US 20240085140A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2024/0085140 A1**

**Hyde et al.** (43) **Pub. Date: Mar. 14, 2024**

(54) **CAM SYNCHRONIZATION DEVICE FOR ARCHERY BOW**

(71) Applicant: **Bowtech, LLC**, Eugene, OR (US)

(72) Inventors: **Tony Hyde**, Potlatch, ID (US); **Joshua Stevens**, Harrisburg, OR (US); **Jacob Jurasevich**, Eugene, OR (US); **Brian Owens**, Creswell, OR (US)

(21) Appl. No.: **17/944,917**

(22) Filed: **Sep. 14, 2022**

**Publication Classification**

(51) **Int. Cl.**

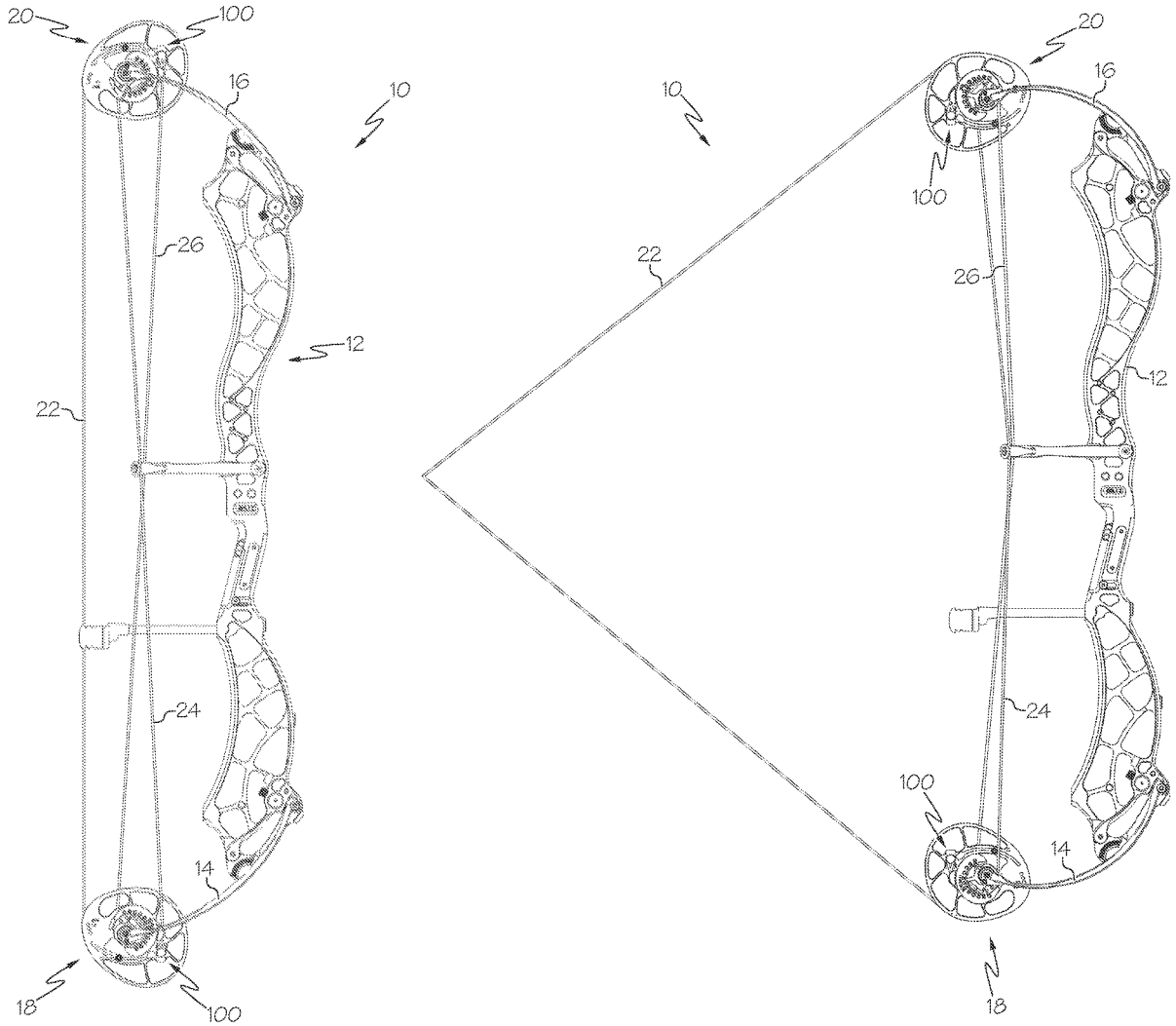
| | |
|---|---|
| ***F41B 5/10*** | (2006.01) |
| ***F41B 5/14*** | (2006.01) |

(52) **U.S. Cl.**

CPC ..... ***F41B 5/105*** (2013.01); ***F41B 5/1403*** (2013.01)

(57) **ABSTRACT**

A timing adjustment assembly for a compound archery bow is provided. The timing adjustment assembly is coupled with a pulley assembly and power cable of the archery bow. The timing adjustment assembly includes an adjustable component and a stationary component. The stationary component is attached to either the pulley assembly, the power cable, or the riser of the archery bow. The adjustable component is configured to move in a linear direction between multiple positional arrangements relative to the stationary component. The movement of the adjustable component changes the effective length of the power cable by moving the termination anchor point of the power cable or deflecting the power cable. The timing adjustment assembly adjusts the effective length of the power cable and relative synchronization of the pulley assembly with the archery bow in a brace position through the change in termination anchor point or deflection.



