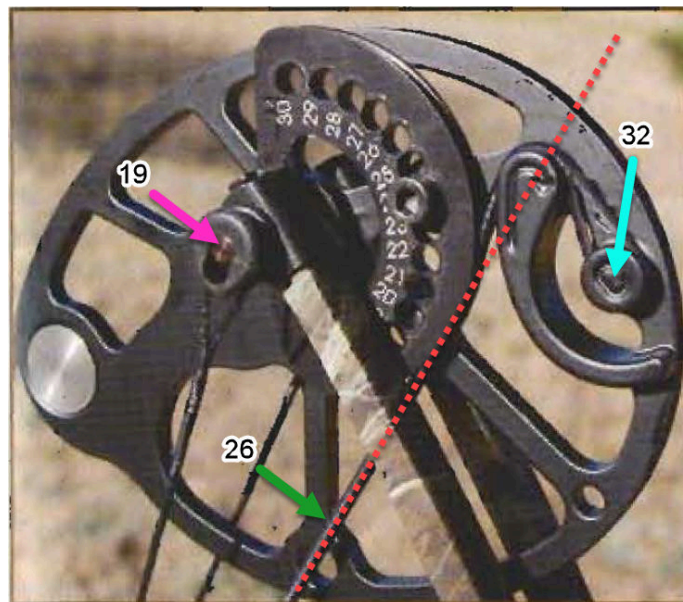
EX2002, 43 (annotated)



EX2017, Appendix A, Photo 8 (annotated)

67. The photograph of the cam of the Mission Menace bow below shows the cam in the brace condition. The photograph has been annotated with a dashed red line aligned with the straight elongate portion of the power cable (26). A POSITA would have understood that the dashed red line along the elongate straight portion of the power cable defines a plane parallel to the viewing axis (*e.g.*,

extending into and out of the page). The axle (19) and the terminal (32) are on opposite sides of the dashed line and thus are on opposite sides of a plane defined by the straight portion of the power cable (26). A POSITA would have understood that the plane would be perpendicular to the cam (e.g., extending into/out of the photograph) because the plane is used to define locations of features on the cam. These parts are clearly similar and visible on the photos of the Menace '455 and '817 cams from EX2017, Appendix A and B.



EX2002, 43 (annotated).

68. A POSITA would have understood that when the bow is drawn, the cam would rotate, but the relative position of the capstan and the terminal with respect to the cam would remain the same because the capstan and the terminal are affixed to the cam and thus undergo the same solid body rotation as the cam. As noted above, the Mission Menace cams were substantively the same as the cams

depicted in FIGS 1-3 of the '989 Patent. While the Menace article does not show the cam of the Menace bow in a drawn configuration, a POSITA would have understood that when the bow is in the drawn condition the power cable rests in the flat portion of the cam module. FIG. 2 from the '989 Patent confirms this. It depicts a cam with substantively the same geometry in the drawn position ('989 Patent, col. 5:8). The bow is in the drawn condition with the power cable resting in the flat portion of the cam module is shown in orange in FIG. 2 of the '989 Patent. The flat portion of the cam module will dramatically increase the draw weight required to rotate the cam further.

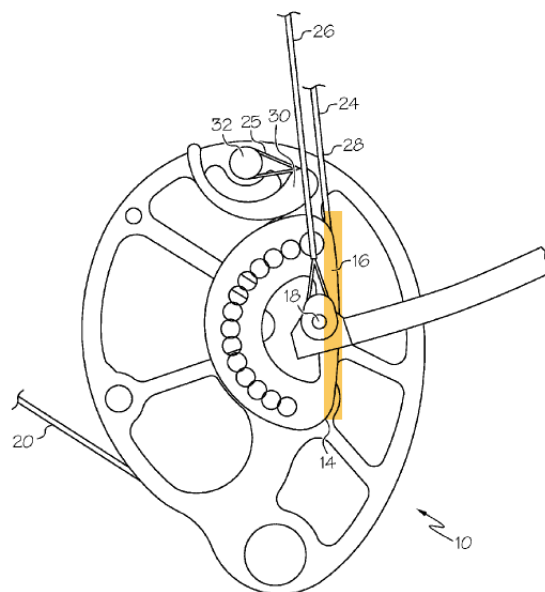


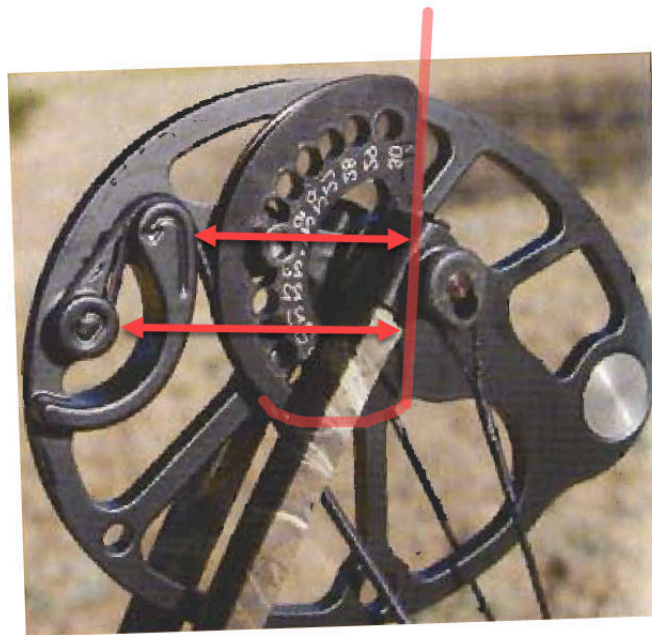
FIG. 2

'989 Patent, FIG. 2 (annotated).

69. A rotated version of the cam photograph from the Menace article is shown below. When in the drawn condition, the power cable of the Menace bow

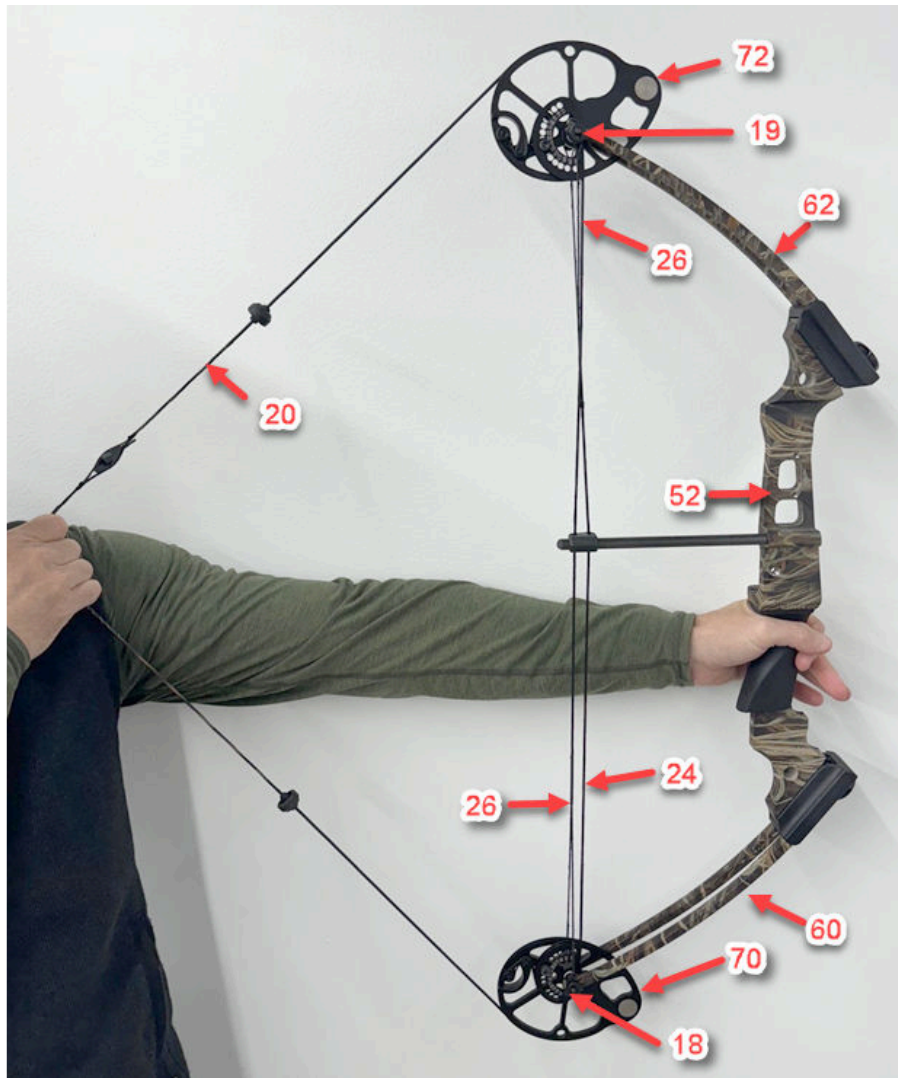
would rest in the flat portion of the cam module, as shown in annotated red lines.

As shown below, the terminal in the photograph is farther from the flat portion of the cam module and consequently farther from the straight portion of the power cable in the drawn condition than the capstan, similar to that depicted in FIG. 2 of the '989 Patent.



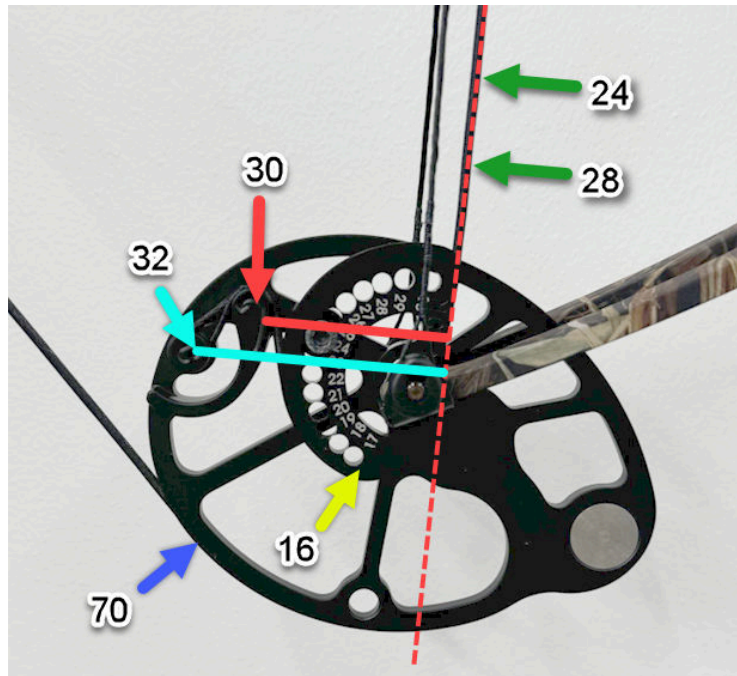
EX2002, 43 (annotated).

70. A photograph of the Menace '455 bow is shown below in the drawn condition. The rotation of the cam from the brace condition to the drawn condition is shown in the video **Menace 455 Lower Cam.mp4**. EX2017.



EX2017, Appendix A, Photo 8 (annotated)

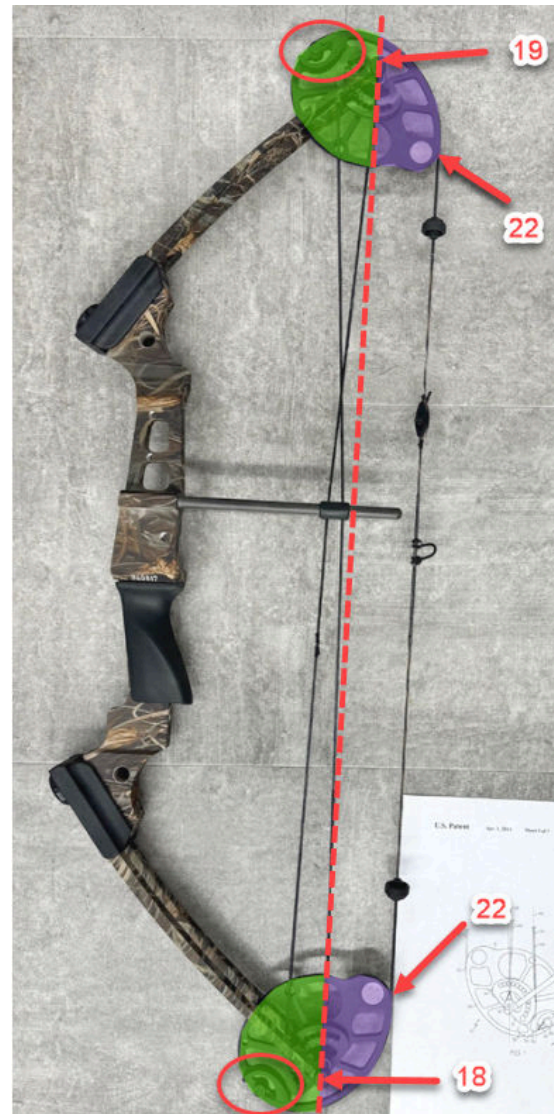
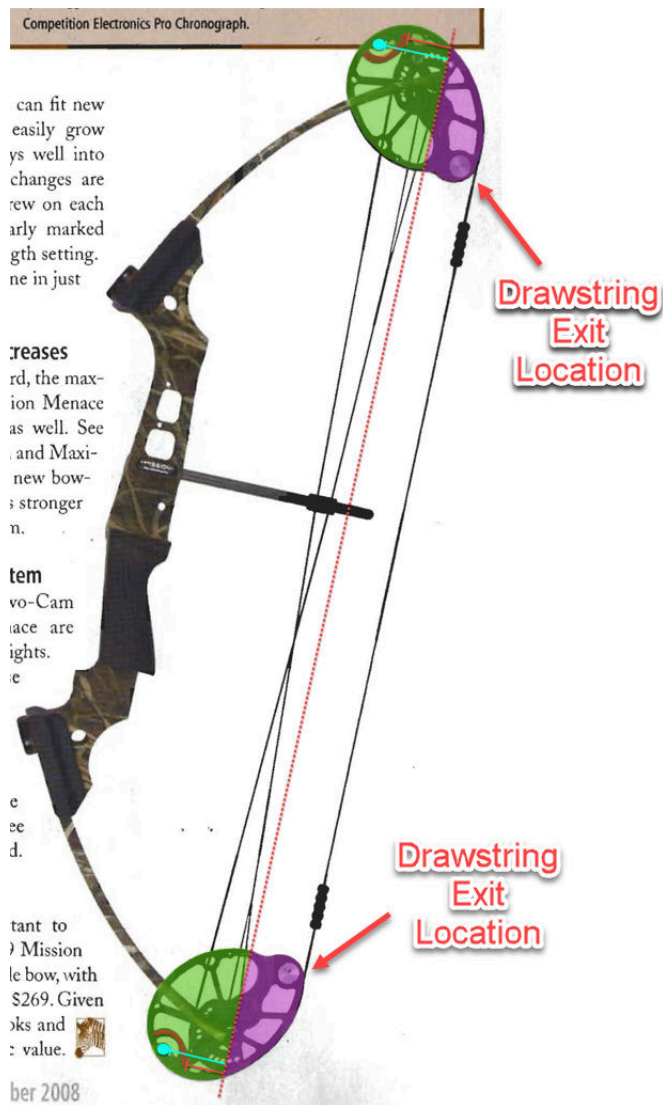
71. A close up photograph of the lower cam (70) of the Menace '455 bow is shown below in the drawn condition. When in the drawn condition, the power cable (24) of the Menace bow rests in the flat portion of the cam module (16). The terminal (32) in the photograph is farther from the flat portion of the cam module (16) and the straight portion (28) of the power cable in the drawn condition than the capstan (30), similar to that depicted in FIG. 2 of the '989 Patent.



EX2017, Appendix A, Photo 10 (annotated).

72. A POSITA would have understood that the two axles on a compound bow are parallel to each other and therefore define a plane.

