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**Strother**

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(54) **TWO-TRACK SYSTEM FOR DUAL CAM COMPOUND BOW**

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(51) **Int. Cl.**  
**F41B 5/10** (2006.01)

(52) **U.S. Cl.** ..... 124/25.6; 124/900

(58) **Field of Classification Search** ..... 124/25.6, 124/900

See application file for complete search history.

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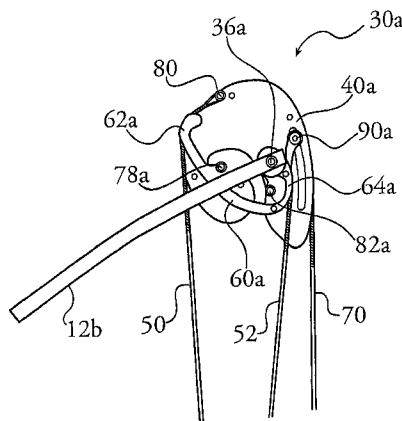
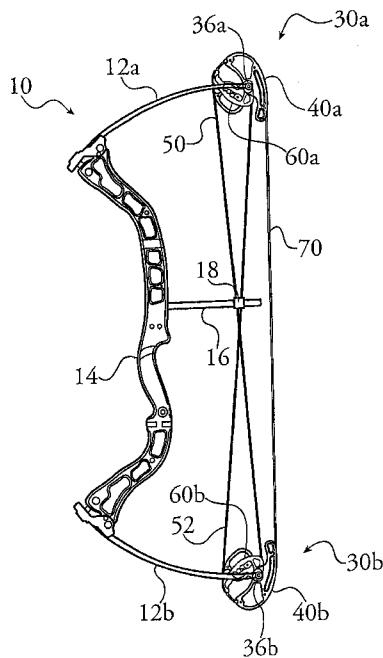
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(57) **ABSTRACT**

The present invention comprises a two-track cam assembly wherein the cam assembly has a bowstring component for housing the bowstring and a power cable component that allows for the take up and let out of the power cable on opposing ends of the power cable component, effectively creating a two-track cam assembly. The efficiency rating of the device achieves 95.8%. The cam assembly can come in a unitary or modular form and further each component (i.e. the bowstring or power cable component) can be in a circular or non-circular form.