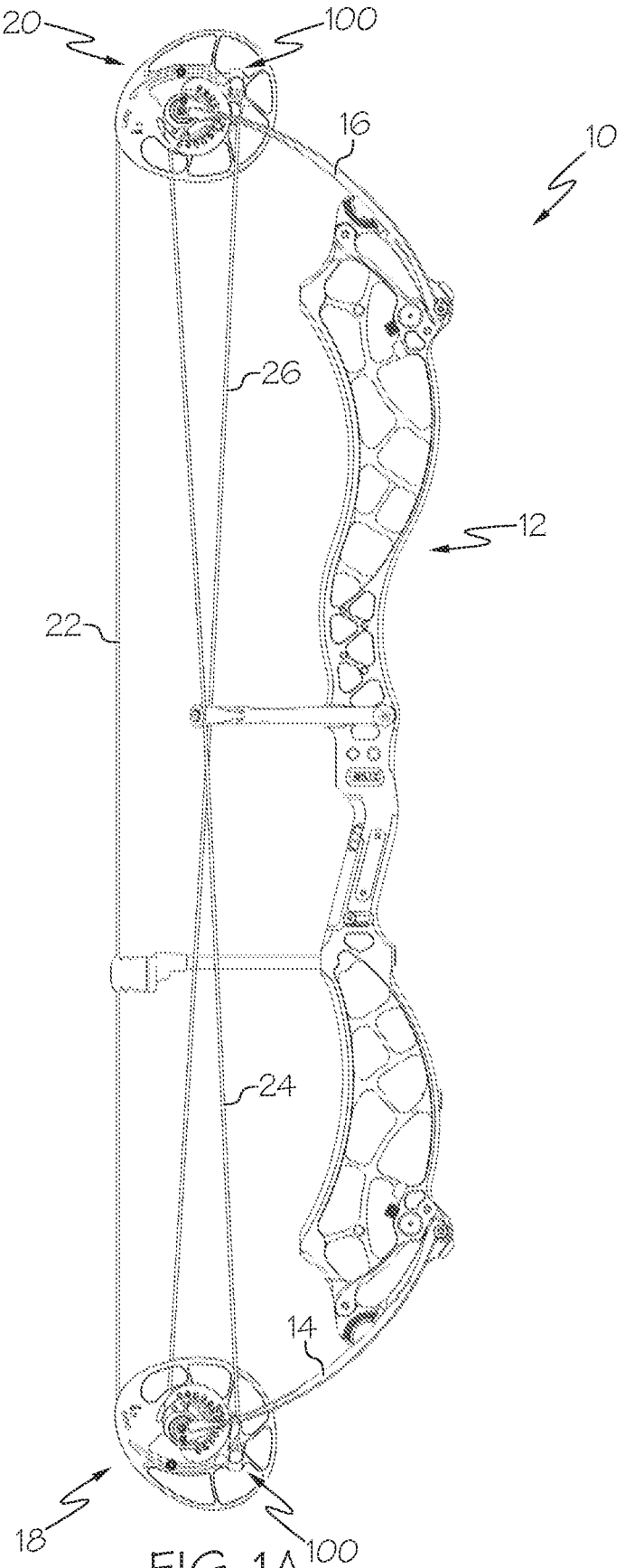



FIG. 1A

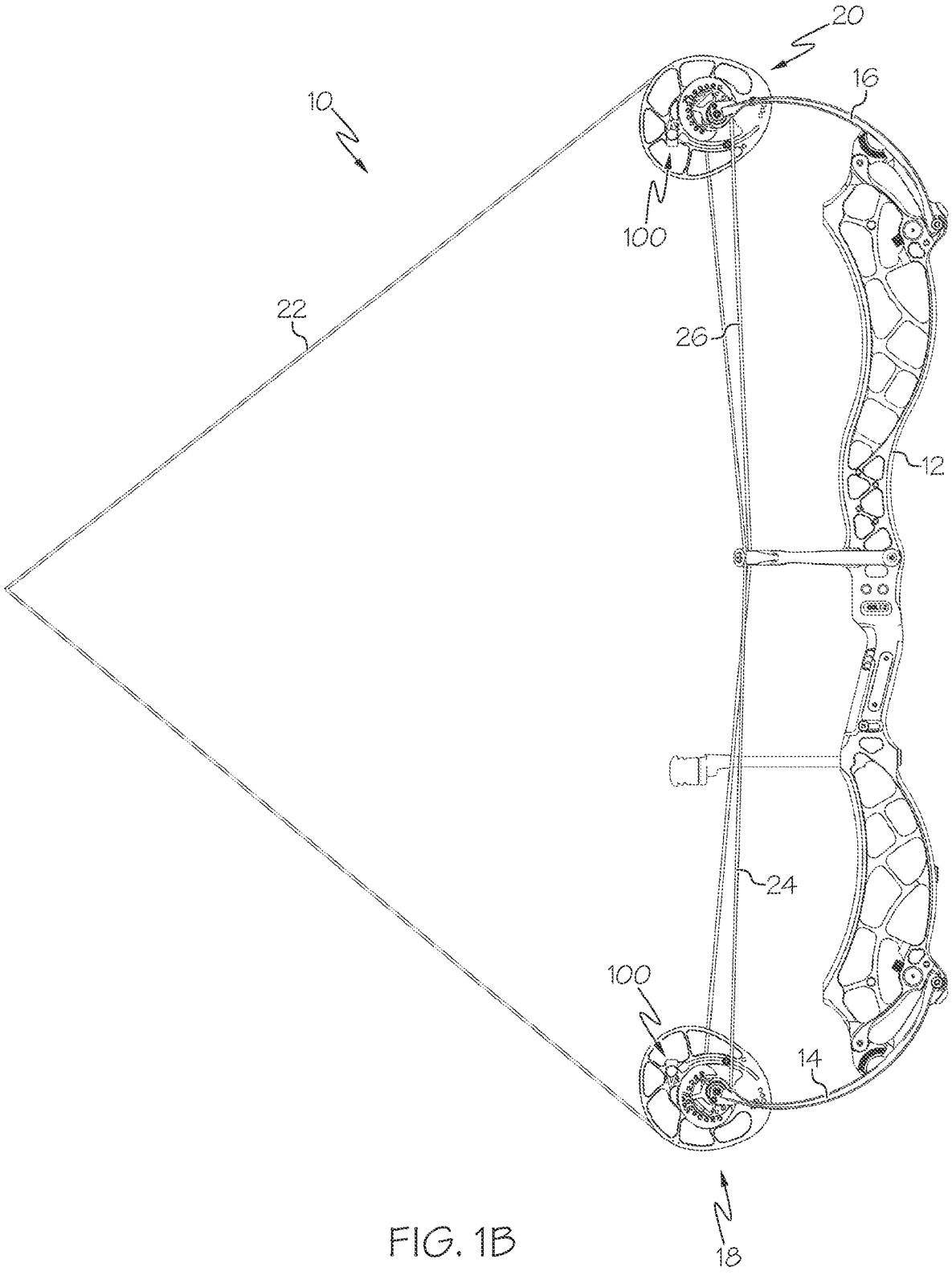



FIG. 1B

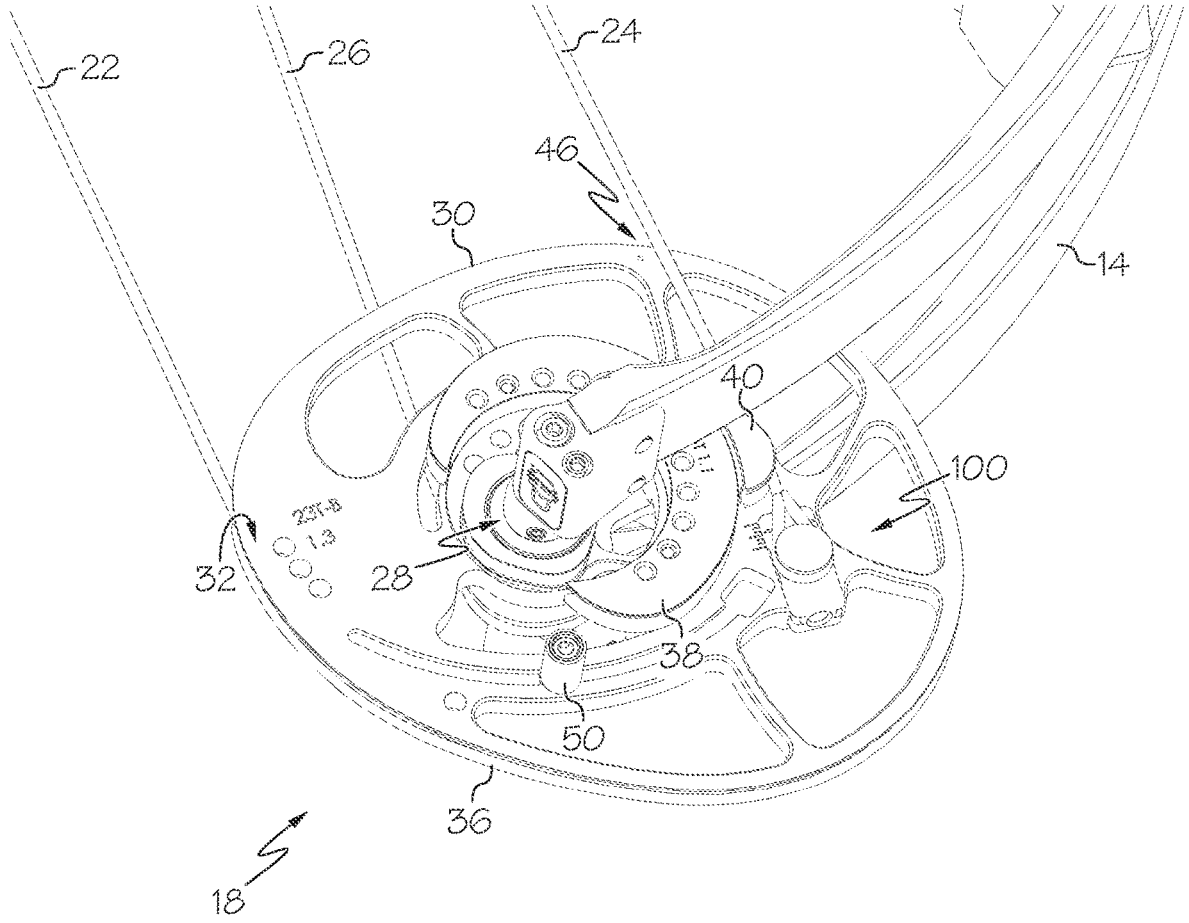



FIG. 2A