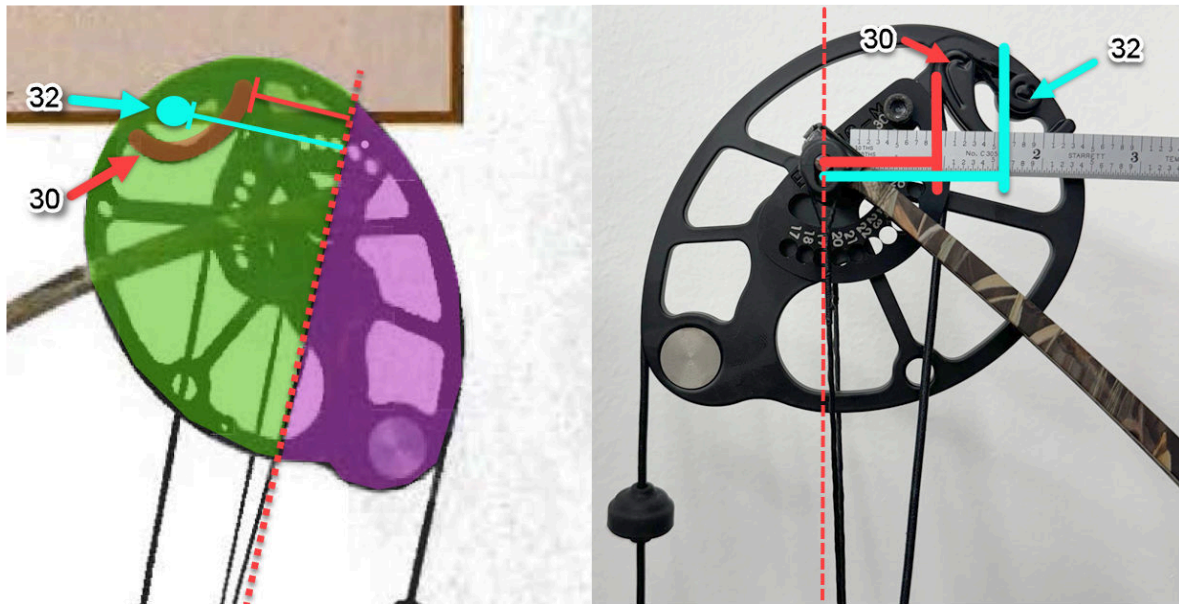
73. The full bow photograph from the Menace Article and of the Menace '817 are annotated below to show an edge view of the axle plane (the red dashed line represents an edge view of the plane) defined by the two axles (18, 19) and the drawstring exit (22) location on each cam. As illustrated, the axle plane of the Mission Menace bow divides each cam into a first part (green) and a second part (purple). It is clear that the capstan and terminal (circled) are located in the green first part, and the drawstring exit (22) is located on the purple second part.



EX2002, 43 (annotated); EX2017, Appendix B, Photo 2 (annotated).

74. The images below show the upper cam of bow in the Menace article and of the Menace '817 to view the detail of the upper cam. The relative distances between the axle plane (dashed red line) of the Mission Menace bow and the terminal (blue) and the capstan (red) have been annotated on the photograph. It is clear that the distance between the terminal (32) and the axle plane is greater than

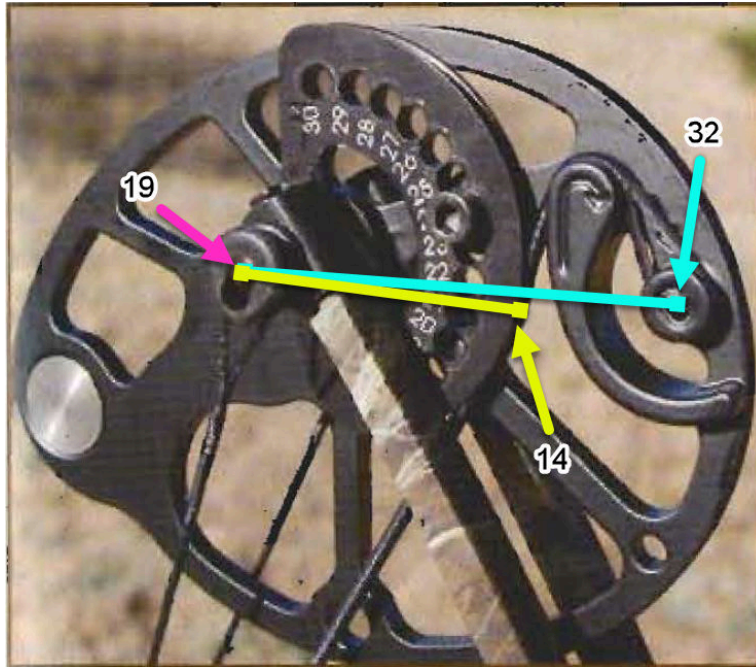
the distance between the capstan (30) and the axle plane on the Mission Menace bow.



EX2002, 43 (annotated); EX2017, Appendix B, Photo 4 (annotated).

75. While the distances are shown approximately orthogonal to the axle plane in the image above, it is my opinion that a POSITA would have understood that the distance between the axle plane and the capstan (30) would be shorter than the distance between the axle plane and the terminal (32) if taken from other locations along the axle plane, such as from the axle.

76. It is clear from the cam photograph below that on the Mission Menace bow, the distance (blue) between the terminal (32) and the axle (19) is greater than the distance (yellow) between the cam track (14) and the axle (19). These parts are clearly similar and visible on the photos of the Menace '455 and '817 cams from EX2017, Appendix A and B.



EX2002, 43 (annotated).

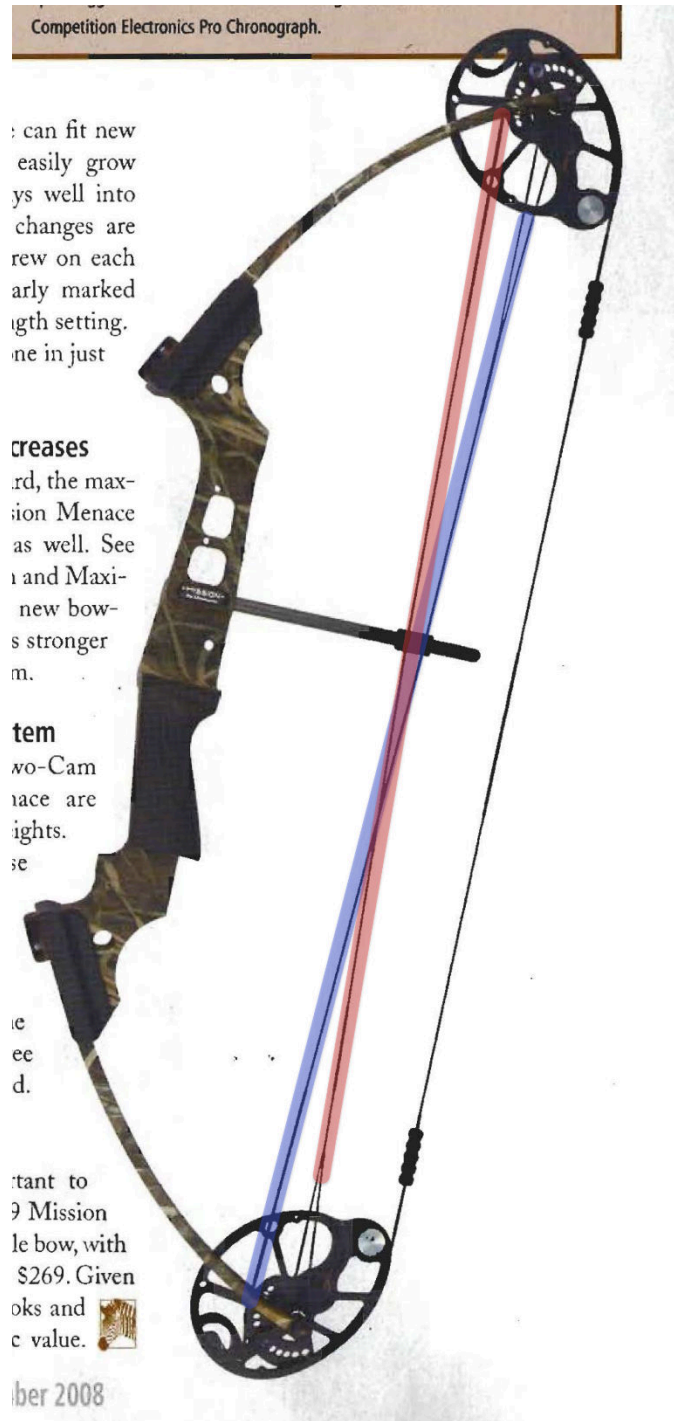
77. In the Menace article, Mr. Krenz stated, “Draw-length changes are a snap. Remove one locking screw on each cam and simply pivot the clearly marked modules to the desired draw-length setting.” EX2002, 43. Based on this, it is clear that the Mission Menace bow included an adjustable/rotatable cam module for changing draw-length. The cam photograph below highlights this adjustable/rotatable module. Additionally, it is my opinion that a POSITA would have understood that the cam module is adjustable/rotatable because the markings and associated holes in the cam module indicate that the module is adjustable. These parts are clearly similar and visible on the photos of the Menace '455 and '817 cams from EX2017, Appendix A and B.



The 2CPW Two-Cam System on the Mission Menace features easy-adjust pivoting draw-length modules. Note the beefy module-locking screw. That screw won't strip out no matter how many times this bow is adjusted.

EX2002, 43 (annotated).

78. It is clear from the full bow photograph and the Menace article that the Mission Menace bow includes two operating cams. EX2002, 43 (“The 2CPW Two-Cam System on the Mission Menace features easy-adjust pivoting draw-length modules.”). The full bow photograph from the Menace article is annotated below to highlight the two power cables in red and blue. These parts are clearly similar and visible on the photos of the Menace ’455 and ’817 cams from EX2017, Appendix A and B.

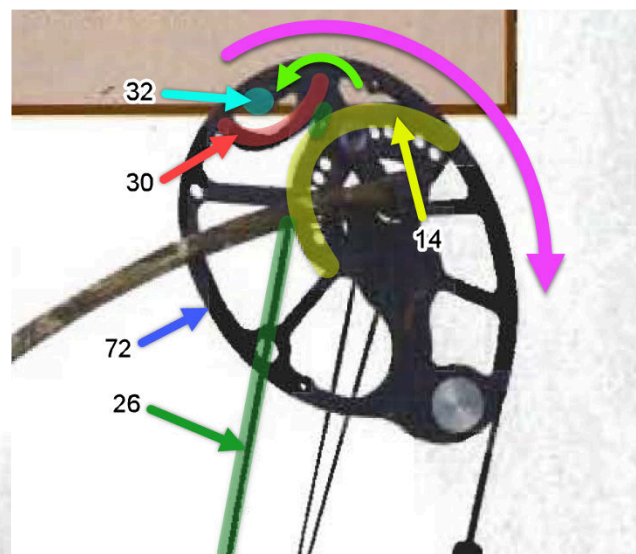
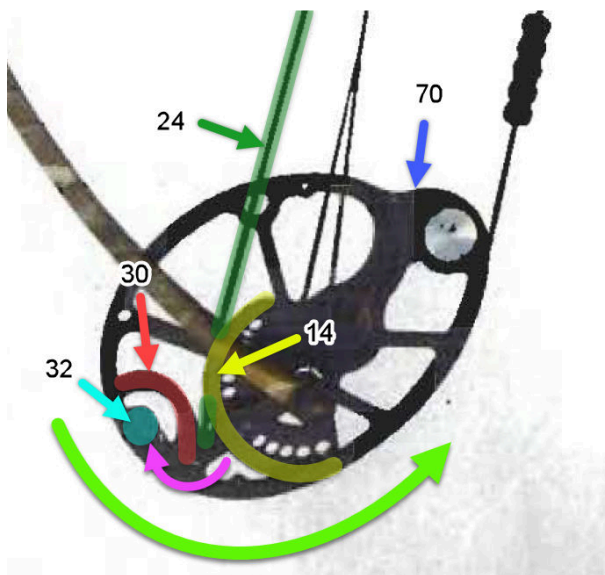


EX2002, 43 (annotated).

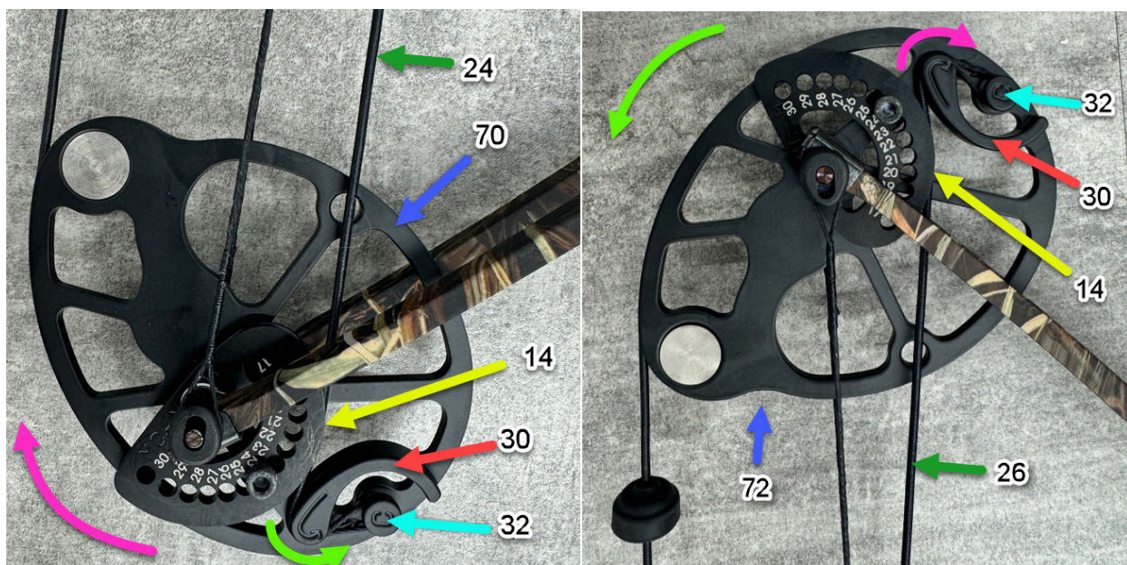
79. The below images show the upper and lower cams cropped from the full bow photograph from the Menace article. The two cams are shown side-by-

side and have been enlarged and annotated to show the components of each cam. As noted above, the full bow photograph shows the opposite side of the cam as compared with the cam photograph; however, a POSITA would have easily identified the structures from the side shown in the full bow photograph.

80. It is clear from the below photographs that both cams (70, 72) of the Menace '455 bow have a cam track (14), a capstan (30), and a terminal (32). On both cams (70, 72) a respective power cable (24, 26) was attached to the terminal (32) and each power cable (24, 26) had an elongate straight portion that extends towards the opposite limb. Based on the cam photograph and the full bow photograph, a POSITA would have understood that a portion of each power cable (24, 26) wrapped around the capstan (30) and a portion looped around the terminal (32). The green arrows indicate a first rotational direction, and the pink arrows indicate a second rotational direction opposite the first rotational direction.



EX2002, 43 (annotated)



EX2017, Appendix A, Photos 4, 5 (annotated).

81. It is clear based on the above photographs that, on the Mission Menace bow, the power cables on each cam wrap around the respective capstan in an opposite direction to the rotational direction of the cam when the bow is drawn. The lower cam (shown on the left) rotates, when drawn, in a first rotational direction (green) which is counter-clockwise in this view, and its power cable wraps in a second rotational direction (pink), which is clockwise in this view. The upper cam (shown on the right) rotates, when drawn, in the second rotational direction (pink, clockwise in this view) and its power cable wraps in the first rotational direction (green, counter-clockwise in this view).