**22 Claims, 11 Drawing Sheets**





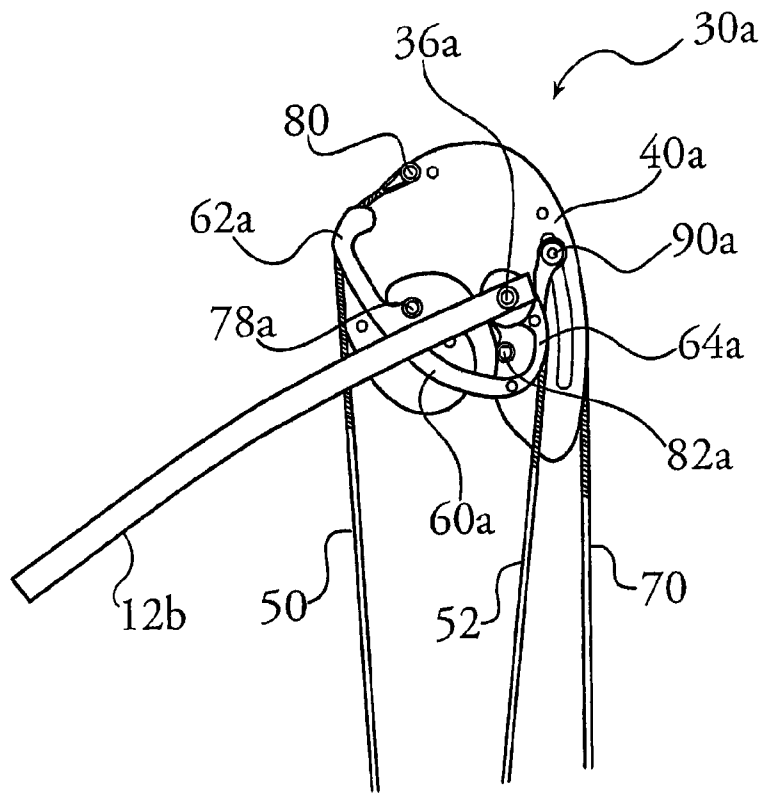


Fig. 2

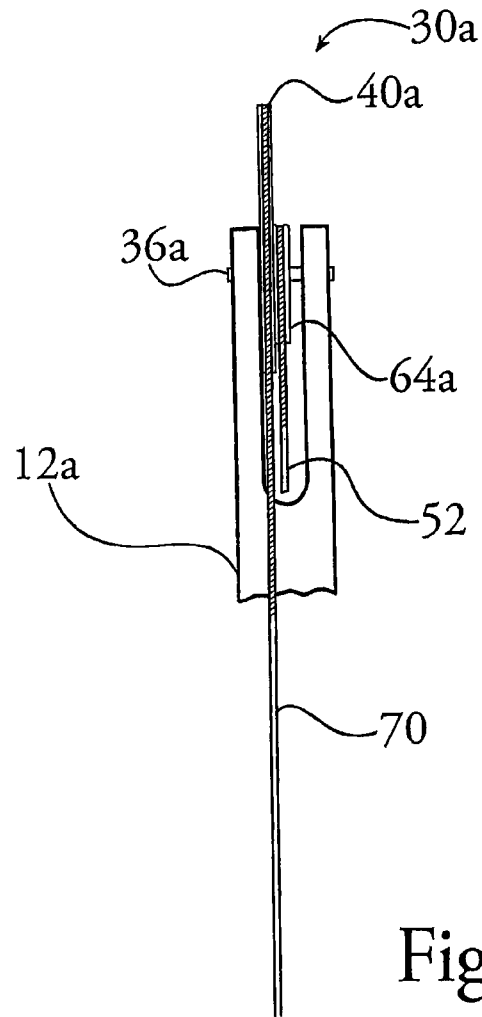
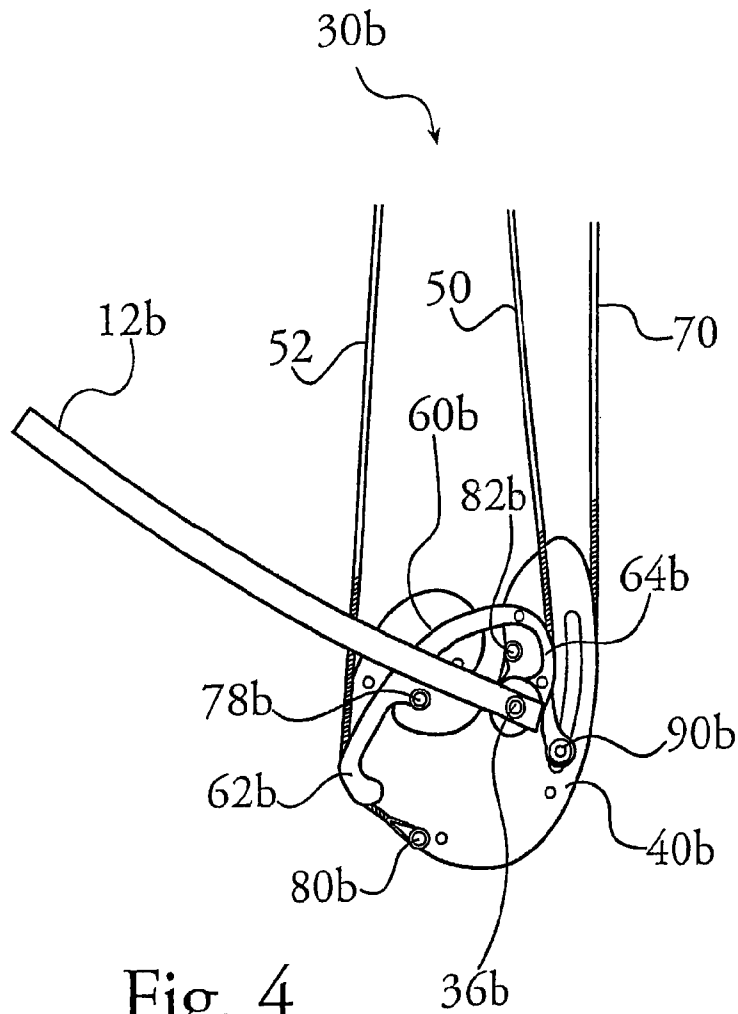