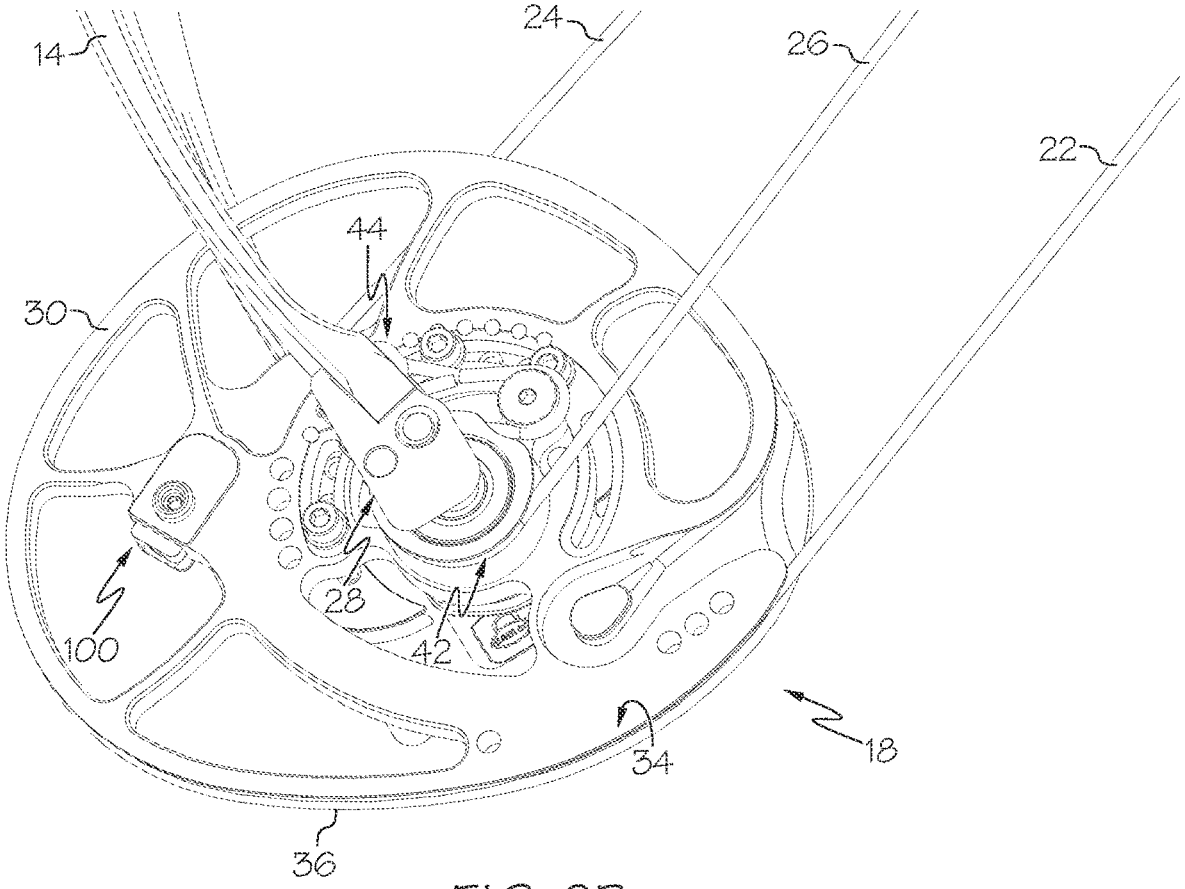



FIG. 2B

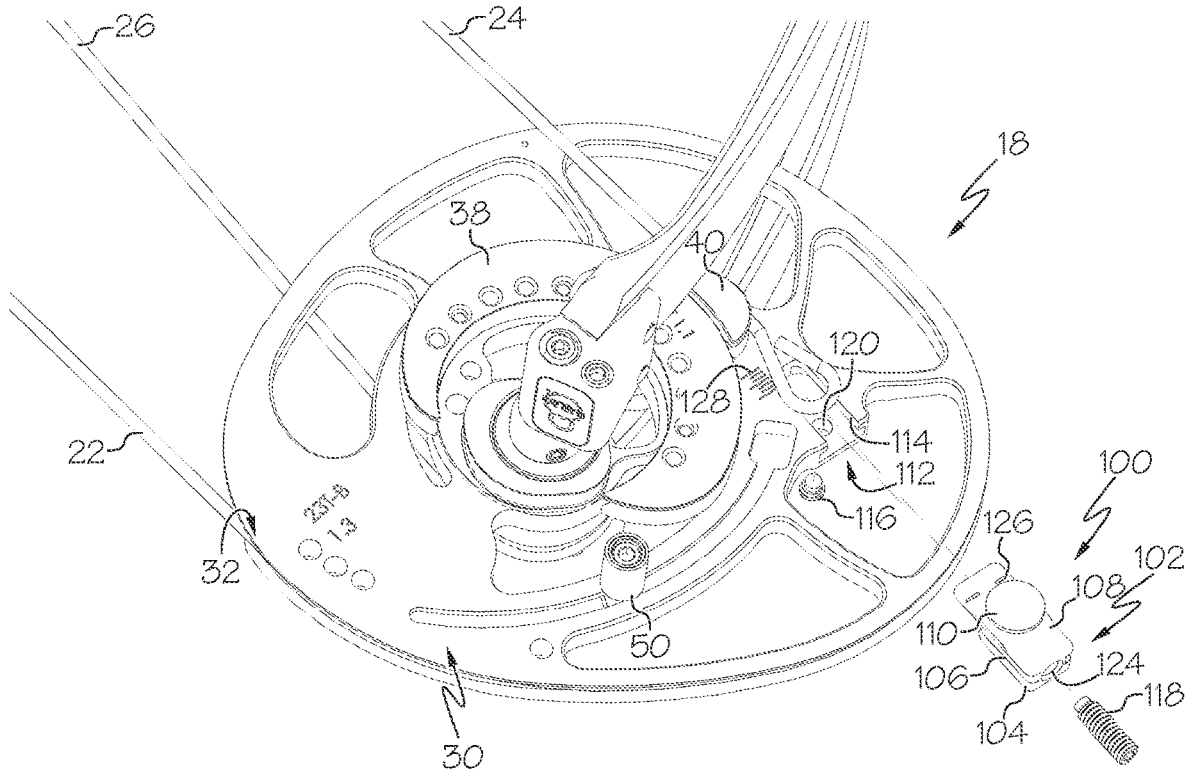

26
24
18
38
40
120
128
114
112
116
22
100
126
102
108
110
124
106
118
104
32
50
30