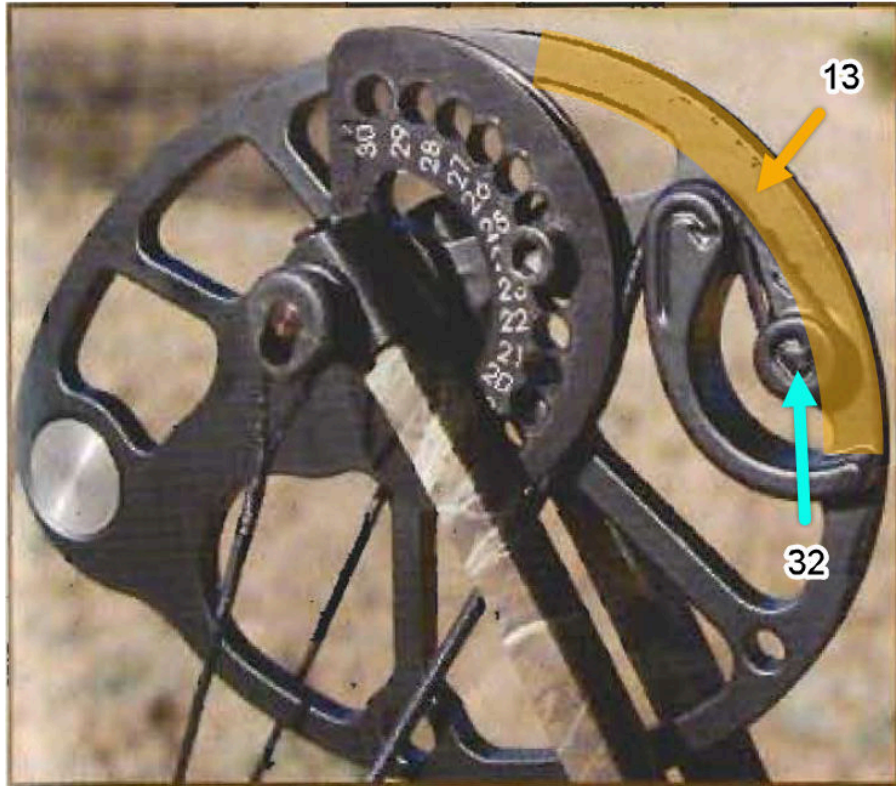
82. The cams of the Mission Menace are mirror images of each other. To illustrate the mirrored cams, the image below depicts overlaid images of the cams

cropped from the full bow photograph. The image of the bottom cam has been given a blue hue to differentiate it from the overlaid top cam, and the image of the top cam has been given transparency to allow the image of the bottom cam to be seen. The image of the top cam has also been flipped vertically (i.e., mirrored across a horizontal axis) and rotated to align with the image of the bottom cam. It is clear from this image that the cams of the Menace bow are mirror images of each other. Further, as noted in Mr. McPherson's declaration, the cams are configured as mirror images to accommodate the power cables being attached to the cams on the same side of the bow. EX2006, 13. The mirrored cams are visible in the photos of the Menace '455 and '817 cams from EX2017, Appendix A and B.



EX2002, 43 annotated

83. It is clear from the annotated photograph below that the terminal (32) of the Mission Menace bow is located on an outer peripheral structure (13) of the cam. These parts are clearly similar and visible on the photos of the Menace '455 and '817 cams from EX2017, Appendix A and B.



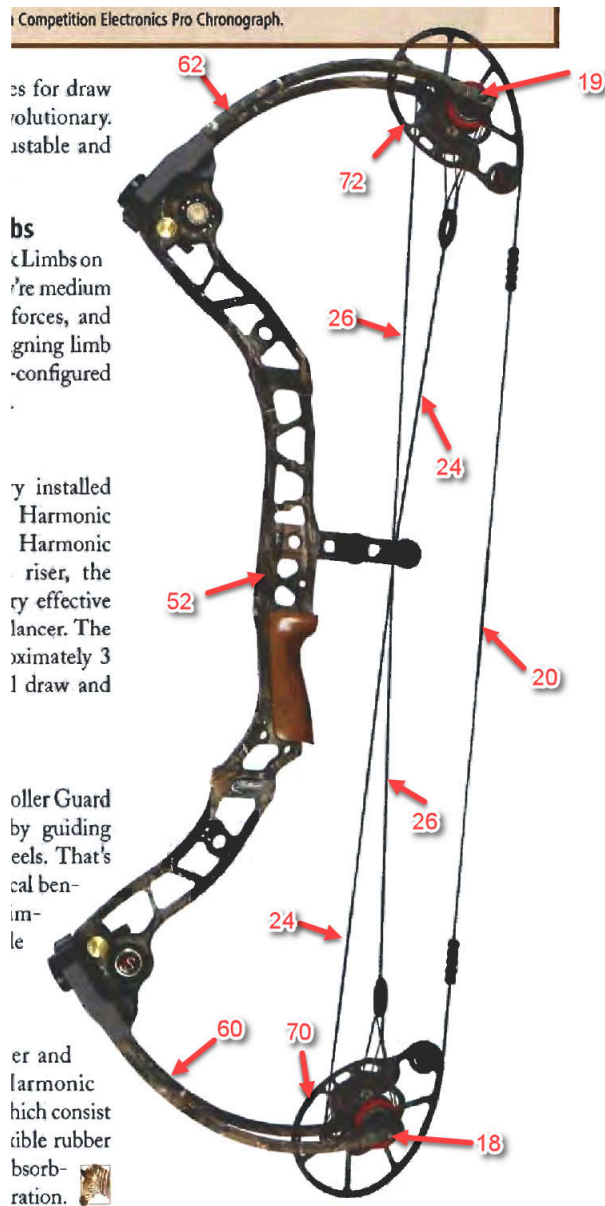
EX2002, 43 (annotated).

E. The Monster bow embodies all the limitations of claims 1-4, and 7-19 of the '989 patent.

84. It is my opinion that the Monster article demonstrates that the Mathews McPherson Series Monster bow embodied all of the limitations of at least claims 1- 4, and 7-19 of the '989 Patent.

85. The Monster article included photographs of the full Monster bow (shown in a brace condition) and a close-up photograph of one of the cams of the Monster bow. I have reproduced and annotated these photographs below to highlight features of the Monster bow.

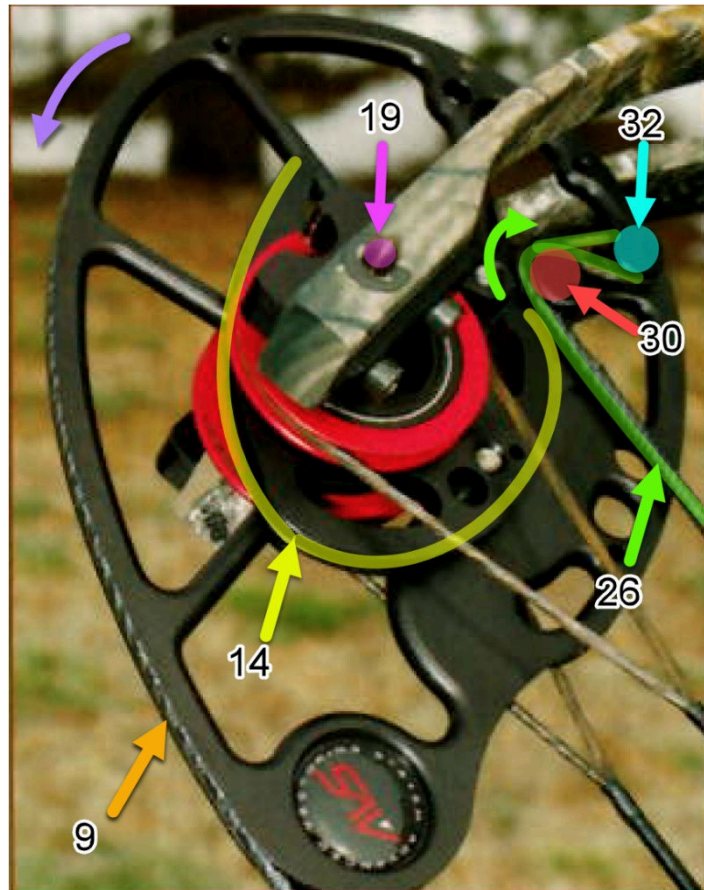
86. It is clear from the photograph of the full Monster bow that the Monster bow includes a riser (52) supporting both a first (60) and a second limb (62). EX2003, 31. Each limb of the Monster bow supports a rotating cam (70, 72) on an axle (18, 19), with a drawstring (20) extending between the two cams. These parts are clearly similar and visible on the photos of the Monster '775 from EX2017, Appendix C.



EX2003, 31 (annotated).

87. It is clear from the photograph of the cam of the Monster bow that the Monster bow includes a drawstring track (9), a cam track (14), a capstan (30), and a terminal (32). It is also clear from the photograph, and a POSITA would have understood, that the cam track is offset in a separate plane from the drawstring

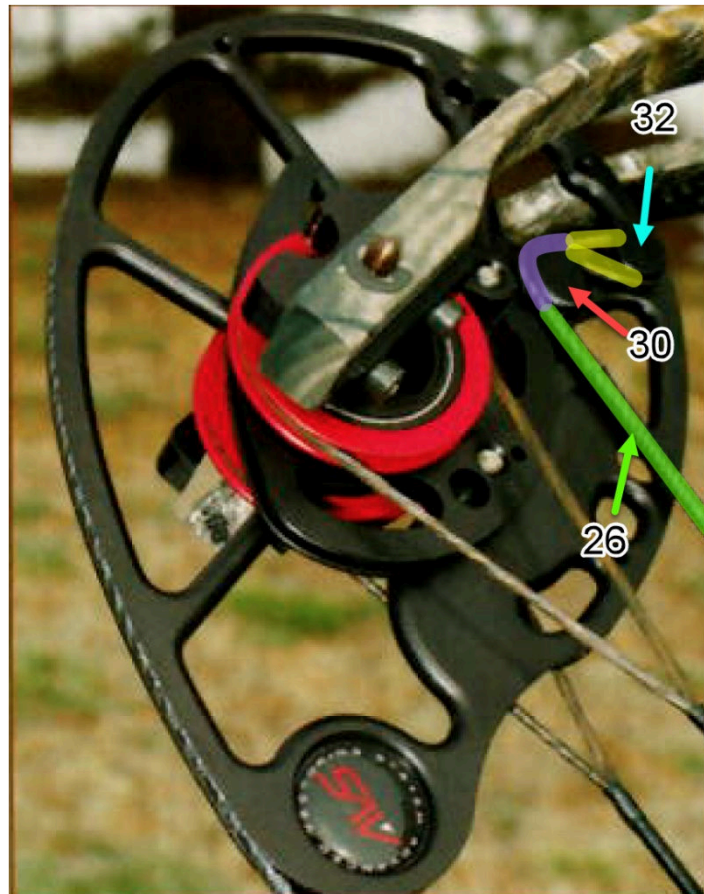
track because the cam track (14) is part of a module affixed to a face of the cam and the drawstring track (9) is in line with the cam. These parts are clearly similar and visible on the photos of the Monster '775 from EX2017, Appendix C.



EX2003, 30 (annotated).

88. It is clear from the annotated cam photograph below that the Monster bow had a power cable (26) with a straight portion (green) extending from one cam towards the other cam. It is clear that the power cable (26) also has a portion (purple) wrapped around the capstan (30) and a portion (yellow) that loops around

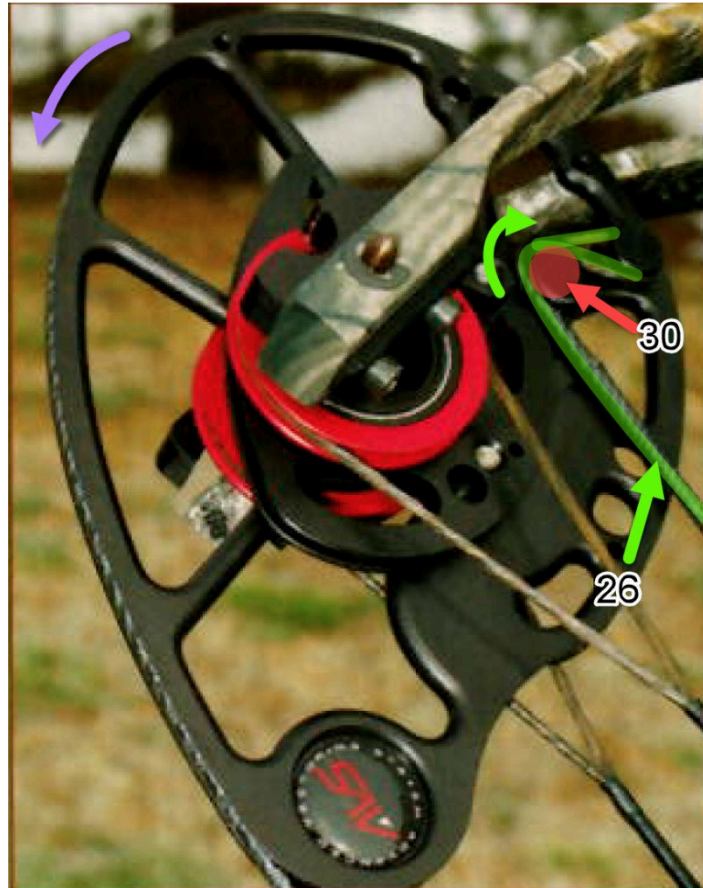
the terminal (32). These parts are clearly similar and visible on the photos of the Monster '775 from EX2017, Appendix C.



EX2003, 30 (annotated).

89. The Monster bow power cable (26) wraps from left to right in a clockwise direction around the capstan (30), as indicated by the green arrow in the image below. A POSITA would have understood that the cam would rotate in the opposite direction when the bow is drawn from the brace condition because the force exerted by the drawstring on the cam when the bow is drawn would be directed along the drawstring, tangential to the cam, in a counterclockwise

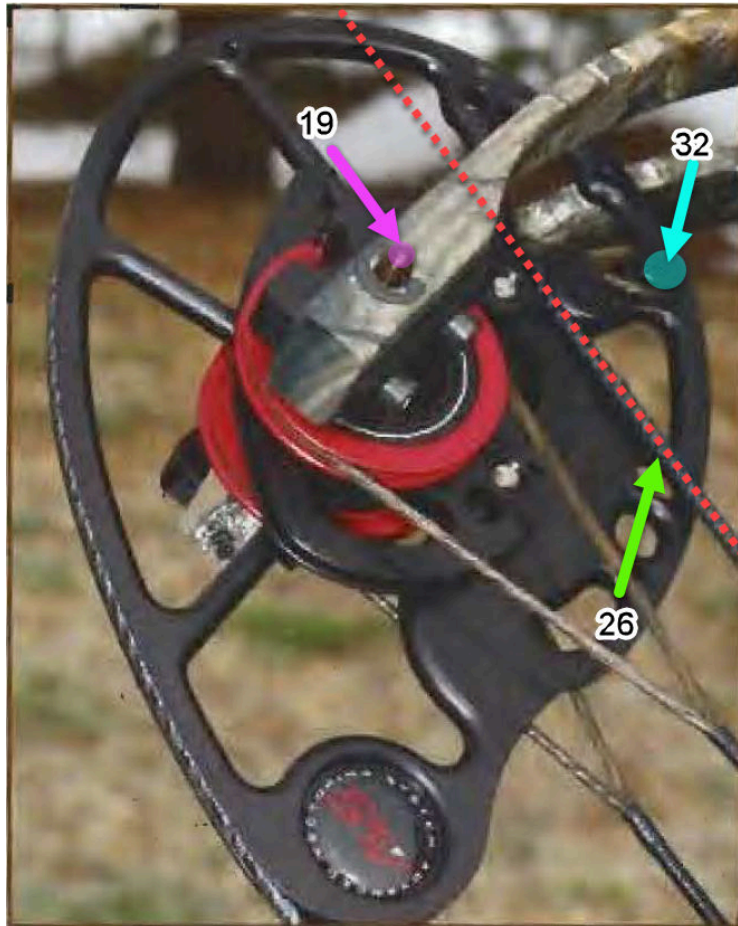
direction for the cam orientation shown in the image below causing rotation as indicated by the purple arrow. These parts are clearly similar and visible on the photos of the Monster '775 from EX2017, Appendix C.



EX2003, 30 (annotated).

90. A POSITA would have understood that the dashed line in the image below represented the edge of a plane defined by the elongate straight portion of the power cable and parallel to the axle direction. That plane extends perpendicularly from the face and is used in the patent description to identify the relative locations of key features on the cam. It is clear that the axle (19) and the

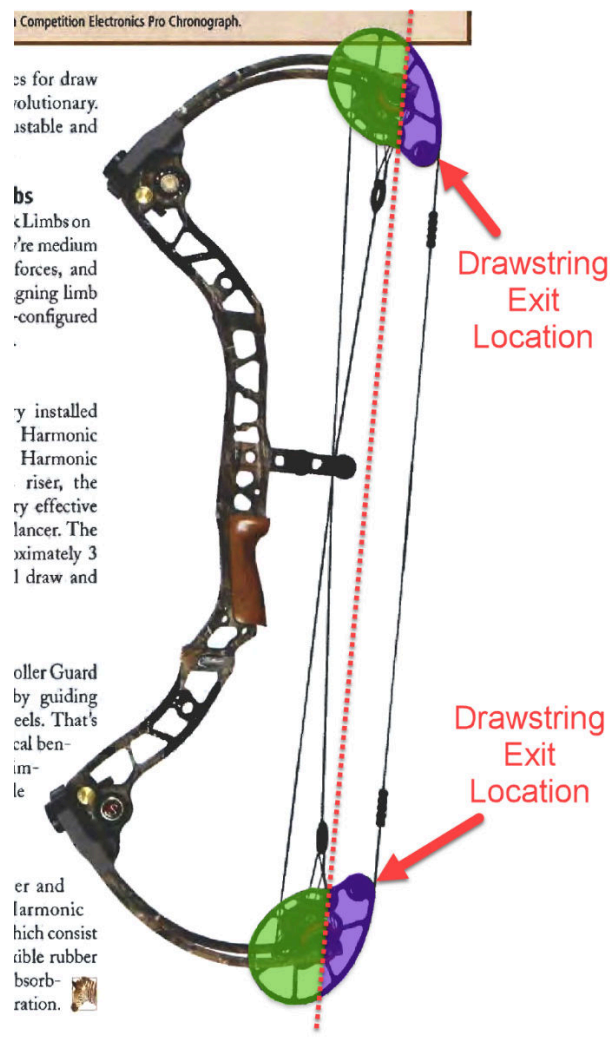
terminal (32) are on opposite sides of the plane defined by the straight portion of the power cable (26). These parts are clearly similar and visible on the photos of the Monster '775 from EX2017, Appendix C.