Fig. 3



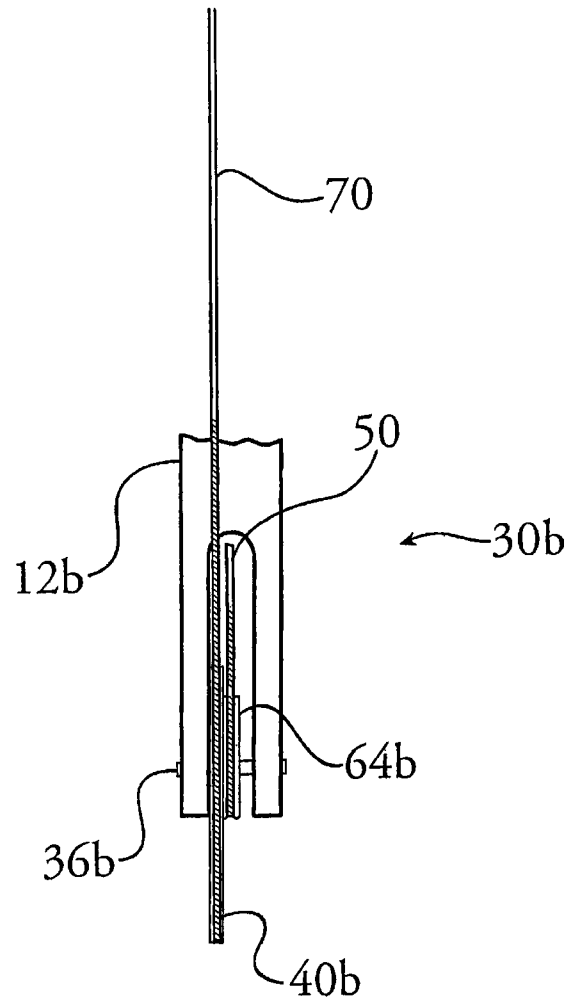


Fig. 5

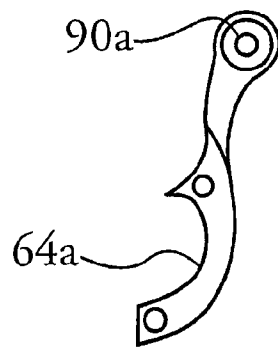


Fig. 6

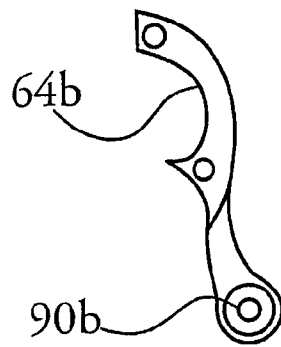
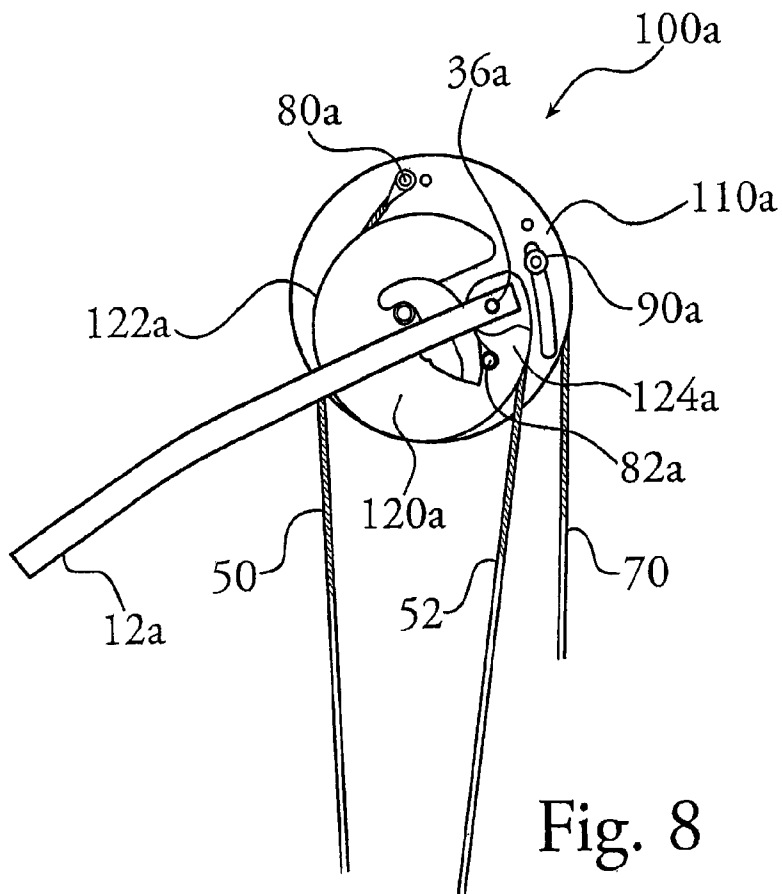