FIG. 3A

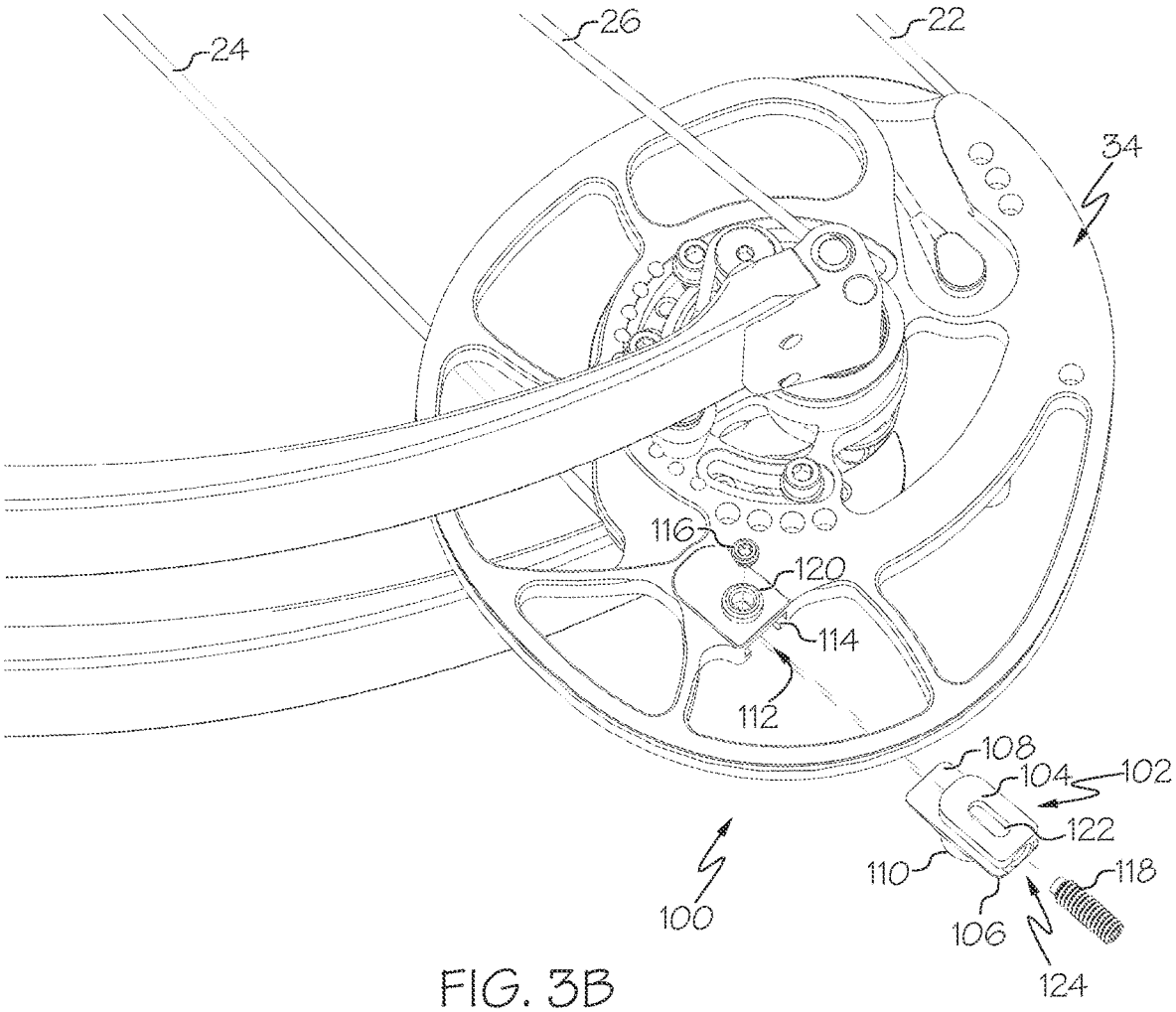



FIG. 3B

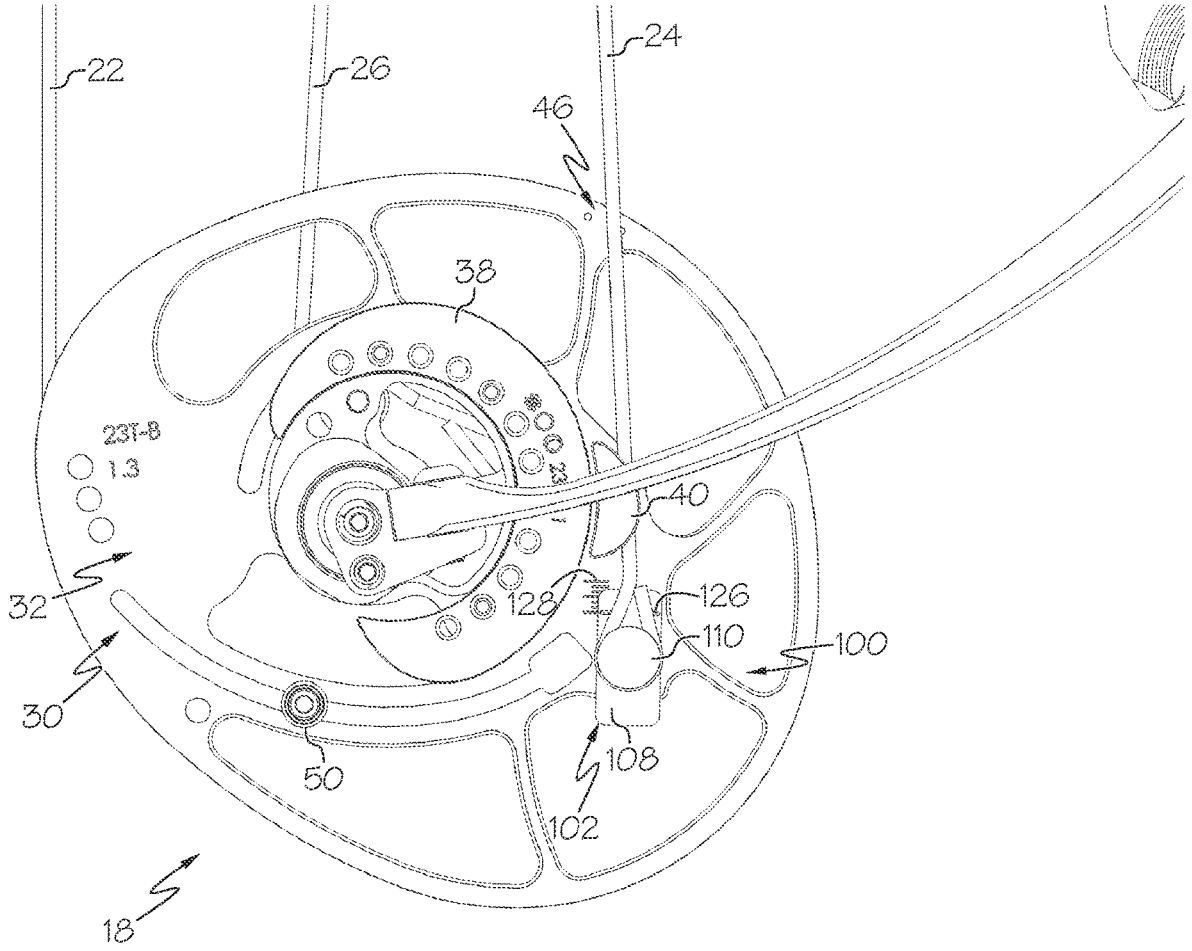



FIG. 4A

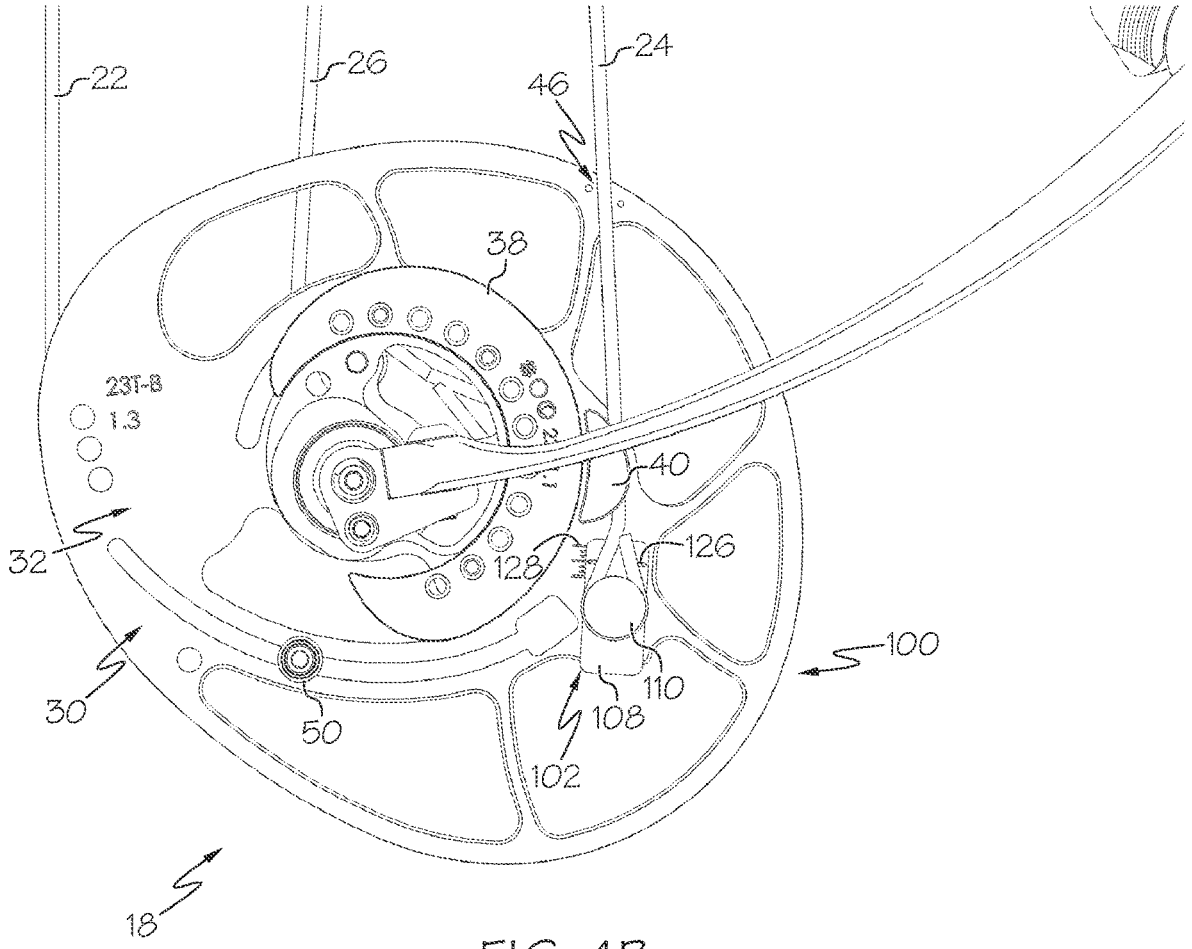