EX2003, 30 (annotated).

91. The full bow photograph from the Monster article and of the Monster '775 are annotated below to show an edge view of the axle plane (dashed red line) defined by the two axles (18, 19) and to indicate the drawstring exit location (22) on each cam. As noted above, a POSITA would understand that a compound bow would have a plane defined between the two axles of the bow and

that the plane is parallel to the axis of rotation of the axles. A POSITA would also have understood that the axle plane would divide the cam into a first part and a second part. It is clear that the axle plane of the Monster bow divides each cam into a first part (green) and a second part (purple). The capstan and terminal (circled) are located on the green first part and the drawstring exit 22 is located on the purple second part.

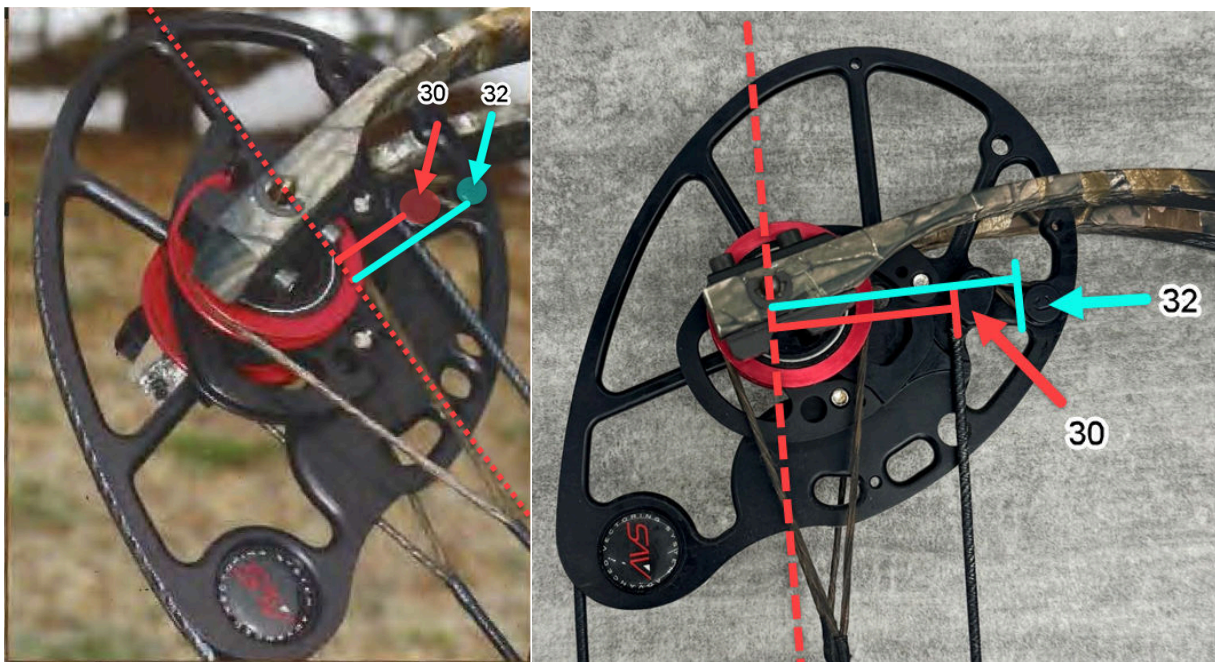


EX2003, 31 (annotated)



EX2017, Appendix C, Photo 2 (annotated).

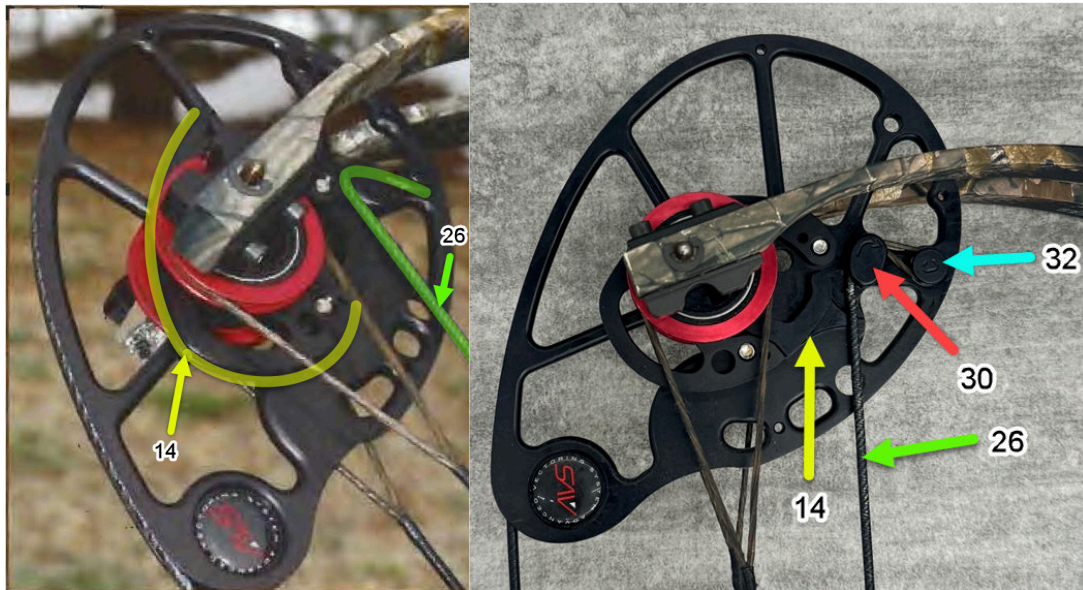
92. The cam photograph from the Monster article and the Monster '775 are annotated below illustrating the relative distances between the axle plane (dashed red line) of the Monster bow and the terminal (32, blue) and the capstan (30, red). It is clear from this photograph that on the Monster bow, the distance (blue) between the terminal (32) and the axle plane is greater than the distance (red) between the capstan (30) and the axle plane.



EX2003, 30 (annotated); EX2017, Appendix C, Photo 3 (annotated).

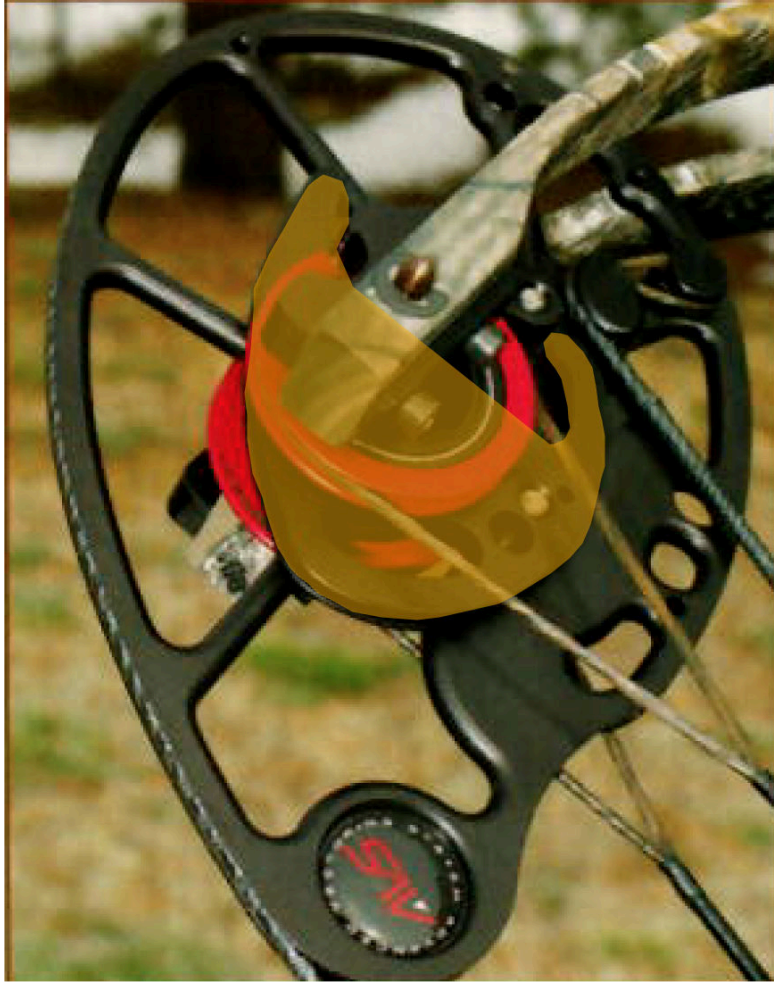
93. It is clear from the cam photographs below that the power cable (26) of the Monster bow does not rest in the cam track (14) while in the brace condition. A POSITA would have understood that because the elongate straight portion of the power cable (26) is fully visible and does not deflect or bend after being looped around the capstan (30) when traversing the power cable (26) from the terminal

(32) toward the opposite limb of the bow. This shows that the power cable (26) does not rest in the cam track (14) in the brace position.



EX2003, 30 (annotated); EX2017, Appendix C, Photo 3 (annotated).

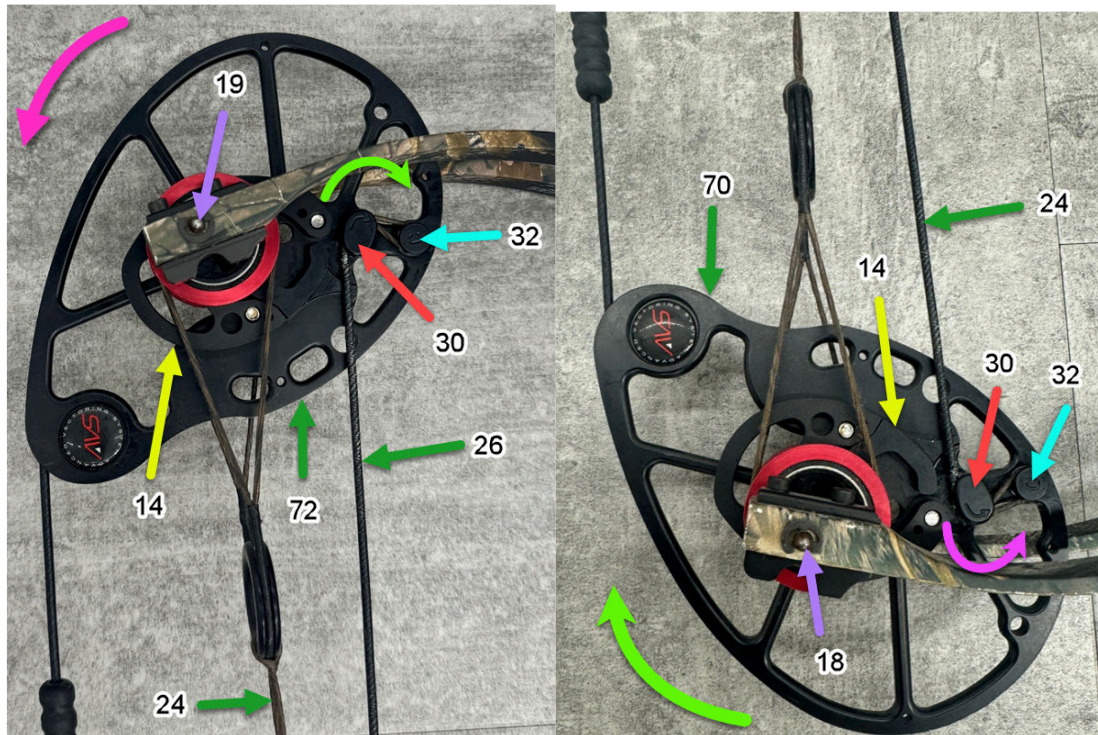
94. Mr. Krenz's review article of the Monster bow stated "[The Monster] utilizes interchangeable modules for draw length adjustment." EX2003, 31. The cam photograph below highlights the interchangeable cam module. These parts are clearly similar and visible on the photos of the Monster '775 from EX2017, Appendix C.



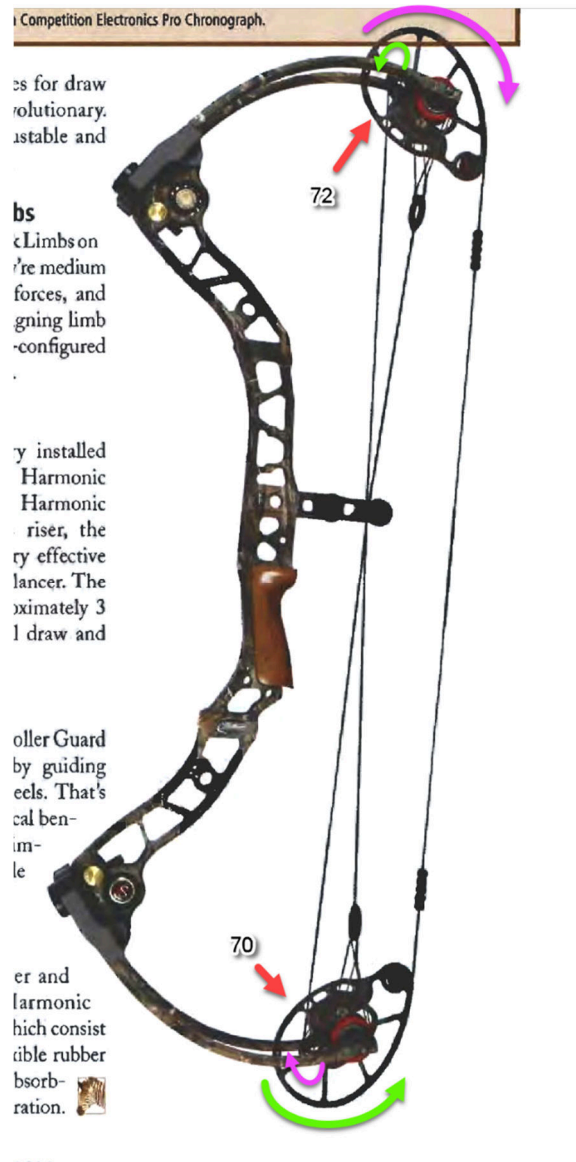
EX200, 30 (annotated).

95. It is clear from the below photographs that both cams (70, 72) of the Monster '775 bow have a cam track (14), a capstan (30), and a terminal (32). On both cams (70, 72) a respective power cable (24, 26) was attached to the terminal (32) and each power cable (24, 26) had an elongate straight portion that extends towards the opposite limb. Based on the cam photograph and the full bow photograph, a POSITA would have understood that a portion of each power cable (24, 26) wrapped around the capstan (30) and a portion looped around the terminal

(32). The bright green arrows indicate a first rotational direction, and the pink arrows indicate a second rotational direction opposite the first rotational direction. Similar features can be seen in the full bow photograph from the Monster Article.



EX 2017, Appendix C, Photos 3 and 4 (annotated)



EX2003, 31 (annotated)

96. The cams of the Monster are mirror images of each other. To illustrate the mirrored cams, the image below depicts overlaid images of the cams cropped from the full bow photograph from the Monster article. The image of the bottom cam has been given a blue hue to differentiate it from the overlaid top cam, and the image of the top cam has been given transparency to allow the image of the

bottom cam to be seen. The image of the top cam has also been flipped vertically (i.e., mirrored across a horizontal axis) and rotated to align with the image of the bottom cam. It is clear from this image that the cams of the Monster bow are mirror images of each other. Further, as noted in Mr. McPherson's declaration, the cams are configured as mirror images to accommodate the power cables being attached to the cams on the same side of the bow. EX2006, 13. These parts are clearly similar and visible on the photos of the Monster '775 cams from EX2017, Appendix C.