Fig. 7



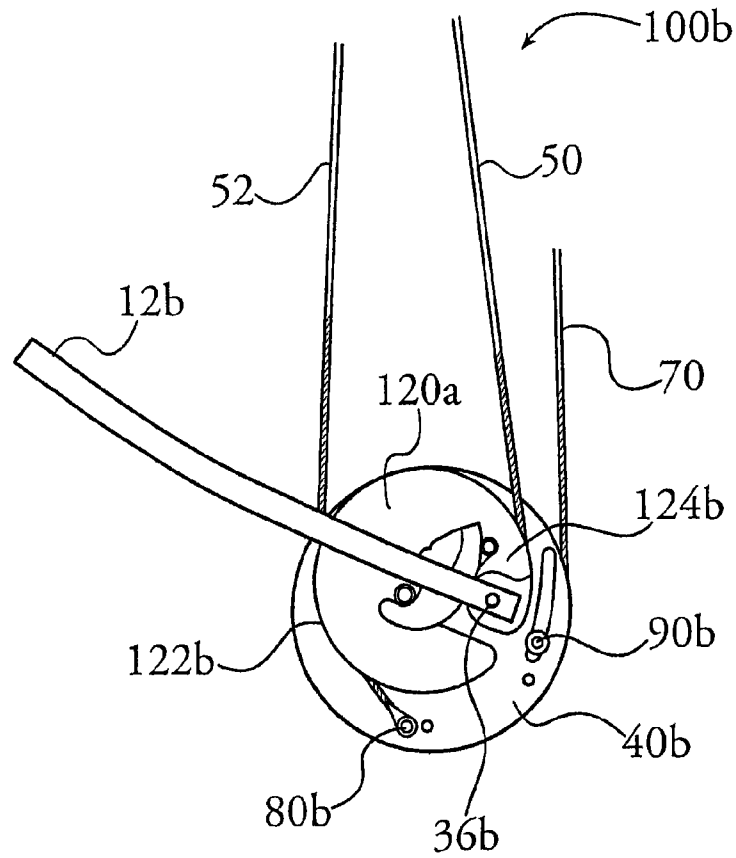


Fig. 9

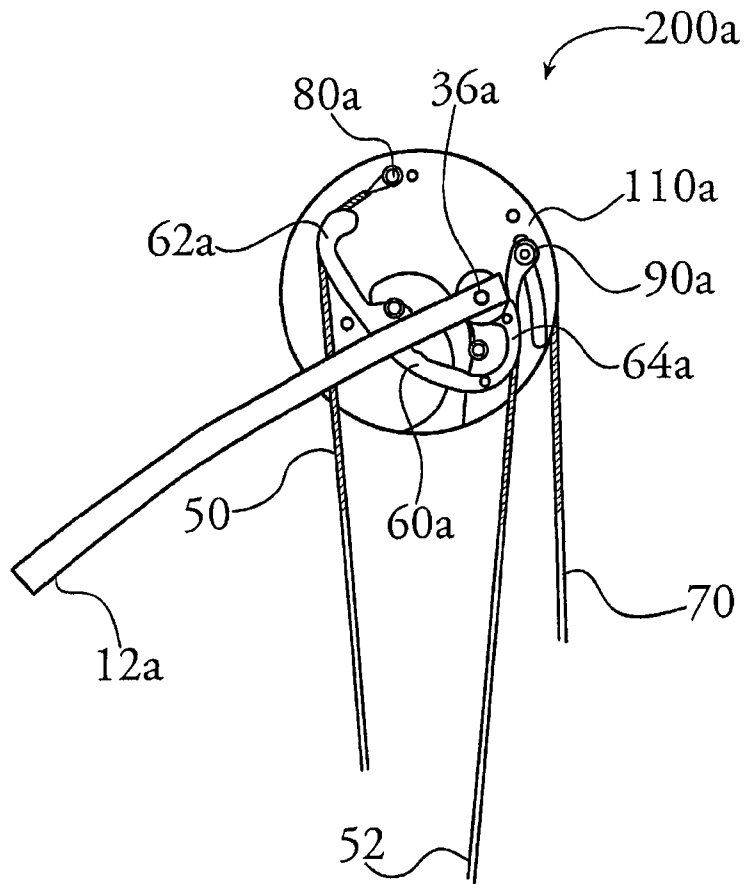


Fig. 10

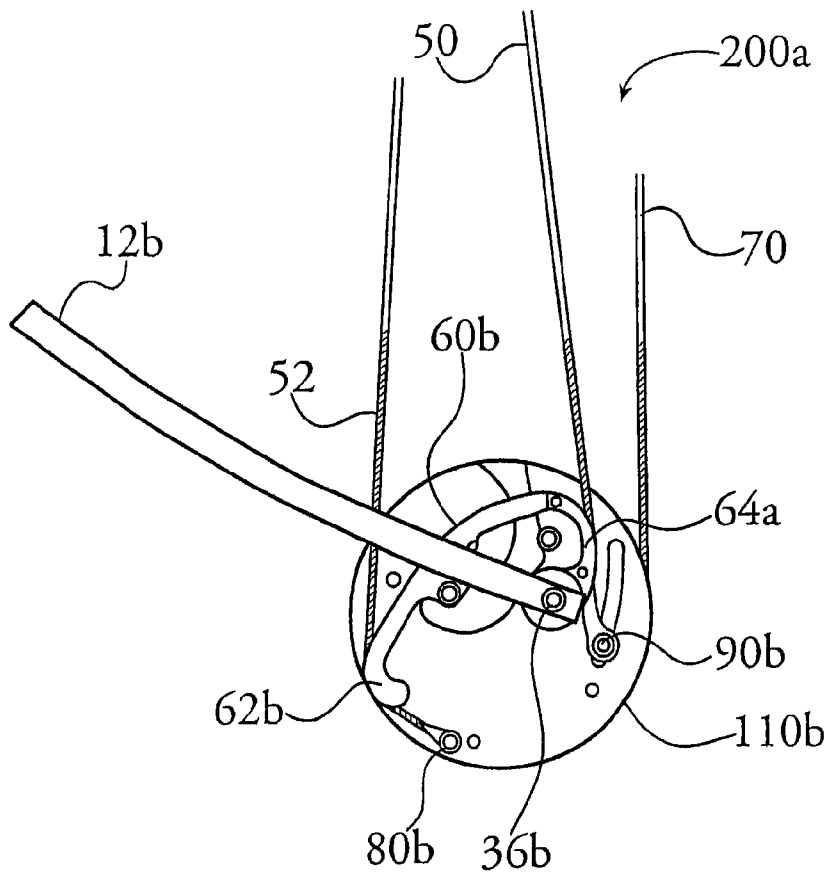


Fig. 11

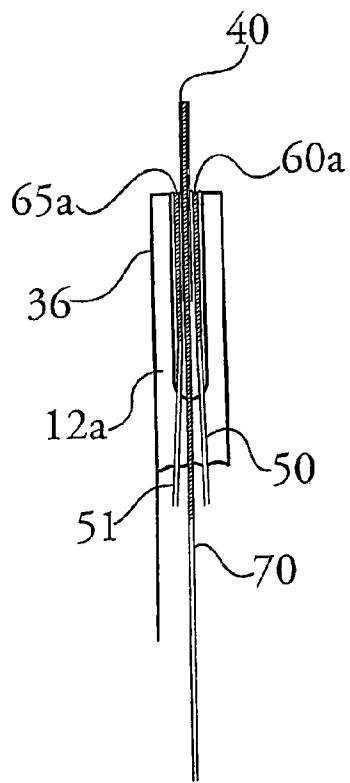


Fig. 12

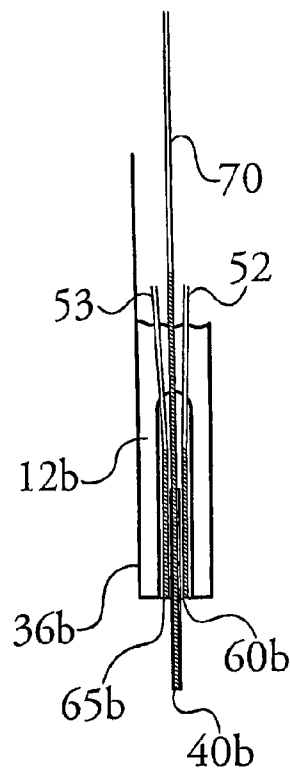


Fig. 13

## TWO-TRACK SYSTEM FOR DUAL CAM COMPOUND BOW

### CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims priority from U.S. Provisional Patent Application Ser. No. 61/062,380, filed Jan. 25, 2008.

### FIELD OF THE INVENTION

This invention relates to compound bows, and more specifically, it relates to a two-track system for bow strings and power cables of the compound bow.

### BACKGROUND OF THE INVENTION

Cams have been used on compound bows for some time. Compound bows have opposing limbs extending from a handle portion which house the cam assemblies. Typically, the cam assemblies are rotatably mounted on an axel which is then mounted on a limbs of bow. The compound bows have a bow string attached to the cam which sits in a track and also, generally, two power cables that each sit in a track on a separate component on the cam, and either anchored to the cam or a limb/axel. When a bowstring is pulled to full draw position, the cam is rotated and the power cables are "taken up" on their respective ends to increase energy stored in the bow for later transfer, with the opposing ends "let out" to provide some give in the power cable.

Cam assemblies are designed to yield efficient energy transfer from the bow to the arrow. Some assemblies seek to achieve a decrease in draw force closer to full draw and increase energy stored by the bow at full draw for a given amount of rotation of the cam assembly.