FIG. 4B

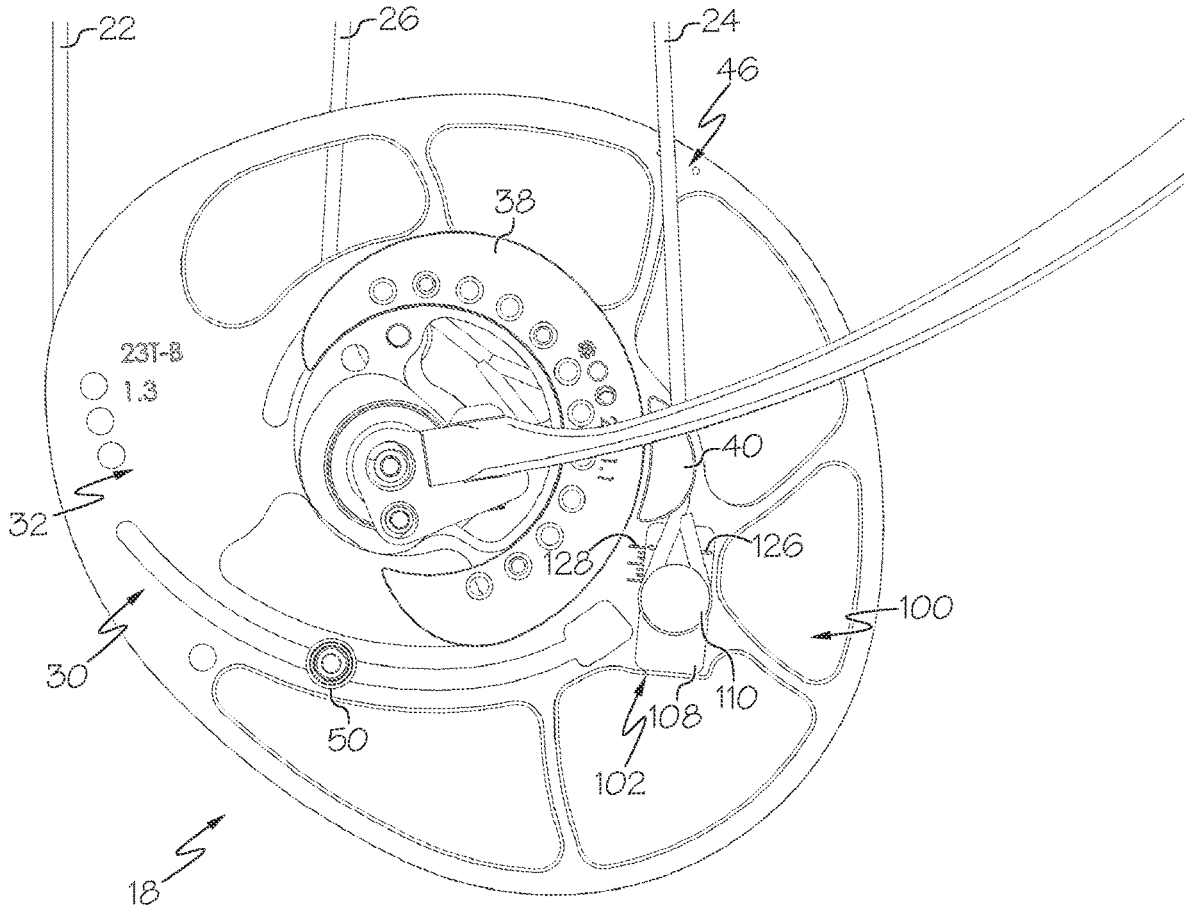



FIG. 4C

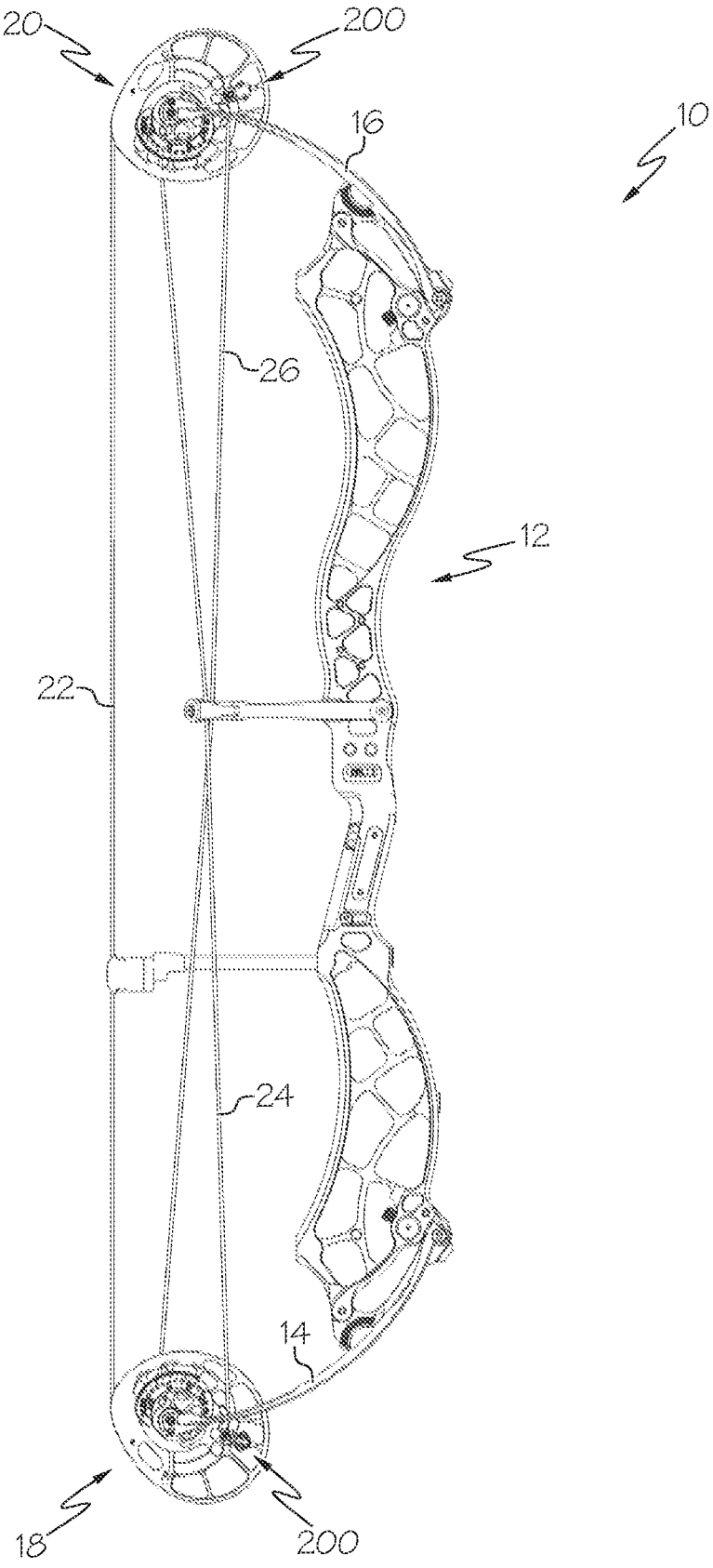



FIG. 5A