EX2003, 31 (annotated)

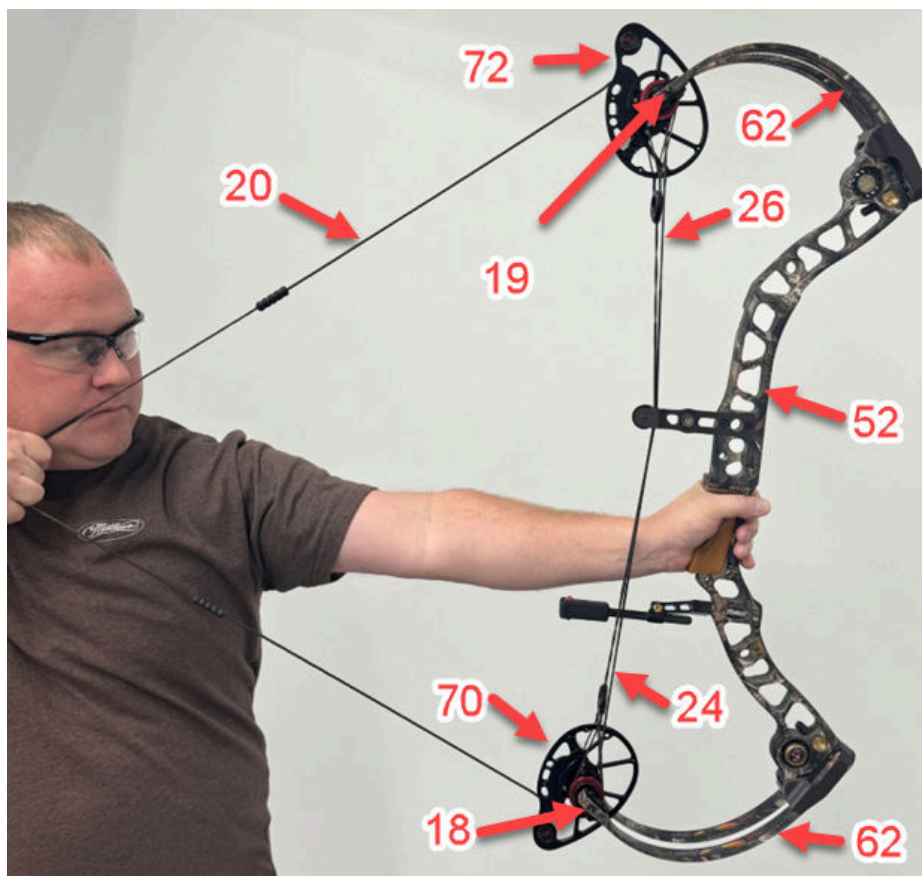
97. It is clear from the annotated photograph below, that the terminal (32) of the Monster bow is located on an outer peripheral structure (13) of the cam.

These parts are clearly similar and visible on the photos of the Monster '775 cams from EX2017, Appendix C.



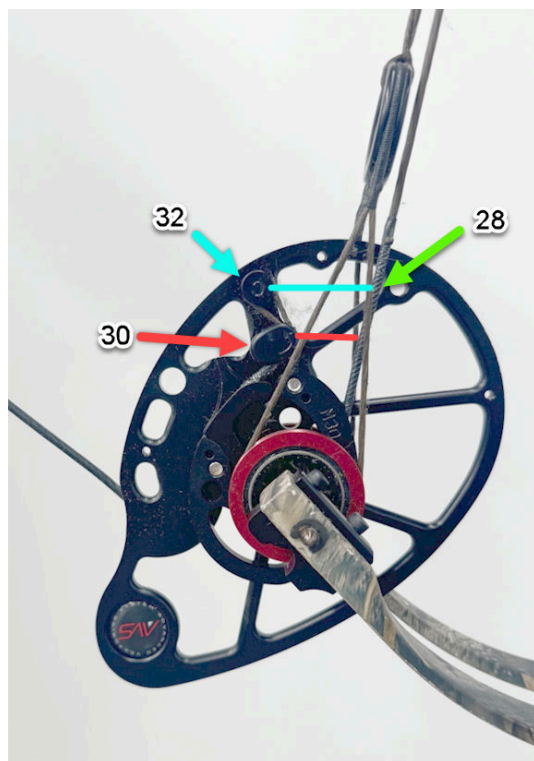
EX2003, 30 (annotated); EX2017, Appendix C, Photo 3 (annotated)

98. A photograph of the Monster '775 bow is shown below in the drawn condition. The rotation of the cam from the brace condition to the drawn condition is shown in the video **Monster Bow.mp4**. EX2017.



EX2017, Appendix C, Photo 6 (annotated)

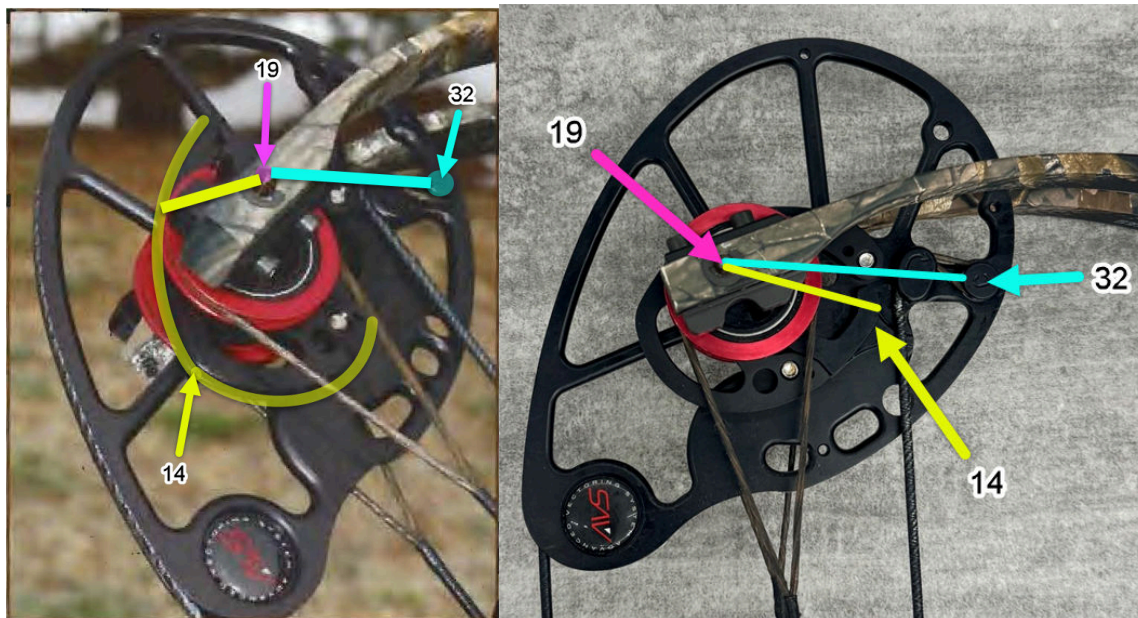
99. A close up photograph of the lower cam (70) of the Monster '775 bow is shown below in the drawn condition. When in the drawn condition, the terminal (32) in the photograph is farther from the straight portion (28) of the power cable in the drawn condition than the capstan (30), similar to that depicted in FIG. 5 of the '989 Patent. The distance is farther whether measured in a horizontal line or orthogonal to the power cable.



EX2017, Appendix C, Photo 7 (annotated)

100. It is clear from the cam photographs below that on the Monster bow, the distance (blue) between the terminal (32) and the axle (19) is greater than the

distance (yellow) between the cam track (14) and the axle (19).



EX2003, 30 (annotated); EX2017, Appendix C, Photo 3 (annotated)

F. The Menace and Monster bows embodied the claims of the '017 Patent

101. It is my opinion that the Menace article demonstrates that the Mission Menace bow embodied all of the limitations of claims 1-3, 5-6, 10-16, and 18-20 of the '017 patent. *See* Sec VI.D.

102. It is my opinion that the Monster article demonstrates that the Mathews McPherson Series Monster bow embodied all of the limitations of, at least, claims 1- 6 and 9-20 of the '017 patent. *See* Sec VI.E.

'017 Patent Independent Claims with Reference Numbers in Annotated Photographs

Claim 1: An archery bow having a brace condition and a drawn condition, the archery bow comprising:

a riser (52);
a first limb (60) and second limb (62) supported by the riser;
a first rotatable member (70) supported by the first limb (60) on a first axis (18), a second rotatable member (72) supported by the second limb (62) on a second axis (19), the first rotatable member (70) comprising a cam track (14), a capstan (30) and a terminal (32);
a drawstring (20) extending between the first rotatable member (70) and the second rotatable member (72);
a power cable (24) attached to said terminal (32) and extending toward the second limb (72), said power cable (24) comprising an elongate straight portion located near said first rotatable member (70), a capstan portion in contact with said capstan (30) and a terminal portion in contact with said terminal (32);
wherein, in the brace condition, the power cable (24) wraps around the capstan (30) in a counter-clockwise direction as the power cable (24) is traversed from the elongate straight portion to the terminal portion; and when the bow is drawn from the brace condition, the first rotatable member (70) rotates in a clockwise direction.

Claim 12: An archery bow having a brace condition and a drawn condition, the bow comprising:

a riser (52);
a first limb (60) and a second limb (62) supported by the riser (52);
a first rotatable member (70) supported by the first limb (60) on a first axle (18), a second rotatable member (72) supported by the second limb (62) on a second axle (19), the first axle (18) and the second axle (19) defining an axle plane, the first rotatable member (70) comprising a cam track (14), a capstan (30) and a terminal (32);
a drawstring (20) extending between the first rotatable member (70) and the second rotatable member (18), the drawstring (20) extending from the first rotatable member (70) at an exit location;
a power cable (24) attached to said terminal (32) and extending toward the second limb (62), said power cable (24) comprising a capstan portion in contact with said capstan (30) and a terminal portion in contact with said terminal (32);
wherein, in the brace condition, the axle plane divides the first rotatable member (70) to a first part and a second part, the capstan (30) and the terminal

(32) located in the first part, the drawstring exit location located in the second part, and a distance between the terminal (32) and the axle plane is greater than a distance between the capstan (30) and the axle.

G. The Menace and Monster bows embodied the claims of the '831 Patent

103. It is my opinion that the Menace article demonstrates that the Mission Menace bow embodied all of the limitations of claims 1-2, 4-5, 9-15, and 17-19 of the '831 patent. *See* Sec VI.D.

104. It is my opinion that the Monster article demonstrates that the Mathews McPherson Series Monster bow embodied all of the limitations of, at least, claims 1- 5, and 8-19, of the '831 patent. *See* Sec VI.E.

'017 Patent Independent Claims with Reference Numbers in Annotated Photographs

Claim 1: An archery bow having a brace condition and a drawn condition, the archery bow comprising:

a riser (52);

a first limb (60) and second limb (62) supported by the riser;

a first rotatable member (70) supported by the first limb (60) on a first axle (18), a second rotatable member (72) supported by the second limb (62) on a second axle (19), the first rotatable member (70) comprising a cam track (14), a capstan (30) and a terminal (32);

a drawstring (20) extending between the first rotatable member (70) and the second rotatable member (72);

a power cable (24) attached to said terminal (32) and extending toward the second limb (72);

wherein the capstan (30) is located between the cam track (14) and the terminal (32), and in the brace condition, the power cable (24) wraps around the

capstan (30) in a first rotational direction as the power cable (24) is traversed toward the terminal (32); and when the bow is drawn from the brace condition, the first rotatable member (70) rotates in a second rotational direction that is opposite the first rotational direction.

Claim 12: An archery bow having a brace condition and a drawn condition, the bow comprising:

- a riser (52);

- a first limb (60) and a second limb (62) supported by the riser (52);

- a first rotatable member (70) supported by the first limb (60) on a first axle (18), a second rotatable member (72) supported by the second limb (62) on a second axle (19), the first axle (18) and the second axle (19) defining an axle plane, the first rotatable member (70) comprising a cam track (14), a capstan (30) and a terminal (32);

- a drawstring (20) extending between the first rotatable member (70) and the second rotatable member (18), the drawstring (20) extending from the first rotatable member (70) at an exit location;

- a power cable (24) attached to said terminal (32) and away from said terminal (32), wrapping around said capstan (30) and extending toward the second limb (62);

- wherein, in the brace condition, the axle plane divides the first rotatable member (70) to a first part and a second part, the capstan (30) and the terminal (32) located in the first part, the drawstring exit location located in the second part, and a distance between the terminal (32) and the axle plane is greater than a distance between the capstan (30) and the axle.

VII. OPINIONS REGARDING THE '473 PROVISIONAL

105. It is clear that FIGS. 1-6 of the '473 Provisional and FIGS. 1-6 of the '989 Patent are substantially the same. It is my opinion that the '473 Provisional discloses all of the features of the claims of the '989 Patent because the cam design and cam features are the same. Further, due to the mechanical nature

of this invention, even if not explicitly stated or shown in the '473 Provisional, a POSITA would have understood that a compound bow using the cams illustrated in FIGS. 1-6 of the '473 Provisional would have the same general features as a compound bow using the cams illustrated in FIGS. 1-6 of the '989 Patent because, for the bow to function properly, the bow would have to have the same general features.

106. FIG. 1 of the '467 Application (shown below with annotations), which is incorporated by reference in the '473 Provisional, depicts a full bow (10) with a riser (12, green), two limbs (14, 16, blue), two rotatable cams (20, 22, purple) supported by the limbs, two power cables (26, 27), and a drawstring (18). The two axles (24, 28) of the compound bow define an axle plane (red dashed line). A POSITA would have understood from FIG. 1 of the '467 Application, and general knowledge of compound bows, that the axle plane that extends between the axles of the cams would be substantially parallel to the drawstring in the brace condition.

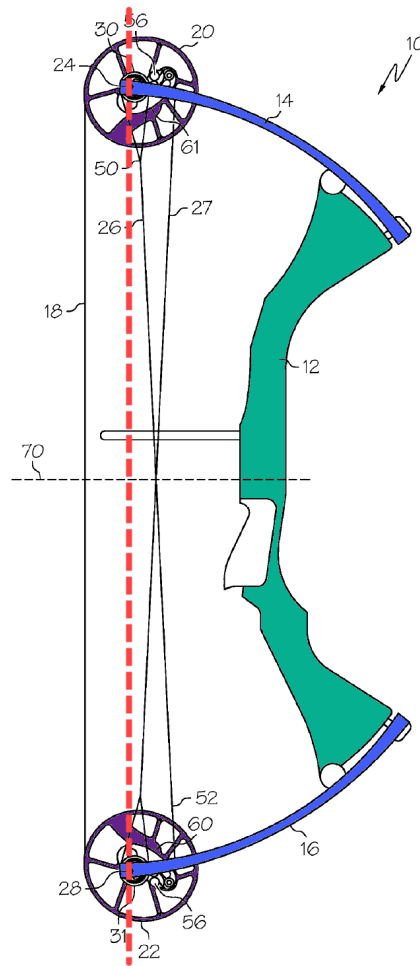
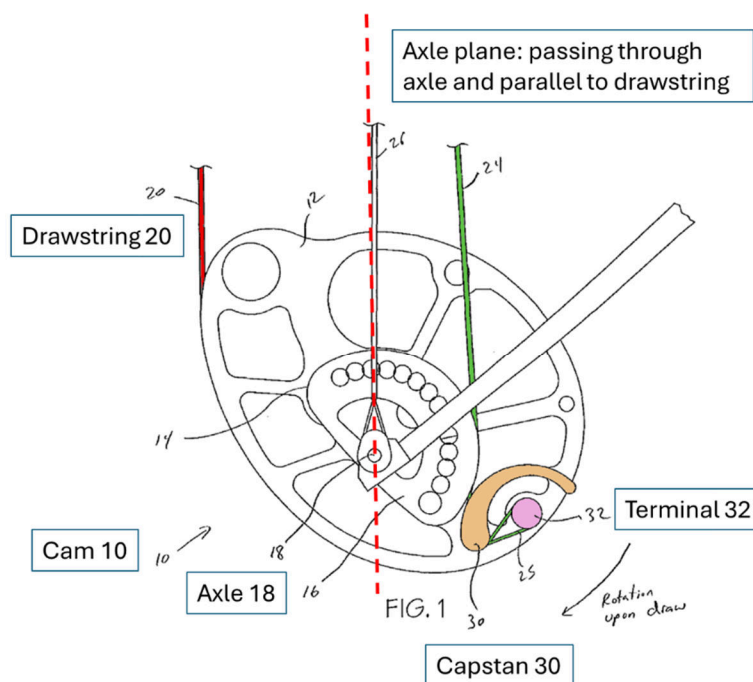


FIG. 1

EX2004, FIG. 1 (annotated)

107. FIG. 1 of the '473 Provisional, annotated below, shows the lower cam of a compound bow in the brace condition. Although only cam (10) and axle (18) are shown in the figure, a POSITA would understand that the axle plane of the compound bow is substantially parallel to the drawstring (20) in the brace condition, and the axle plane would go through the axle (18) because the drawstring extends from one cam to the other cam. In order for the drawstring to impart a force normal to the arrow when shooting the bow, the drawstring would

need to be substantially parallel to the axle plane. The red dashed line in the annotated figure below represents the axle plane defined in this manner. A POSITA would have understood from this image that the drawstring exit and the capstan (30) and terminal (32) are on opposite sides of the axle plane. Further, a POSITA would have understood that the distance between the axle plane and the terminal is greater than the distance between the axle plane and the capstan.