There exists a number of U.S. patents directed to compound bows, including U.S. Pat. No. 7,305,979 issued to Craig Yehle on Dec. 11, 2007. The Yehle patent discloses a cam assembly having a journal for letting out a draw cable causing the cam to rotate and two other journals for take-up mechanism and a let-out mechanism for the two power cables. The Yehle patent requires that the power cables and draw string each sit in a different components and tracks for the take up and let out mechanism to work and to have the efficiencies described therein.

Therefore, a compound bow having a mechanism with fewer tracks is desired because of the advantage in assembly in manufacturing and to increase efficiency in the transfer of energy to propel bows.

Further, an adjustable or modular take-up/let-out mechanism is desired to account for different size draw lengths or other specifications required by the user.

### SUMMARY OF THE INVENTION

The invention comprises, in one form thereof, a cam assembly comprising bowstring cam component having a track for receiving a bowstring; and a power cable cam component having a take up portion and a let out portion, wherein the take up and let out portion have a track for receiving a power cable.

More particularly, the invention includes a compound bow comprising a handle portion; a limb portion; at least two cam assemblies, each comprising a bowstring cam component having a track for receiving a bowstring; and a power cable cam component having a take up portion and a let out portion, wherein the take up and let out portion have a track for

receiving a power cable, a draw stop pin, a take up terminating post, and a let out terminating post; an axel; at least two power cables; and a bowstring.

The cam assembly has a two track system wherein the power cables utilize a track or opposing tracks made on the power cable component of the cam assembly. Another track is formed on the bowstring component of the cam assembly in which the bowstring lies.