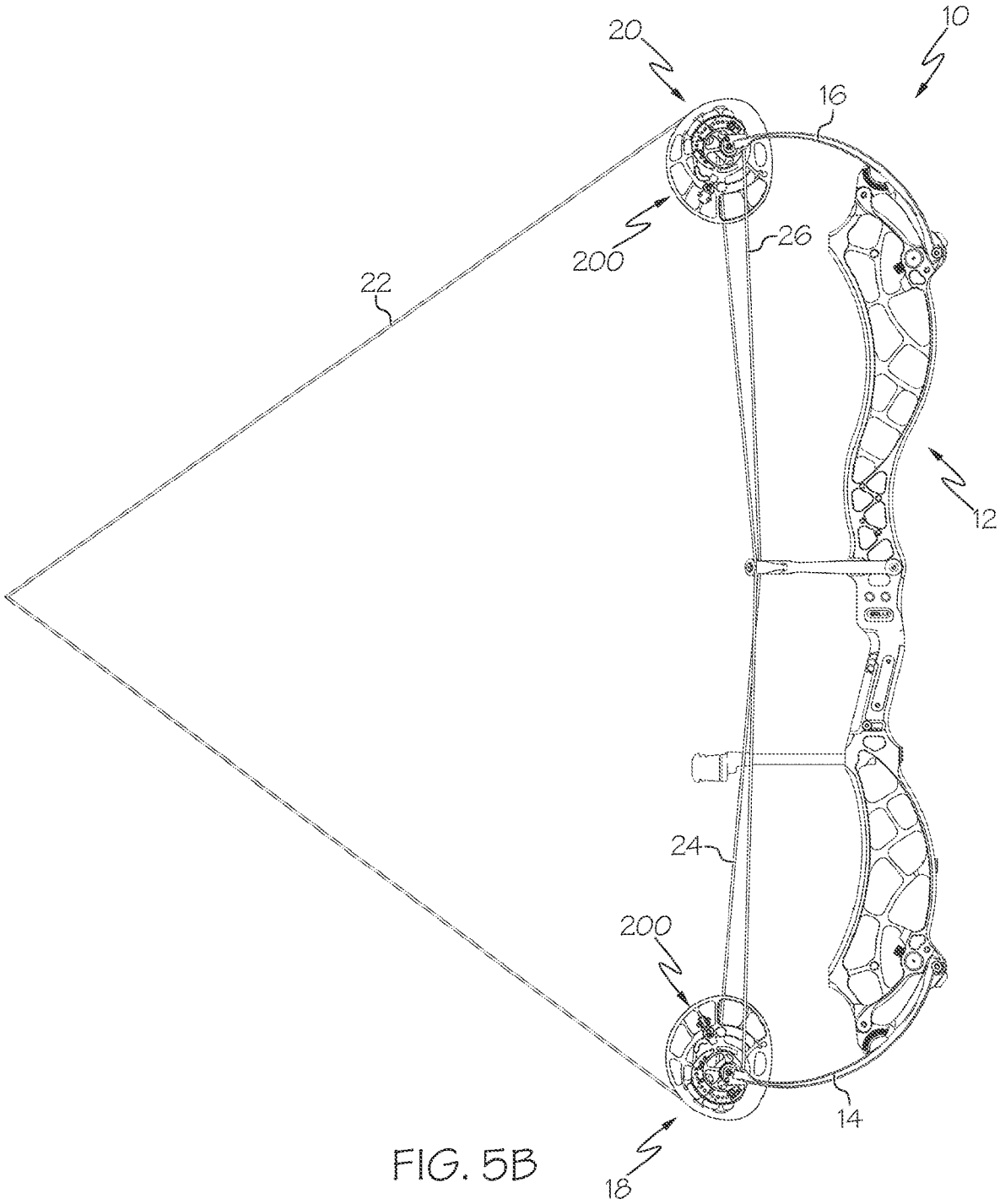



FIG. 5B

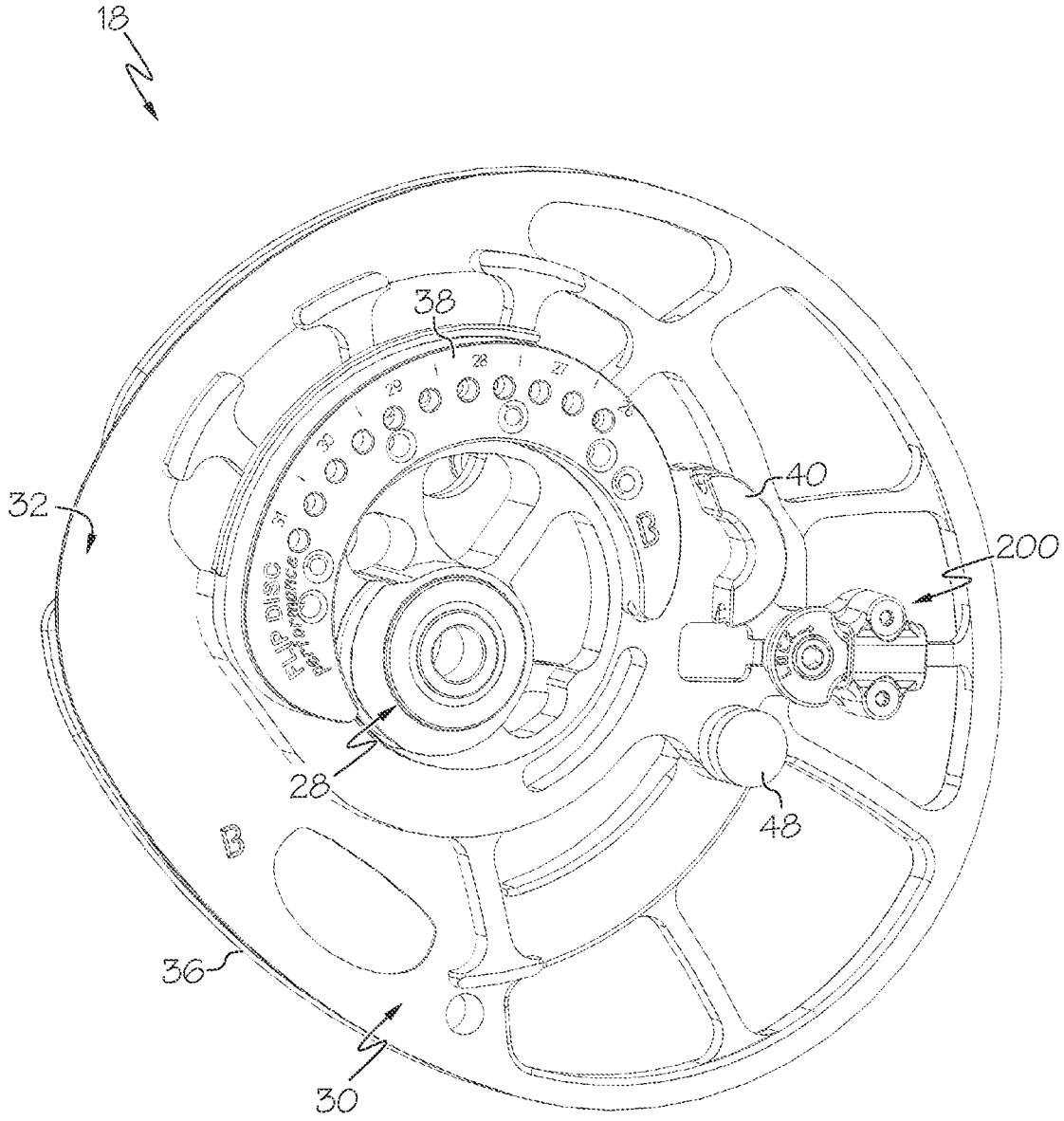



FIG. 6A

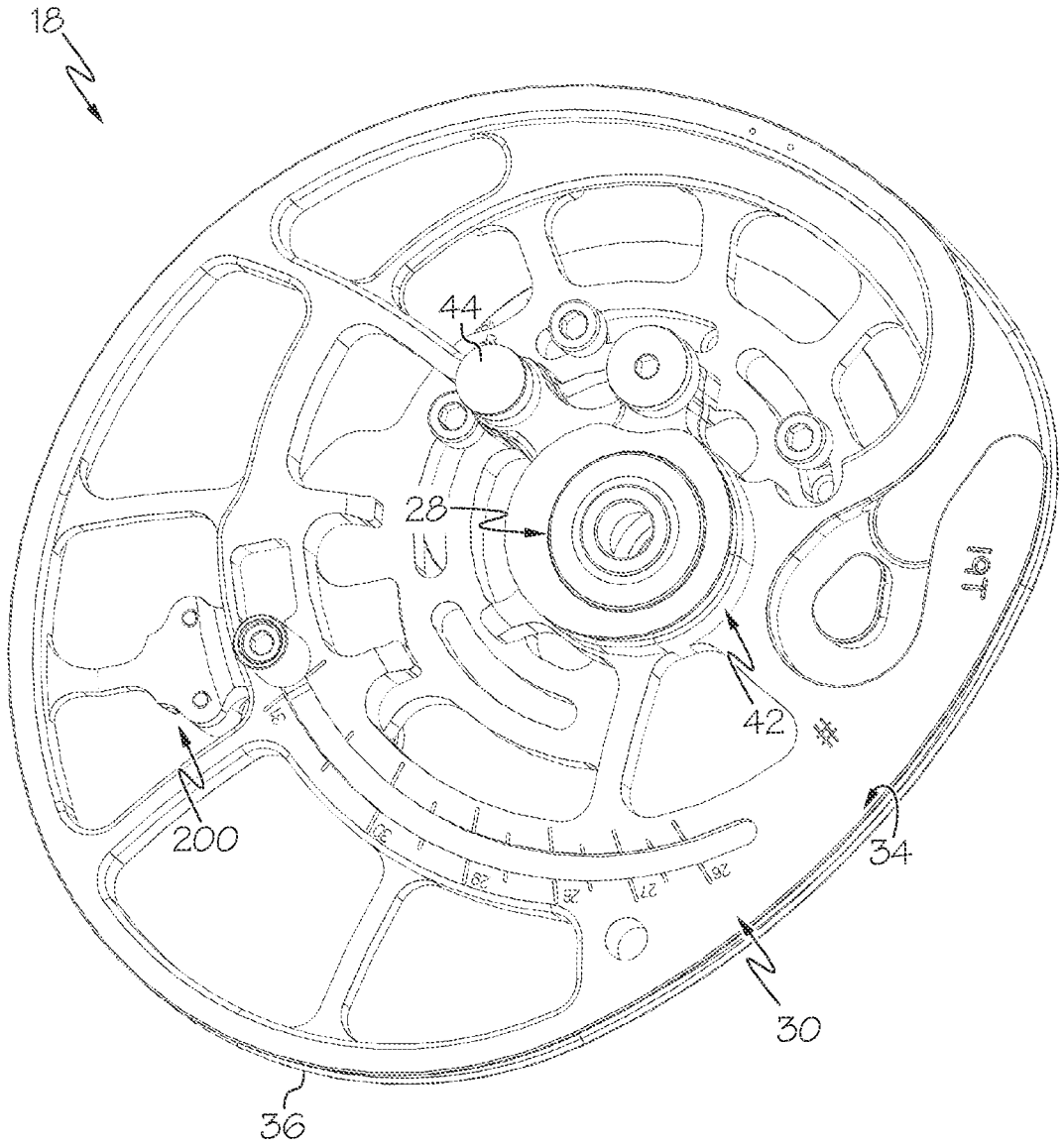