EX2001, FIG. 1 (annotated)

VIII. OVERVIEW OF THE PRIOR ART

A. **Darlington (EX1004)**

108. Darlington describes a compound archery bow with two pulleys, one pulley is attached to an upper limb and one pulley is attached to a lower limb of the bow. The bow has a bowstring and two power cables. The power cables are

attached at each end to one of the pulleys. When the bowstring is drawn, the pulleys rotate, and each pulley unwraps (lets out) one power cable while wrapping (taking up) the other power cable. When one pulley unwraps one end of a power cable, the other pulley wraps the other end.

B. Islas (EX1005)

109. Islas describes a bowstring cam assembly for a compound archery bow. The bowstring cam is attached at the end of a bow power limb. Two power cams are attached to the bowstring cam and rotate with the bowstring cam. A cam cable extends over the periphery of each power cam. One of the power cams attached to the bowstring cam is situated to wrap one cam cable during draw while the other power cam of the same bowstring cam is situated to unwrap the other cam cable during draw.

IX. A POSITA WOULD NOT HAVE COMBINED ISLAS AND DARLINGTON TO YIELD THE “REVERSE WRAP”

110. In my opinion, the modified design proposed by Petitioner is not a rational combination of Darlington and Islas. But even assuming that a POSITA would arrive at the “combined” design proposed by Petitioner, the end result introduces serious problems that run counter to the motivations proposed by Petitioner. Petitioner’s proposed combination solves no problems in either Darlington or Islas, but introduces many problems, including knife-edge contact between the power cable and the cam, increased cam lean that results in increased

cable rub and possible cable derailment, reduced energy storage and arrow speed, and loss of control of the draw curve shape. In the paragraphs below I address each of the supposed motivations to combine proposed by Petitioner and demonstrate the fallacies in Mr. Lange's arguments.

A. Darlington and Islas teach the same cable wrap directions

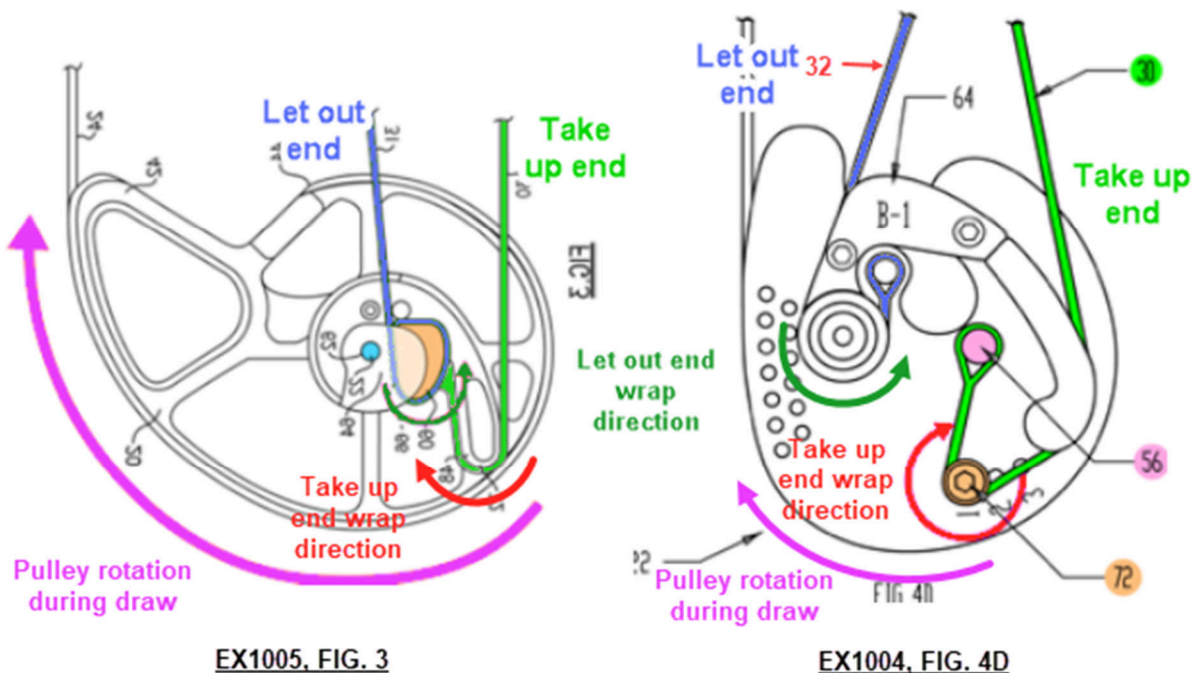
111. It is my opinion that a POSITA would have known that power cables for compound bows have two ends. One end, often referred to as the “take up” or “wrapping” end, wraps around a portion of the cam (e.g., a cam module) when the bow is drawn to pull the limbs of the bow together to store potential energy that is imparted to the arrow when the drawstring is released. The other end of the power cable is either attached to the opposite limb or opposite cam. When attached to the opposite cam, it is often called the “control,” “unwrapping,” or “let out” end of the power cable. When attached to the opposite limb, it is often called the “anchor” end of the power cable – that is largely due to the fact that this end of the power cable terminates on a passive anchor and does not wrap or unwrap power cable. An “unwrapping” end is wrapped around a portion of the cam when in the brace condition and the “unwrapping” end is “unwrapped” from the cam when the bow is drawn. In short, the “wrapping” end takes up the power cable when drawing the bow to flex the limbs of the bow, and the “unwrapping” end lets out the power cable when the bow is drawn. This process can be difficult to visualize from static

drawings, but can be seen more clearly in the animations of Darlington's and Islas' cams. EX2020, EX2021. The animations shows the wrapping and unwrapping of the power cables for each cam as the cams rotate from brace to draw orientations.

112. It is clear from review of properly oriented patent figures that Darlington and Islas have the same cable configuration. FIG. 4D of Darlington is shown below alongside a rotated and flipped version of FIG. 3 of Islas so that both figures show the same cable orientation.³ The bows shown in both Darlington and Islas have synchronized cams – meaning that, during draw, each power cable is concurrently wrapped at one end and unwrapped at the opposite end. For instance, as shown in the annotated figures and the animation files (EX2020, EX2021), the power cables of both Darlington and Islas have a “wrapping” end and an “unwrapping” end. At the “wrapping” end, the power cable is wrapped in cable grooves when the bow is drawn. In both Darlington and Islas, the “wrapping” end of the power cable is wrapped inward toward the cam/pulley center, which is in the same direction that the cam rotates when the bow is drawn. At the “unwrapping” end, the power cable is unwrapped out of the cable groove. In both Darlington and Islas, the “unwrapping” end is wrapped in a direction opposite of the direction that

³ Darlington FIG. 4 and Islas FIG 3 are reproduced with the annotations from '989 Pet., 31, 29. Additional annotations have been added to each figure.

the cam/pulley rotates when the bow is drawn enabling the power cable to be “unwrapped” from the cable grooves during draw. Regarding the teaching of Islas, Mr. Lange states that, “only the rotational direction of the power cable around the orange element is being combined.” But it is clear from the figures below that Darlington already teaches wrapping in a second rotational direction. There is no reason to look to Islas for this teaching.



113. A POSITA would have recognized the distinction between the “wrapping” and “unwrapping” ends of the power cables because the power cable is “wrapped” at the “wrapping” end when the bow is drawn, and the power cable is “unwrapped” from the “unwrapping” end when the bow is drawn. A POSITA would not have incorporated features from the “unwrapping” end of a power cable

to the “wrapping” end of a power cable because the “unwrapping” end and the “wrapping” end perform different functions, namely, to “unwrap” or “wrap” the power cable, respectively – distinctively, wrapping power cable during draw is forces the bow limbs to flex and store energy; unwrapping decreases limb flex. For instance, if a cam unwrapped more power cable than it wrapped, it would self-energize, releasing all of the stored energy in the limbs, resulting in a catastrophic failure. Further, neither Darlington nor Islas describe anchoring either the wrapping end or the unwrapping end of a cable near a periphery of the pulley. In both references, both cables are anchored near the center of the cams. As shown above, Darlington’s anchor 56 for the unwrapping end of the cable is located closer to the center of the pulley and the rotational axis. In Islas, the anchor for cable 31 is located even closer to its rotational axis. As will be discussed elsewhere in this declaration, the positioning of the anchor is not arbitrary because it affects the forces on the pulley by the power cable and consequently the movement of the pulley and the power cable.

B. The proposed combination does not improve safety or reduce cable rub.

114. As an initial matter, I note that Mr. Lange conflates desirable design goals with motivation to combine. Safety is an important design goal, but the proposed combination does not contribute to a safer design. The proposed combination is less safe, because it will dramatically increase cable wear (due to

cyclic motion discontinuities and knife-edge contact between the cable and the cam) and will also dramatically increase the possibility of the cable rub and derailment due to cam lean and unconstrained cable motion. Avoiding cable rub is an important design goal, but the proposed combination does not contribute to reduced cable rub. Rather the proposed combination dramatically increases the possibility of cable rub due to cam lean. Furthermore, there is no indication that safety, energy storage, arrow speed or cable rub are problems in either Darlington or Islas – these only become problems in Petitioner’s proposed combination.

115. Specifically, with respect to Mr. Lange’s opinion that the combined design improves safety (and cable life) by reducing the possibility of cable rub, I disagree.

116. Mr. Lange opines that, “In removing portions of the structure (section 42, described further below), wrapping the power cable further away from the other components of the pulleys, and positioning the terminal anchor towards the periphery of the cam, a PHOSITA would have recognized motivations of reduced cost and of increased safety due to decreased likelihood of power cable contact.” EX1003, ¶61. In response, I first note that there is no evidence that cable rub occurs or is a problem in Darlington. Cable rub occurs when a cable slides over another component such as a cam or another cable. Rubbing requires (1) contact between two surfaces and (2) a non-zero relative sliding velocity at the contact

point. If motion is controlled such that there is no sliding between the surfaces, no rubbing can occur. Moving the power cable further away from the other components, as Mr. Lange suggests, does nothing more to eliminate rubbing. Further, Mr. Lange has not identified any components in Darlington that have a relative surface velocity and are so closely spaced that there is a concern that rubbing may occur.

117. I also believe Mr. Lange may be conflating cable rub with cable wrap. For example, Mr. Lange states: “Specifically, a PHOSITA would have recognized that the natural wear that occurs as a cable rides in and out of a track as the bow is drawn would have been reduced by the modification of Darlington mapped in the Petition. EX1003, ¶59. Further, the cable wear discussed in EX1006, 6:28-36, 7:4-15, 29:65-67 referenced by Mr. Lange, describes cable rub at the location where the power cables cross and could come in contact with the arrow or fletching and not cable wear or rub with respect to the wrapping or unwrapping of cables on the cam. A POSITA would have understood that cable rub is different than cable wrap. When a cable wraps onto a continuous cam surface, the tangential velocity of contact points on the cable and the cam are, by definition, the same.⁴ This means

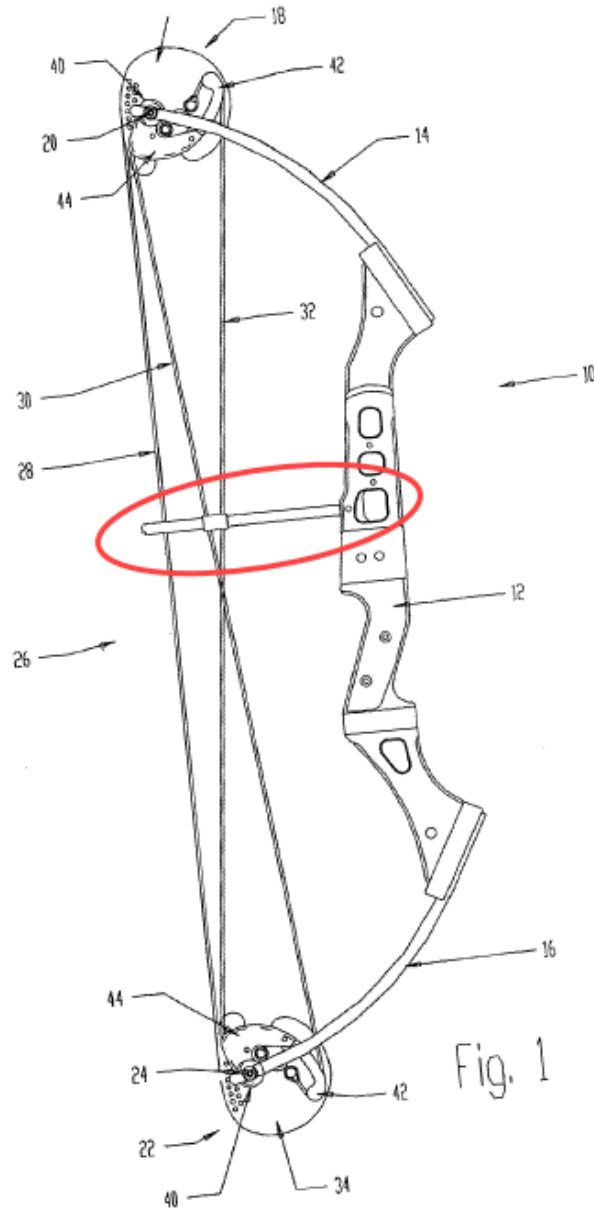
⁴ Tidwell, P. H., Bandukwala, N., Dhande, S. G., Reinholtz, C. F. and Webb,

that there can be no relative velocity of the surfaces and thus no rubbing. Said in another way, because condition (2) stated above (non-zero relative sliding velocity at the contact point) is not met, no rubbing occurs due to cable wrap on the cam. Note that if the cable is not accurately aligned with the groove, it may still rub against the side walls of the groove as it is being seated.

118. Petitioner's combination fails to capture the power cable in its take up track in the brace condition, instead leaving a large void between the power cable and its take up track. This is quite problematic, most likely to the point of inoperability, as power cables are necessarily at an angle to the cam surface due to uneven forces, and more specifically, to the existence of cable guards – which pull the cables out of the arrow's path. A POSITA would have understood that Darlington's Fig. 1 (reproduced below) shows the use of a cable guard (circled). It is not certain that Petitioner's combination will even be able to capture the power cable in its take up track, but if it does, it will only be by creating a severe cable rubbing against the edge of the cable track and contact with the knife-edge surface

G, "Synthesis of Wrapping Cams," Journal of Mechanical Design, Transactions of the ASME, Vol.116, No. 2, June 1994

shown in the combination. *Infra* These interactions will severely limit the life of the power cable and will create unsafe operating conditions.



EX1004, FIG. 1 (annotated)

119. Petitioner's proposed combination eliminates an essential component in Darlington, namely section 42 of the power cam. This change is not taught or

suggested by Islas, and it creates multiple problems related to performance, wear, energy storage, and safety, among others. One significant problem created by eliminating section 42 of Darlington's pulley is motion discontinuity that makes smooth drawing of the bow impossible. The embodiments shown in both Darlington and Islas illustrate only continuous wrapping and unwrapping of cables from cam surfaces that results in smooth continuous motion. Darlington teaches to avoid the type of motion discontinuities inherent in Petitioner's proposed design, noting "Cable groove 50a, 50b, 50c preferably is substantially continuous in a plane perpendicular to the axis of rotation around axle 20, "substantially" meaning that there are no more than small gaps between the cable groove sections that do not affect smooth drawing of the bow." Darlington, 2:61-65. I will explain below the significance of this concept and why Petitioner's proposed design is, at best, highly undesirable.