An advantage of the present invention is that the device has high efficiency in transferring energy stored in the limbs during the draw cycle to the arrow or other projectile of the device.

A further advantage of the present invention is that it requires less component parts for cam assembly which is highly desirable in the art.

An even further advantage of the present invention is that the cam assembly allows for a modular format which allows the user to change minor components to change parameters of the device (e.g. draw length) without having to change the entire cam assembly or bow.

### BRIEF DESCRIPTION OF THE DRAWINGS

The present invention is disclosed with reference to the accompanying drawings, wherein:

FIG. 1 is a side view of a dual cam compound bow embodying the present invention;

FIG. 2 is a side view of the top cam assembly in a first embodiment of the present invention.

FIG. 3 is a rearview of the top cam assembly in a first embodiment of the present invention.

FIG. 4 is a side view of the bottom cam assembly in a first embodiment of the present invention.

FIG. 5 is a rearview of the bottom cam assembly in a first embodiment of the present invention.

FIG. 6 and 7 show the modular form of the let out portion 64a,b with the draw stop pin 90a,b attached thereto.

FIG. 8 is a side view of the top cam assembly in a second embodiment of the present invention.

FIG. 9 is a side view of the bottom cam assembly in a second embodiment of the present invention.

FIG. 10 is a side view of the top cam assembly in a third embodiment of the present invention.

FIG. 11 is a side view of the bottom cam assembly in a third embodiment of the present invention.

FIG. 12 is a rearview of the top cam assembly in a fourth embodiment of the present invention.

FIG. 13 is a rearview of the bottom cam assembly in a first embodiment of the present invention.

Corresponding reference characters indicate corresponding parts throughout the several views. The examples set out herein illustrate a few embodiments of the invention but should not be construed as limiting the scope of the invention in any manner.

### DETAILED DESCRIPTION

FIG. 1 shows a dual cam compound bow 10 of the present invention. The bow 10 has a frame, which includes bow limbs 12a,b extending from handle 14. Extending from the handle is cable guard 16 and a cable slide 18 through which the power cables 50 and 52 are placed. The bowstring 70 and power cables 50, 52 are attached to the bow 10 at the cam assemblies 30a,b, which further is placed on the limbs via axel 36a,b. The cams 30a,b are shown in greater detail in the following figures.

The cams **30a,b** have bowstring assemblies **40a,b**, each having a single track for the bowstring **70** with each end of the bowstring **70** being attached to the cams **30a,b** at a terminating post (not shown). Further, the each of the cams **30a,b** have terminating posts **80,82** for each of the ends of the respective power cables **50, 52**, and which will be described in more detail herein. Further, each cam assembly **30a,b** has a power cable assembly **60a,b** having either a single track or groove around perimeter of the assembly **60a,b** for receiving or retaining the power cables. Alternatively, the power cable assembly **60a,b** can have the tracks or grooves on the portions of the assembly receiving the cable instead of a unitary track around the perimeter. The power cable assembly **60a,b** has a take up portion **62a,b** and a let out portion **64a,b** for managing the take up and let out of the power cables through a single track.

FIG. 2 shows a side view of the top cam assembly **30a**. FIG. 2 shows one embodiment of the cam **30a** in non-circular shape. The bowstring **70** is in line with the track in the bowstring assembly **40a** and attached with a terminating post (not shown). The power cable assembly **60a** has a take up portion **62a** and a let out portion **64a**, and can either be a unitary piece or be modular. For instance as shown in FIG. 2, the power cable assembly **60a** has a modular unit for the let out portion **64a**, which allows manufacturers to make a single cam assembly with one small piece that can account for varying sizes and preferences by the user. Specifically, this versatility is important because each hunter or archer has different specifications (e.g. draw length) which can be accounted for by having a modular portion to the cam assembly **30a**, and in this case is the let out portion **64a**. The power cable **52**, in FIG. 2, is attached to terminating post **82a** and wraps around the let out portion **64a** and therefore feeds power cable **52** out when the bow is in full draw. On the opposing side of power cable assembly **60a** is power cable **50**, which sits on the take up portion **62a** of the assembly **60a**. Power cable **50** is attached at terminating post **80a**, and is taken up when the bow is in full draw by the take up portion **62a**. The power cable assembly **60a** is attached to the bowstring assembly **30a** by a fastening mechanism, but it will be well recognized the power cable assembly **60a** can be attached to the bowstring assembly **40a** by any means or, if desired, manufactured as a single piece with the bowstring assembly **40a** to make-up top cam assembly **30a**. As shown, the power cable assembly **60a** is attached to the bowstring assembly **40a** by a fastener **78a**. The cam assembly **30a** is attached to the limb **12a** by axel **36a**. Last the take power cable assembly **60a**, either in a unitary form or modular form, may optionally have draw stop pin **90a** attached to stop the draw cycle of the bow. The draw stop pin **90a**, however, does not have to be attached to the power cable assembly **60a** in order to function on the cam assembly **30a**.