FIG. 6B

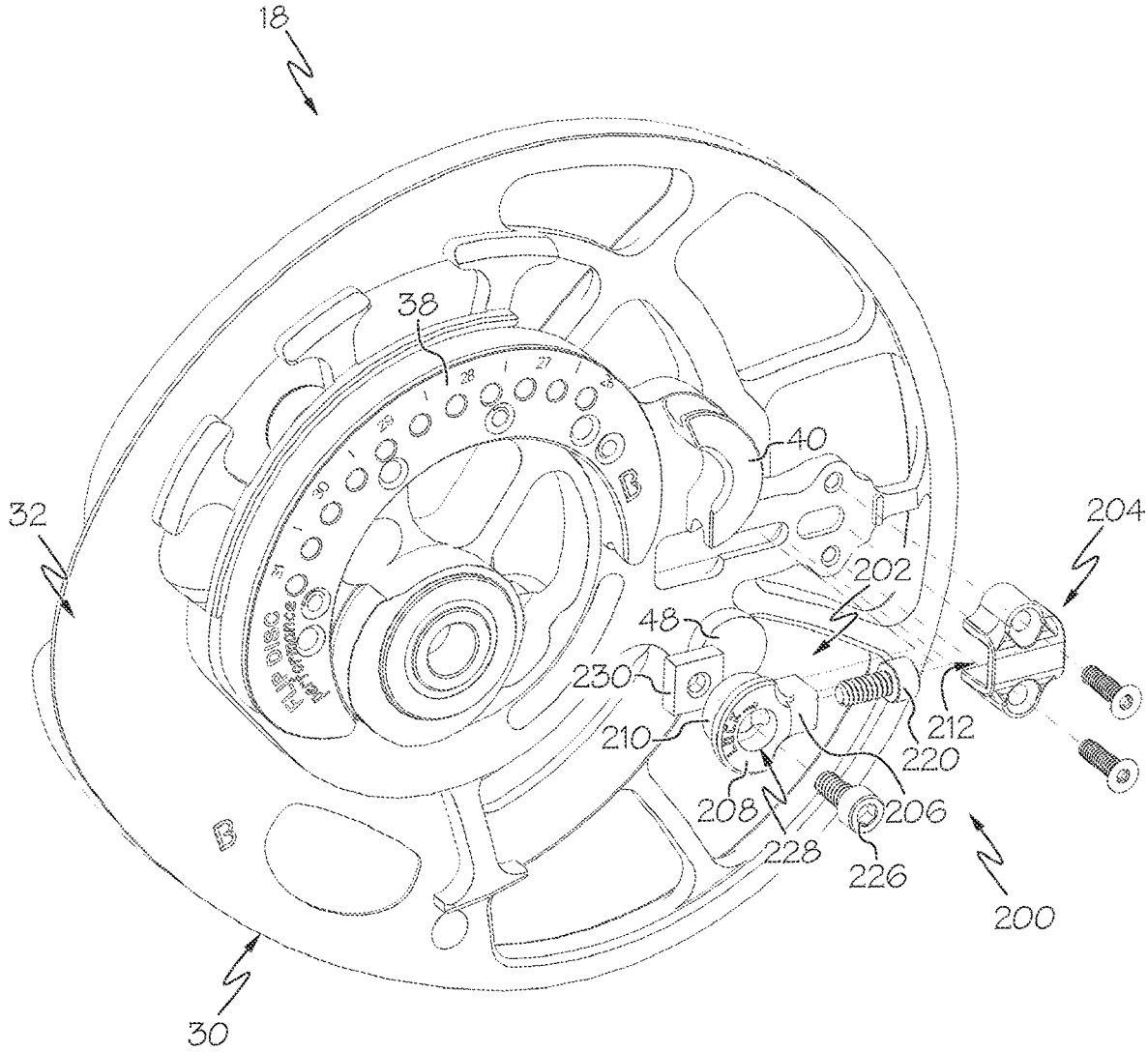



FIG. 7A

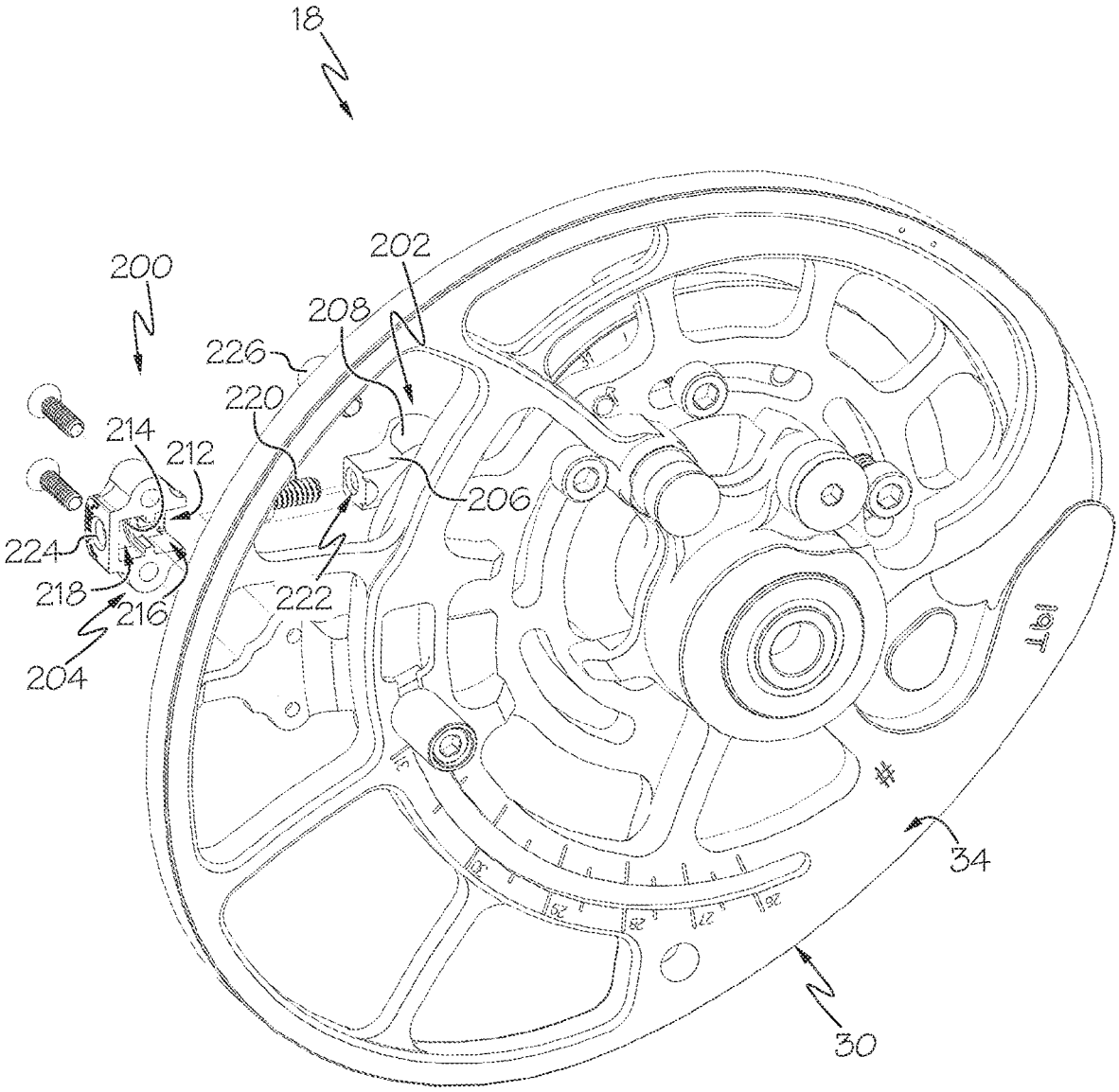



FIG. 7B