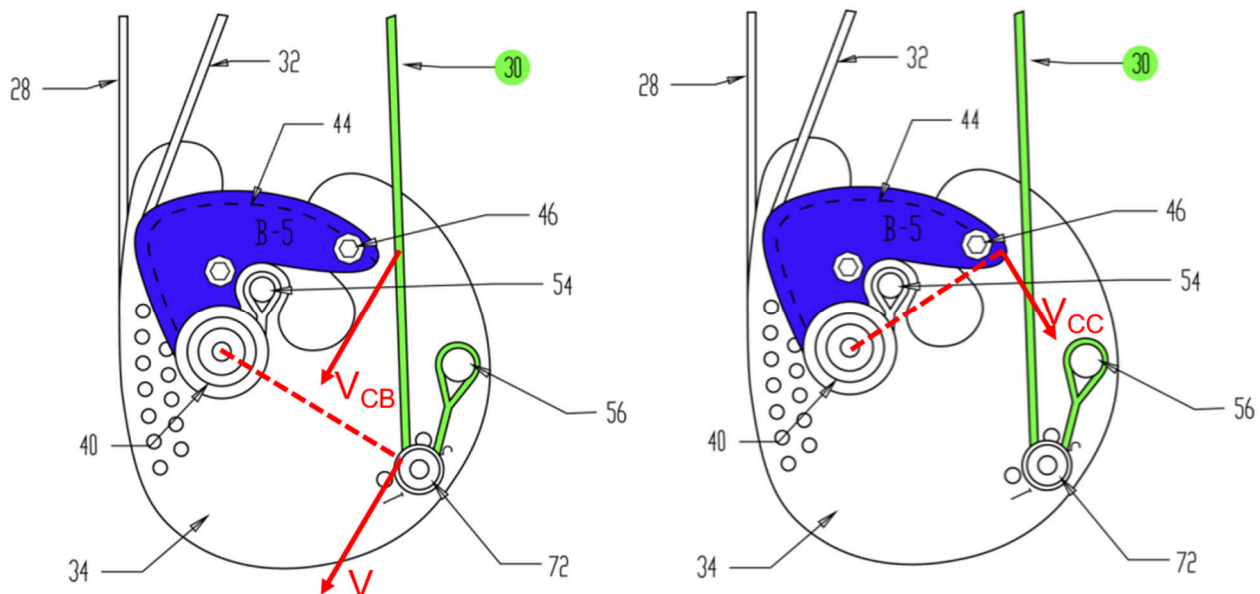
120. To understand the deleterious effects of Petitioner's proposal to remove section 42 of Darlington's pulley and replace it with an unsupported span of power cable, it is instructive to consider the relative velocity of a point on the cable and a point on the cam as they first come into contact with each other. In the figures below I have reproduced and further annotated Petitioner's proposed design. EX1003, ¶66. Both of the annotated images below show velocity vectors in red that indicate velocity relative to a coordinate system at the center of rotation

of the cam (i.e., the center of concentric circles at hub 40). The left image shows velocity vector V representing the velocity of the point on the cable where the cable first contacts post 72. Since this point rotates about the cam center, vector V must be perpendicular to a line (shown dashed red) from the center of cam rotation to the point. Because the cable is taut and moves in a nearly self-parallel manner until it contacts the cam, the point on the cable that will first contact the cam will have approximately the same velocity relative to the cam as V .

121. A POSITA would understand this to be true because the two cams at either end of the bow are separated by a relatively large distance compared to the size of a cam. This means that the orientation of the power cable changes only slightly during draw. Using Darlington Fig. 1 showing the full bow in the brace position and Mr. Lange's modified cam, I measured both the distance between the cam centers and the maximum change in distance between the take-up and let-out power cables. Based on these measurements, the maximum change in orientation of power cable 30 will be less than 3 degrees in Mr. Lange's proposed system. As a confirmation, I also measured the change in angle of power cable 30 between brace and full draw in Darlington's Fig. 1 and Fig. 1A to be 4 degrees. As I will discuss later in this declaration, Darlington creates much more movement of the power cable than the design proposed by Mr. Lange. This means that points on

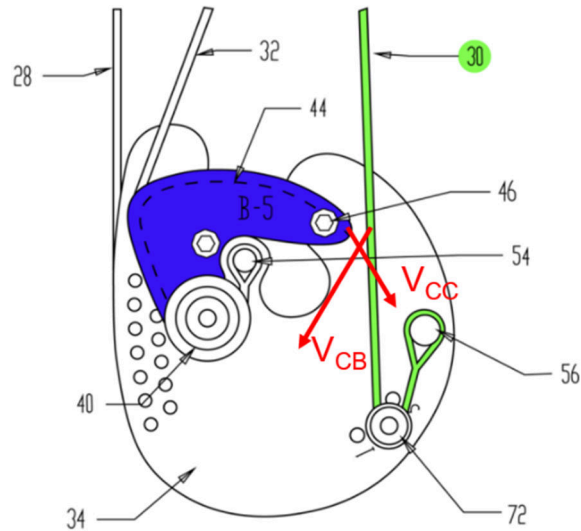
power cable 30 near the cam in the design proposed by Mr. Lange will have nearly the same velocity, both in magnitude and direction.

122. The vector V_{CB} in the left image represents the velocity of the specific point on the cable that will first contact the tip of cam module B-5. Note that, for the reasons discussed above, V_{CB} will be approximately equal to V . The right image shows a similar construction used to determine the velocity of the tip of cam module B-5. Vector V_{CC} represents the velocity of the point on cam module B-5 that will first contact the cable. Since this point also rotates about the cam center, vector V_{CC} must be perpendicular to a line (shown dashed red) from the center of cam rotation to the point at the tip of module B-5. Note that V_{CC} is smaller in magnitude than V because it is closer to the center of cam rotation.



EX1003, 59 (annotated); EX1003, 59 (annotated)

123. The image below illustrates the velocity discontinuity that will occur when the cable first contacts the tip of cam module B-5. The tip of cam module B-5 is moving down and to the right. The contact point on the taut cable is moving down and to the left. Because the points come into contact abruptly with different velocities, an impact (or collision) occurs. I note that the same type of velocity discontinuity will occur when the bowstring is released and the arrow is fired, except the directions of the velocity vectors will be reversed. The image below looks and acts like the hammer in a piano striking a piano string and causing it to vibrate. The situation here is much worse, however, because the hammer in a piano is gently rounded and made of wood covered in soft felt. The cam module B-5, on the other hand, is made of a rigid material and, as I will discuss elsewhere, terminates at the point of contact in a knife-edge-like sharp corner. Even if the tip of cam module B-5 had a generous radius at the point of contact (which is not illustrated or suggested by Petitioner), the velocity discontinuity will still be present and will result in vibrations and unsmooth drawing of the bow. This, along with cable wear, is precisely the problem Darlington sought to avoid by making the cable groove substantially continuous.



EX1003, 59 (annotated)

124. I note that the Monster bow and patent embodiment 2 are different than Petitioner's proposed combination with respect to velocity continuity. This can be seen, for example, in the video attached to Mr. Ozanne's declaration, EX2017, **Monster Bow.mp4**, which shows a zoomed in view of the lower cam of the Monster '775 while the bow is being drawn from the brace condition to the drawn condition. At 00:01 in this video we see the cable and the power cam engaging (i.e., first making contact) with matched velocities. The image below is a still from that video annotated to show this matched-velocity condition.

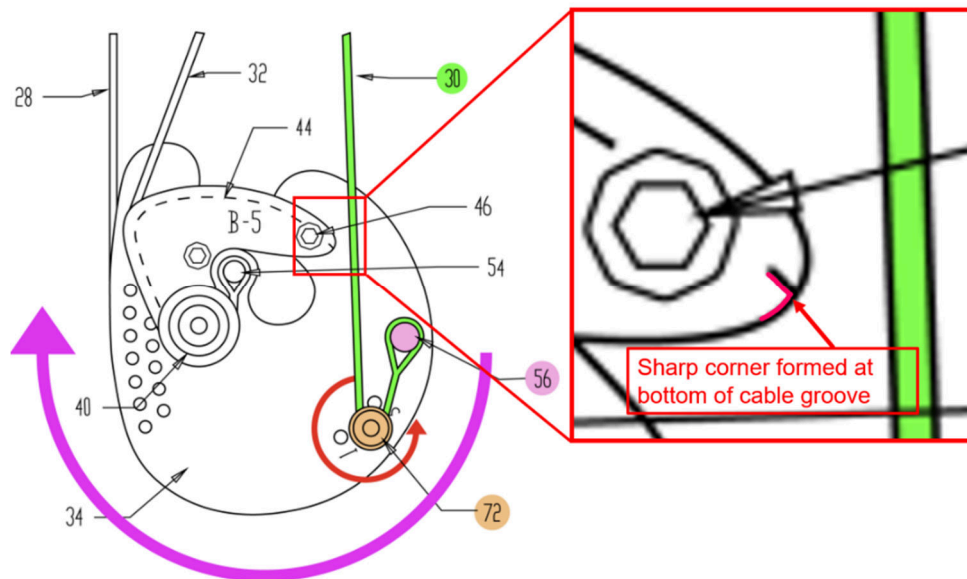


EX2017 **Monster Bow.mp4**, Still Image at 00:01 (annotated)

125. As I mentioned above, Petitioner’s proposed design has another serious problem at the point where the tip of cam module B-5 first contacts (impacts) the power cable. In addition to the velocity discontinuity discussed above, the design⁵ presented by Petitioner has a knife-edge-like sharp corner at the

⁵ In EX1003, ¶58, Mr. Lange presents what he describes as two “embodiments” of the proposed combination. I believe these are the same embodiment. They are like the first embodiment shown in Darlington with two different draw length modules and two corresponding locations for intermediate post 72. In any case, even if these are different, both suffer from the same shortcomings and any analysis I present for one applies equally to the other.

point where the tip of cam module B-5 first contacts the power cable. Below I have annotated the figure from EX1003, ¶58 and created an enlarged window showing the sharp corner (outlined red) formed at the bottom edged of the cable groove. Such a design is inherently unsafe and may result in failure of a typical polymer power cable the first time the bow is drawn.



EX1003, 59 (annotated)

126. Mr. Lange appears to recognize that a sharp corner or a small radius bend where the power cable wraps the cam is a problem. This motivates his so-called “second embodiment” (see footnote 5, *supra*). Regarding this “embodiment,” Mr. Lange states “In this embodiment, the draw length module 44 has been reshaped to round-off its end, ensuring that there is no potentially sharp edge for the take-up of power cable 30.” EX1003, ¶58. I note that Petitioner rounded-off the end of the outer profile of module B-5, but the cable does not ride on this outer

profile. Rather, the cable should sit down in the cable groove, the bottom of which is illustrated by dashed lines in the left image above. The sharp corner is what creates the knife-edge-like surface that is so destructive to the cable.

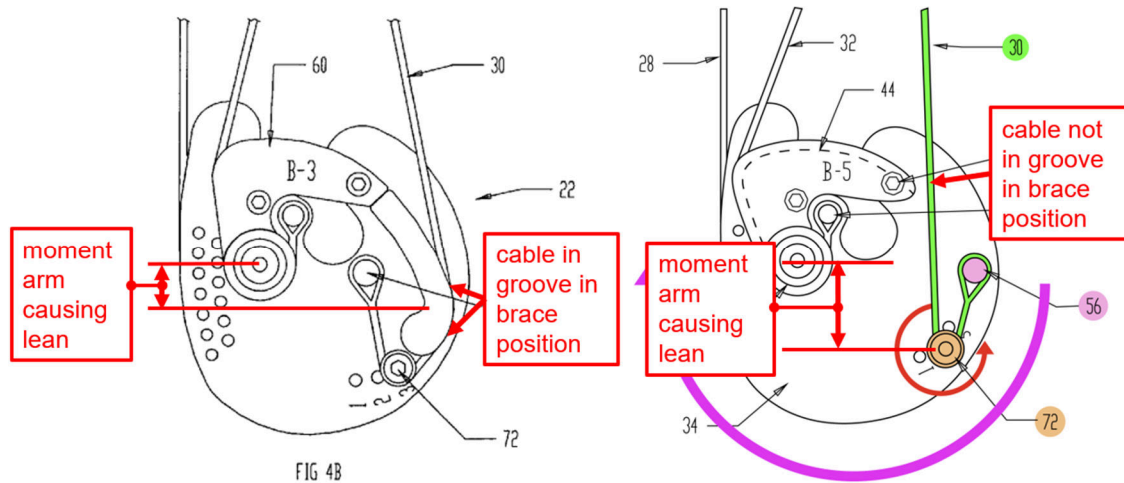
127. Even if Petitioner had proposed a radius at the bottom of the groove similar to the outer profile radius depicted, the small radius corner would still be a problem. A POSITA would have known that a cable should not be bent around a curve with a small radius because it causes high stresses and accelerates cable fatigue failures. This is one of many reasons Petitioner's proposal to remove section 42 is ill advised. Section 42 is essential for creating a smooth, continuous groove with a large radius of curvature for the power cable. All of the figures in Darlington support this understanding, including the figures for Darlington's second embodiment. For example, as illustrated in Darlington Figs. 2, 3A-3D, 4A-4D, replaceable draw length modules 44, 60, 62 and 64 are shaped to provide a large bending radius and a smooth, continuous contact along groove 50a-c. For at least this reason (I will discuss other reasons later), I do not believe a POSITA would have considered section 42 of Darlington's power cam to have been superfluous as Mr. Lange opines. EX1003, ¶62.

128. Another significant problem that Petitioner does not address or appear to consider is cam lean. Cam lean in a compound bow refers to cams that are not aligned with the vertical plane of the bow and are tilted to the right or the left

instead of being straight up and down. A slight amount of cam lean may be acceptable, but too much lean can cause significant cable wear and cable derailment. Derailment occurs when a cable does not wrap in its intended groove. The modified Darlington pulley is predisposed to excessive cam lean, making the proposed combination less safe and more prone to cable wear, derailment and high maintenance costs.

129. As I have already discussed, Darlington teaches the desirability of a continuous cam groove without gaps or discontinuities, which facilitates smooth draw, eliminates impact between the cable and cam tip and reduces vibrations. A continuous groove also helps keep the cable in the groove, which reduces cable wear and the likelihood of derailment. This is evident in the left-hand image below, which shows Darlington Fig. 4B. In Darlington, the cable is seated in the groove at the start of the motion cycle (i.e., in the brace position). As shown, the cable is seated deep in the groove of power cam section 42 and remains in the groove through the motion cycle. For comparison, the design concept proposed by Petitioner is shown on the right. Petitioner's cable is not seated in the groove in the brace position. If there is no cam lean and everything is perfectly aligned, the cable in Petitioner's design should enter the center of the groove on the tip of B-5. In the inevitable event of cam lean, however, the cable may strike the edge of the groove or miss it altogether (i.e., derail). Cam lean occurs when tension in the

cables creates a turning moment that deflects the cam out of the drawing plane. In Petitioner's design this will cause the bottom of the cam to move out of the page and will cause the top of the cam to move into the page. The longer moment arm inherent in Petitioner's design exacerbates this problem. Cam lean will cause the cable in Petitioner's design to rub on the side of the groove in the best case, or derail altogether in the worst case. This again show the importance of cam section 42 in Darlington and why it cannot be eliminated as Petitioner proposes.



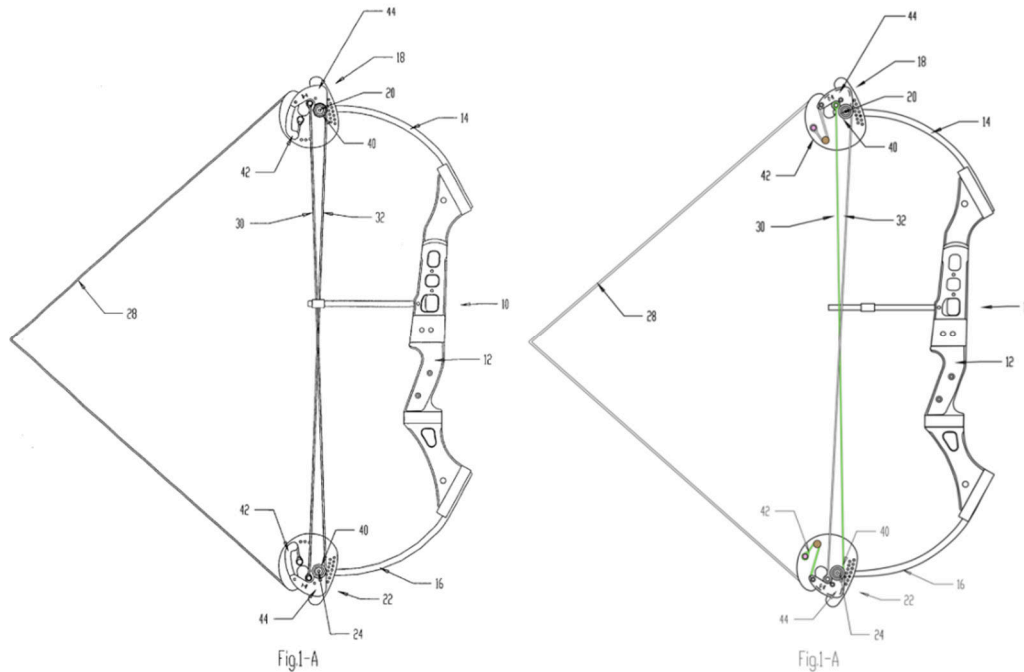
Darlington, Fig 4B (annotated); EX1003, 59 (annotated)

130. The problems associated with Petitioner's proposed combination discussed above would create significant safety, maintenance and performance issues. Excessive vibration, rapid cable wear, broken power cables and cable derailment are all direct and predictable consequences of the design proposed by Petitioner.