FIG. 3 shows the rearview of the top cam assembly. As seen from this perspective, the cam assembly **30a** has one track on the bowstring assembly **40a** for the bowstring **70** and a second track for the power cables **52** and **50** (not shown) on same track but on opposing sides of the power cable assembly **60a**. In FIG. 3, the let out portion **64a** is visible with power cable **52** sitting in the track or groove. Axel **36a** is inserted through the limb **12a** and then the cam assembly **30a** and then the other end of the limb **12a**.

FIG. 4 shows a side view of the bottom cam assembly **30b**. FIG. 4 shows the bottom cam **30b** in non-circular shape as well. The bowstring **70** is in bowstring assembly **40b** and attached with a terminating post (not shown). The power cable assembly **60b** has a take up portion **62b** and a let out portion **64b**, which can either be a unitary piece or as shown can have a modular unit. In FIG. 4, there is a modular assem-

bly shown where the let up portion **64b** can be changed in size and shape according to the user's specifications. The power cable **52**, in FIG. 4, is attached to terminating post **80b** and wraps around the take up portion **62b** and therefore is taken up when the bow is in full draw. On the opposing side of power cable assembly **60b** is power cable **50**, which attaches to terminating post **82b** and wraps around the let out portion **64b**, and is let out when the bow is in full draw position. The power cam assembly **60b** is attached to the bowstring assembly **30b** by a fastening mechanism, the two assemblies can be attached by any means or if desired manufactured as a single piece. As shown, the power cable assembly **60b** is attached to the bowstring assembly **40b** by a fastener **78b**. The cam assembly **30b** is attached to the limb **12b** by axel **36b**. Last the power cable assembly **60b**, either in a unitary or modular form, may optionally have draw stop pin **90b** attached to stop the draw cycle of the bow.

FIG. 5 shows the rearview of the bottom cam assembly **30b**. As seen from this perspective, the cam assembly **30b** has a bowstring assembly **40b** for the bowstring **70**, and a power cable assembly **60b** for both power cables **50,52**. In FIG. 5, power cable **50** is visible because it is sitting on the let out portion **64b** of the power cable assembly **60b**. Axel **36b** allows bottom cam assembly **30b** to rotate when the drawstring is pulled, and holds bottom cam assembly **30b** in limb **12b**.

FIG. 6 and 7 show the modular form of the let out portion **64a,b** and draw stop pin **90a,b** for the cam assemblies **30a,b**. The let out portion **64a,b** and draw stop pins **90a,b** can be attached in any number of ways or can be further manufactured as a unitary piece. Further, as described above, let out portion **64a,b** can be manufactured as a single part of power cable assembly **60a,b**. Therefore, though the modular form is more desirable to personalize the parameters of the device size (e.g. draw length), the cam assembly could be manufactured as a single unit or in varying degrees of pieces.

FIG. 8 and 9 show a side view of a second embodiment of the present invention **100a,b**. FIG. 8 shows the top cam assembly **100a** is in a circular shape. In particular, the power cable assembly **120a** is shown as being in a unitary form, having the take up portion **122a** and let out portion **124a**. The draw stop pin **90a** is not attached to the power cable assembly **120a**, though if preferred the assembly **120a** could be attached to the pin **90a**. Further the bowstring assembly **110a** is also in a circular or disc shape with power cable assembly **120a** attached thereto. FIG. 9 exemplifies the bottom cam assembly **100b** for the second embodiment, which is in a circular or disc shape. Generally the other components of the cam assemblies **100a,b** are similar to those shown in the first embodiment.

FIGS. 10 and 11 show a third embodiment of the present invention, wherein the cam assembly **200a,b** have a circular portion for the bowstring track **110a,b** and a non-circular power cable assembly **60a,b**. It will be understood that other embodiments could include a non-circular portion for the bowstring assembly and a circular power cable assembly and, again, can be either modular or unitary form. Further other geometrical shapes, such as ovalar, may be used in varying forms for either the bowstring or power cable assembly.

Still another embodiment could include a three track system, as shown in the rearview perspectives of FIG. 12 and 13. The three track system would be used where there are four power cables. This type of embodiment would include two power cable assemblies as described above, both of which would be attached to the bowstring assembly.

In use, using the first embodiments as an exemplar and in reference to FIGS. 1-3, the bowstring **70** is pulled rearward toward the hunter or archer. The tension by the bowstring

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forces the cam assemblies **30a, b** to rotate rearward. Focusing on FIG. 1, the power cable assembly **60a** on top cam assembly **30a** is moved upward as the entire cam **30a** is moved rearward. The terminating post **80**, with power cable **50** attached, moves upward, and therefore causes take up of power cable **50**. On the bottom cam assembly **30b** the cam **30b** is also moved rearwardly. The positioning of the power cable assembly **60** and power cable **50** causes power cable **50** to be let out on the bottom cam assembly **30a**. The same is true in the opposite manner for power cable **52** (i.e. power cable **52** is taken up) on the cam assemblies **30a, b**. Accordingly energy is stored in the limbs of the device and transferred to the arrow or other projectile placed in the compound bow in a highly efficient manner with little shock to the user.

Though the compound bow embodying the invention may have differing specifications, the bow may have a brace height of about eight (8) inches and axel-to-axel length of about thirty-two and half (32½) inches. The draw length can range from twenty-seven (27) to thirty (30) inches and a draw weight between sixty (60) to eighty (80) inches.

It should be particularly noted that dual track cam disclosed in this invention has a highly efficient and powerful performance. With respect to speed, the following performance results were noted in a twenty-nine (29") inch draw cycle, sixty pound (60 lbs.) draw weight compound bow, in testing completed by Archery Evolution:

Arrow (Grains)	300	360	420	540
Speed (ft./sec.)	307.3	283.5	264.2	235.4
Kinetic Energy (ft.lbs.)	62.9	64.2	65.1	66.4
Momentum	13.2	14.6	15.9	18.2
Dynamic Efficiency	83.7%	85.5%	86.7%	88.5%
Noise Output (dBA)	88.7	84.1	85.5	87.1
Total Vibration (G)	222.8	234.4	228.7	188.6

While the invention has been described with reference to particular embodiments, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted for elements thereof without departing from the scope of the invention. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the invention without departing from the scope of the invention.

Therefore, it is intended that the invention not be limited to the particular embodiments disclosed as the best mode contemplated for carrying out this invention, but that the invention will include all embodiments falling within the scope and spirit of the appended claims.

The invention claimed is:

1. A compound bow comprising:

a handle portion;

an upper limb portion having at least one cam assembly rotatably mounted thereon;

a lower limb portion having at least one cam assembly rotatably mounted thereon;

at least one said cam assembly comprising:

a bowstring cam component having a track for receiving a bowstring and an attached draw stop pin;

a power cable cam component having a take up portion and a modular let out portion;

said take up portion including a track for receiving a power cable; said modular let out portion including a track for receiving a power cable; the tracks for the take up portion and let out portion being substantially coplanar; and wherein

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said modular let out portion is sized and shaped to change operating parameters, including a draw length parameter of said compound bow, and is designed to be interchanged with another modular let out portion being of a different size and shape to change said operating parameters of said compound bow.

2. The compound bow of claim 1 wherein a said power cable cam component is of a substantially non-circular shape.

3. The compound bow of claim 1 wherein a said power cable cam component is of a substantially circular shape.

4. The compound bow of claim 1 wherein a said power cable cam component is of a substantially ovalular shape.

5. The compound bow of claim 1 wherein said let out portion is attached to said draw stop pin.

6. The compound bow of claim 1 wherein a said draw stop pin is attached to said power cable cam component.

7. The compound bow of claim 1 wherein a said draw stop pin is attached to said bowstring cam component.

8. The compound bow of claim 1 wherein said bowstring cam component includes a slotted opening.

9. The compound bow of claim 8 wherein a said draw stop pin is attached to said bowstring cam component while being inserted through said slotted opening.

10. The compound bow of claim 9 wherein a location of said draw stop pin can be adjusted within said slotted opening.

11. The compound bow of claim 10 wherein a position of said let out portion is adjustable by adjusting a location of said draw stop pin within said slotted opening.

12. The compound bow of claim 1 wherein the tracks on said take up portion and said let out portion of said power cable cam component are a continuous track around at least a portion on the periphery of said power cable cam component.

13. The compound bow of claim 1 wherein the tracks on said take up portion and said let out portion of the power cable cam component are distinct, non-continuous tracks on the periphery of said power cable cam component.

14. A compound bow comprising:

a handle portion;

an upper limb portion having at least one cam assembly rotatably mounted thereon;

a lower limb portion having at least one cam assembly rotatably mounted thereon;

at least one said cam assembly comprising:

a bowstring cam component having a track for receiving a bowstring and a draw stop pin;

a power cable cam component having a take up portion and a let out portion; said take up portion including a track for receiving a power cable; said let out portion including a track for receiving a power cable; the tracks for the take up portion and let out portion being substantially coplanar; and wherein

said let out portion is sized and shaped to set operating parameters of said compound bow and is attached to said draw stop pin.

15. The compound bow of claim 14 wherein a said power cable cam component is of a substantially non-circular shape.

16. The compound bow of claim 14 wherein a said power cable cam component is of a substantially circular shape.

17. The compound bow of claim 14 wherein a said power cable cam component is of a substantially ovalular shape.

18. The compound bow of claim 14 wherein a said draw stop pin is attached to said bowstring cam component.

19. The compound bow of claim 14 wherein said bowstring cam component includes a slotted opening.

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20. The compound bow of claim 19 wherein a said draw stop pin is attached to said bowstring cam component while being inserted through said slotted opening.

21. The compound bow of claim 20 wherein a location of said draw stop pin can be adjusted within said slotted opening.

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22. The compound bow of claim 21 wherein a position of said let out portion is adjustable by adjusting a location of said draw stop pin within said slotted opening.

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