C. The proposed combination does not increase maximum angular sweep of the rotatable member.

131. I note that Mr. Lange again conflates desirable design goals with motivation to combine. Increased maximum angular sweep of the rotatable member is a desirable design goal, but nothing in the proposed combination leads to an increased angular sweep compared to Darlington. Increased energy storage and increased arrow speed are also important design goals, but the proposed combination would dramatically reduce the stored energy and arrow speed, because the amount of power cable that can be taken up is greatly reduced by removing Darlington's section 42.

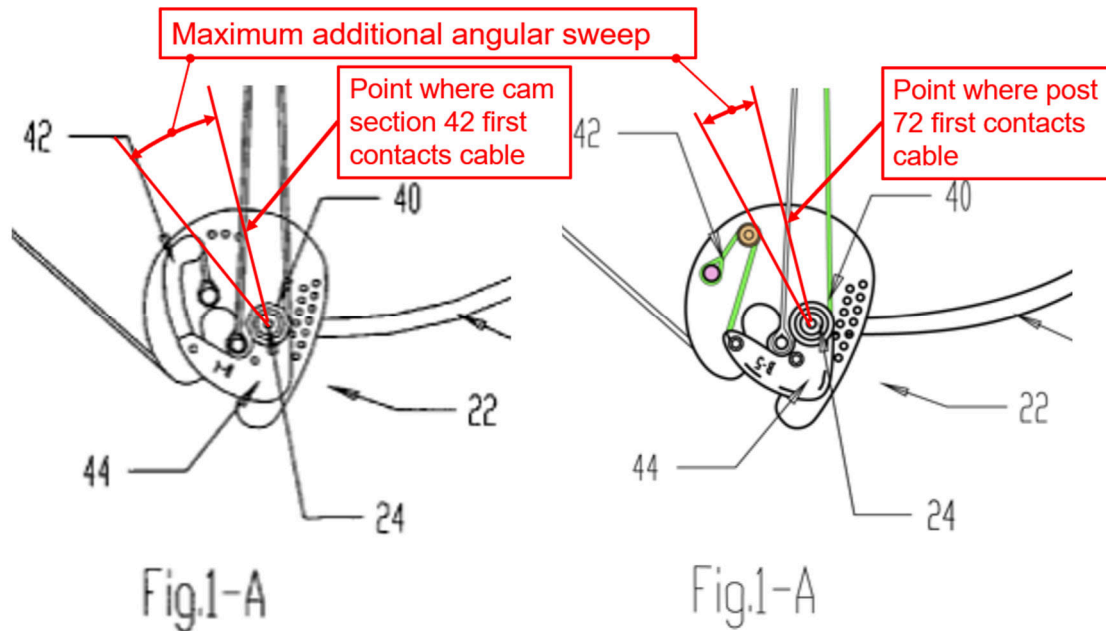
132. Specifically, with respect to Mr. Lange's opinion that the combined design increases maximum angular sweep of the rotatable member and increases arrow speed, I disagree. The maximum angular sweep of the rotatable member in Petitioner's proposed combination will be less than the maximum angular sweep in Darlington. Petitioner's modified version of Figure 1A from Darlington is helpful in understanding maximum draw and maximum angular sweep of the rotatable member. Below I have reproduced original Fig 1A from Darlington alongside the modified version of this figure produced in EX1003, ¶83. These two figures show identical draw length and angular sweep of the rotatable member.



Darlington, Fig. 1A; EX1003, ¶83

133. Petitioner's figures thus show no increase in draw length or angular sweep of the rotatable member for either of Petitioner's embodiments illustrated. The absolute maximum angular sweep of the rotatable member in both these designs (original Darlington and modified Darlington) will occur when an element on the rotatable member physically begins to interfere with the power cable. This limit can be seen by greatly enlarging the lower portion of the two figures above. In the left image (Original Darlington), the rotatable member can rotate approximately an additional 25 degrees before the end of cam section 42 contacts the power cable. The angle is measured between the end of section 42 in the drawn position and the approximate location where the end of section 42 would contact the let-out end of the power cable. In Petitioner's modified design, the

rotatable member can rotate approximately an additional 14 degrees before post 72 (highlighted orange) contacts the power cable. Petitioner's proposed modified design clearly reduces rather than increases the maximum angular sweep of the rotatable member.



Darlington, Fig. 1A (annotated); EX1003, ¶83 (annotated).

134. Petitioner's proposed design will also cause the cam to be positioned in a different orientation at brace, which will further reduce the available cam rotation. The reason for this is that power cable 30 will act through a smaller moment arm in Petitioner's proposed design than in the original Darlington design. Because the cam must be in static equilibrium at brace, the moments acting on it must sum to zero. The shorter moment arm in Petitioner's proposed design means that the cam must rotate in the clockwise direction to increase tension in power

cable 30 to find a new equilibrium brace position. This new equilibrium position will further decrease the available cam rotation.

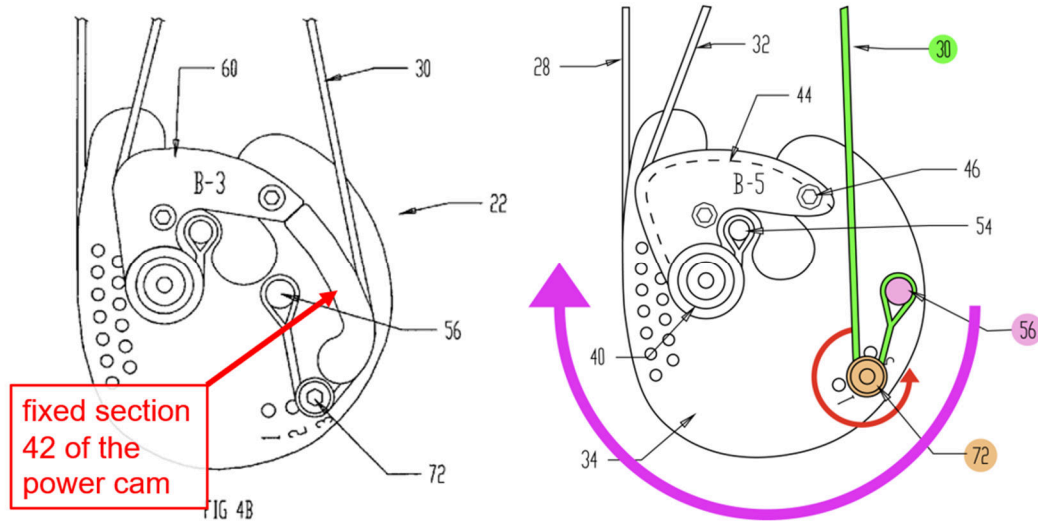
D. The proposed combination reduces the amount of energy stored and reduces the arrow speed.

135. Increased energy storage and increased arrow speed are important design goals, but the proposed combination would dramatically reduce the stored energy and arrow speed as compared to Darlington.

136. Specifically, with respect to Mr. Lange's opinion that the combined design increases energy storage and arrow speed, I disagree. The proposed combination would dramatically reduce the amount of stored energy and would also reduce arrow speed. This is true because the amount of power cable that can be taken up is greatly reduced by removing arcuate section 42 of Darlington's power cam and leaving just a straight, unsupported section of power cable that has limited ability to create deflection in the limbs where energy is stored.

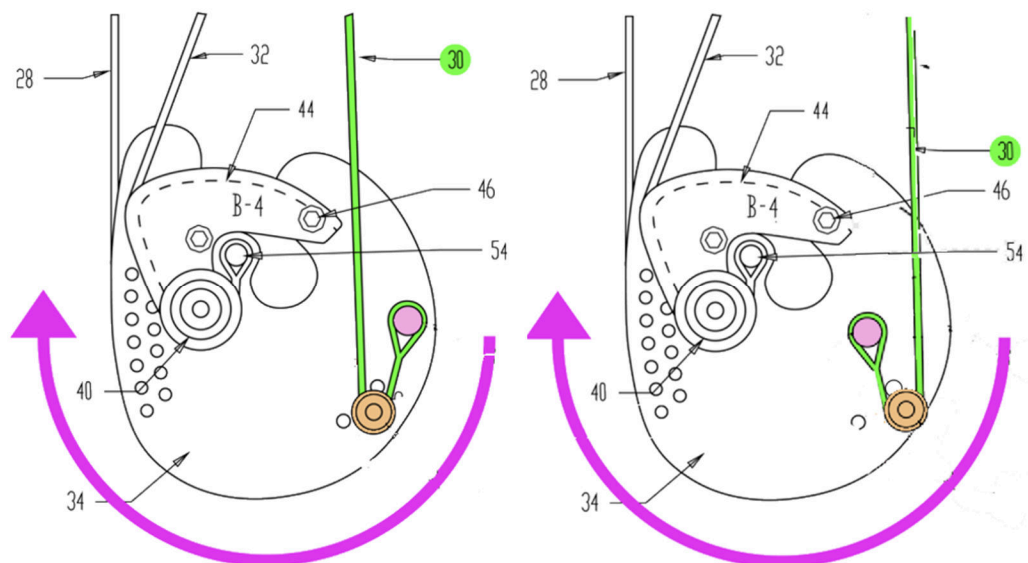
137. The reduction in stored energy (and resulting reduction in arrow velocity) in Petitioner's proposed design can be understood by considering how much of the power cable will be taken up as the cam rotates in the two figures below. The left figure is Fig. 4B from Darlington, the right figure is Petitioner's proposed design. One simple difference that can easily be observed is that power cable 30 is closer to the center of cam rotation in the modified Darlington pulley than it is in the original Darlington. This is an inevitable consequence of

Petitioner's attempt to introduce a reverse wrap into the combination. In Darlington, power cable 30 wraps around the fixed section 42 of the power cam at the outer edge of the rotatable member. This, along with the arcuate shape of section 42 produces maximum cable displacement. In Petitioner's proposed design, the cable is always much closer to the center of cam rotation, which dramatically reduces cable displacement. Cable displacement is directly proportional to the deflection of the limbs. The amount of energy stored is proportional to the square of limb deflection. This is because the limbs are essentially cantilever beams. Energy stored in a cantilever beam is proportional to the displacement of the end of the beam squared. This means that, for example, a limb that deflects 1.5 inches will store 2.25 times as much energy as a limb that deflects 1 inch. A POSITA would not have been motivated to modify Darlington in the manner proposed by Petitioner for the additional reason that the amount of energy stored and the maximum arrow speed will be greatly reduced.



Darlington, Fig. 4B (annotated); EX1003, ¶58

138. With respect to the reduced energy storage and velocity discontinuity problems described above, I find it curious that Petitioner does not appear to have considered the alternative design modification depicted in the image below. The left image shows the modified design proposed by Petitioner. EX1003, ¶58. The right image shows a variation of this modified design, but with better energy storage capacity and less severe velocity discontinuity, although still not an improvement from Darlington. Petitioner's failure to consider this simple but improved (compared to Petitioner's proposed design) design variation suggests Petitioner may have used the '989 patent as a roadmap to guide the proposed combination.



EX1003, ¶58 (left), Improved Variation (right)

139. In addition to the reduction in stored energy and arrow speed discussed above, the modified design proposed by Petitioner is inferior to Darlington in its ability to control the shape of the draw force curve. The draw force curve is graphical representation of the way the draw weight (pulling force) changes from the brace (at rest) position to the full draw position. To store maximum energy, the draw force curve must ramp up quickly and hold a high value through most of the draw length. At the end of the draw, the draw force curve drops off sharply to allow the archer to hold and aim the bow with a lower holding force. This force reduction at the end of the draw is known as let-off. A POSITA would have known that the profile of section 42 of the Darlington pulley enabled the designer to control the shape of the draw force curve in the ramp-up portion of the draw. Darlington's section 42 of the power cam is critically

important to controlling the shape of the draw force curve and is not, as Mr. Lange opines, rendered “superfluous” by the modified design proposed by Petitioner. Clearly, section 42 was removed in Petitioner’s design to accommodate moving the anchor toward the periphery of the pulley.

E. The proposed combination does not simplify the overall design or result in reduced manufacturing cost.

140. As I have noted above, the design proposed by Petitioner has multiple serious shortcomings. Among these shortcomings are reduced safety, higher maintenance costs, reduced energy storage, decreased angular sweep of the rotatable member, decreased arrow speed, loss of control of the draw force curve, velocity discontinuity as the power cable collides with the tip of the cam, excessive vibration due to this severe discontinuity, and cam lean causing cable wear and possible derailment. It is not clear how a POSITA would have even attempted to implement Petitioner’s proposed design to address these issues. I believe such an effort would require extensive redesign and experimentation with no guarantee of finding a viable solution. Mr. Lange argues that the overall design would be simplified by removing Darlington’s cam section 42: “[s]ection 42 highlighted in brown in annotated Fig. 4C below would have been rendered superfluous and would have been desirably eliminated from the combined Darlington+Islas bow, simplifying the overall design.” EX1003, ¶62. As I have shown above, section 42 is not superfluous; eliminating it has severe consequences that, at best, will require

additional design work and added or modified components to address. For example, significant modifications to Petitioner's proposed design will be needed to mitigate the effect of the velocity discontinuity and resulting vibration. A significantly larger rotatable member will be required to regain the lost energy storage capacity. This, in turn, will require additional material and more time spent machining the rotatable member. Any small material savings or simplification gained by eliminating section 42 will be more than offset by the added complexity and material that will be required to create a functional design.

X. OVERVIEW OF CONCLUSIONS FORMED

141. A POSITA would have understood that the 2009 model year Mission Menace bow and the 2009 model year Mathews McPherson Series Monster bow embodied the claim limitations of the '989 Patent, the '017 Patent, and the '831 Patent.

142. A POSITA would have understood that the '473 Provisional describes each of the claim limitations of the '989 patent, the '017 Patent, and the '831 Patent.

143. A POSITA would not have combined Darlington and Islas to yield a bow cam with the "reverse wrap" described and claimed in the '989 Patent, the '017 Patent, and the '831 Patent because neither Darlington nor Islas describe a "reverse wrap" of the "wrapping" end of a power cable. A POSITA would not

have incorporated features from the “unwrapping” end of the power cable into the “wrapping” end of the power cable because the “unwrapping” end and the “wrapping” end perform different functions.

144. Petitioner’s proposed combination does not accomplish any of the proffered motivations to combine. The proposed combination does not increase safety or maintainability by decreasing cable rub. Rather, the proposed combination increases cable rub with the cam and decreases safety from cable wear and potential derailment due to cam lean. The proposed combination does not increase the angular sweep of the cam. Rather the proposed combination at best does not change the actual angular sweep of the cam during draw and decreases the absolute angular sweep of the cam because the capstan of the modified Darlington pulley will contact the power cable at a smaller angular rotation than the original Darlington pulley. The proposed combination does not simplify the overall design and reduce manufacturing costs because the proposed combination introduces many problems that will need to be solved by using larger components and additional complexity.

XI. ADDITIONAL REMARKS

145. I currently hold the opinions expressed in this declaration. But my analysis may continue, and I may acquire additional information and/or attain supplemental insights that may result in added observations.

146. I hereby declare that all statements made of my own knowledge are true and that all statements made on information and belief are believed to be true. I further declare that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of the Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this proceeding or any patent confirmed therein.

Date: 5 Dec. 2024

By:

A handwritten signature in dark ink, appearing to read 'C. F. Reinholtz', is written over a horizontal line.

Charles F. Reinholtz, Ph.D.

New Smyrna Beach, Florida