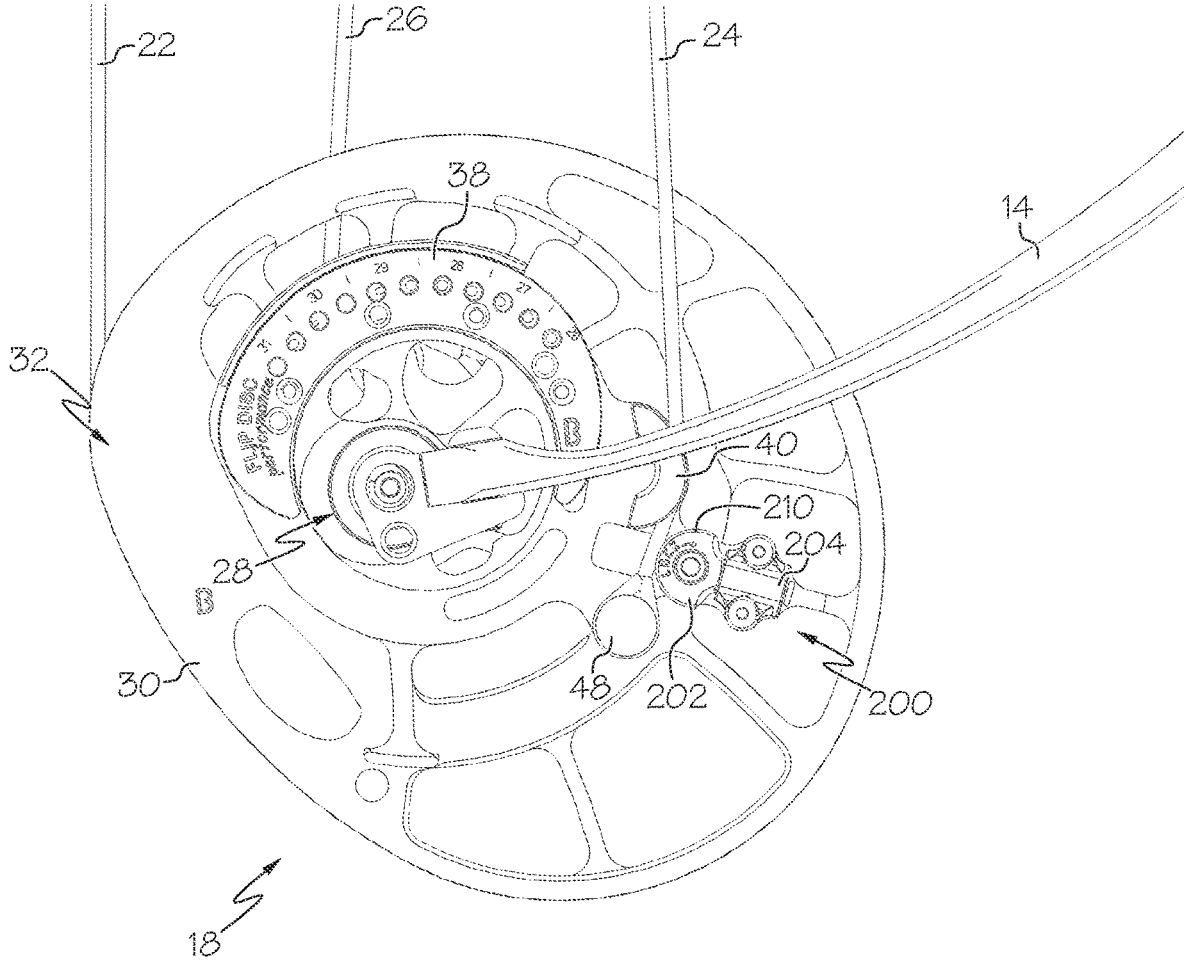



FIG. 8A

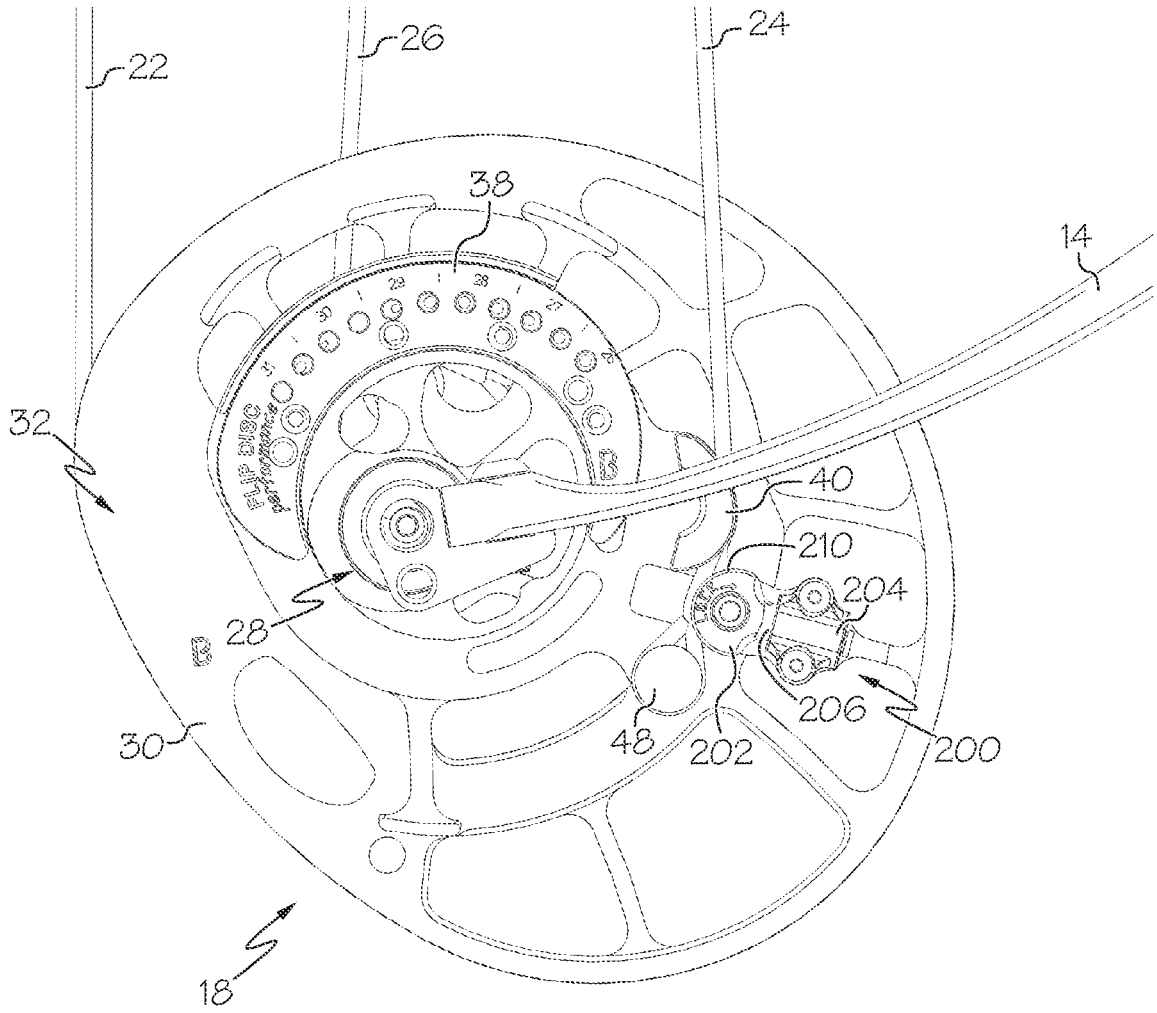



FIG. 8B

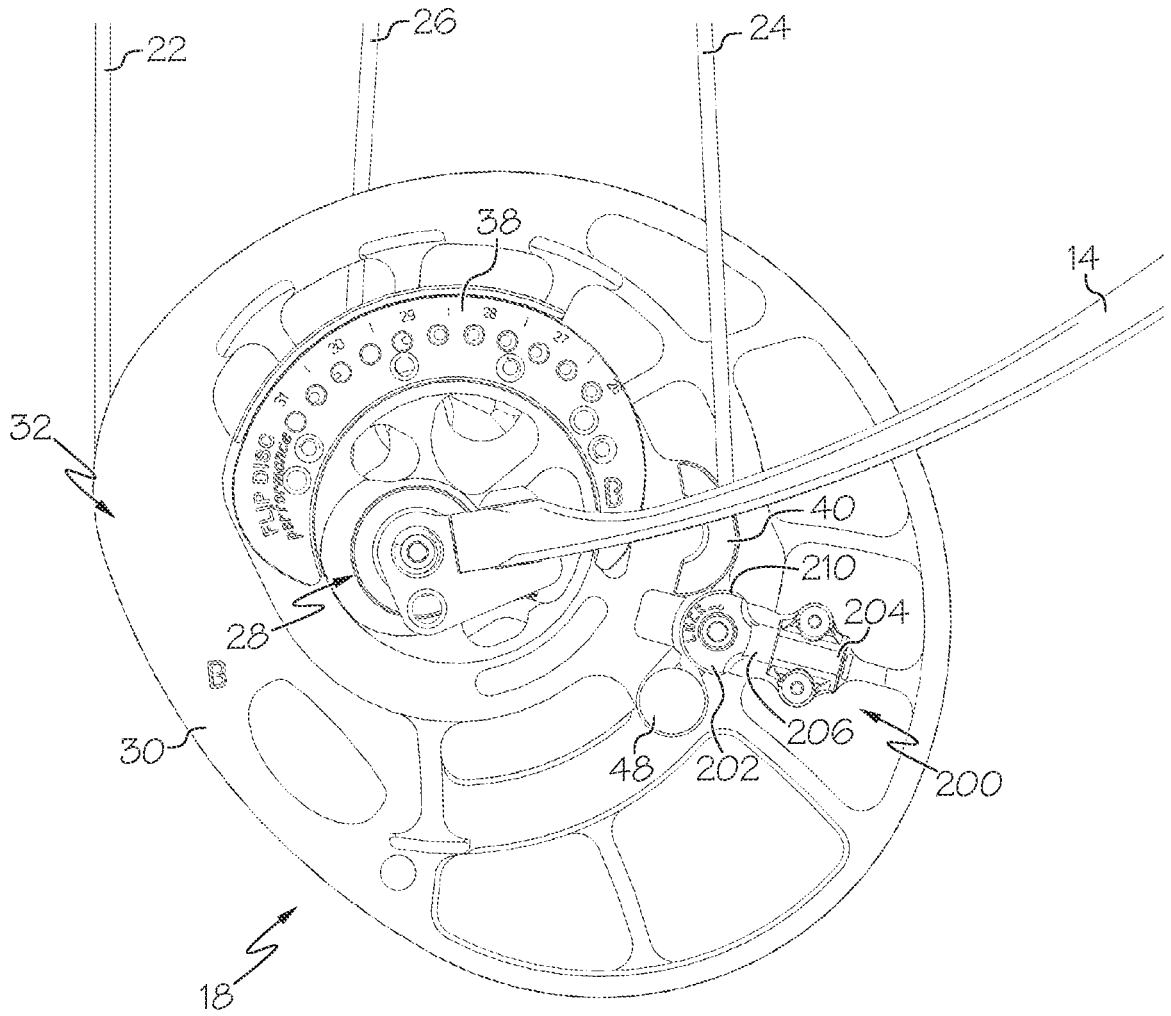



FIG. 8C

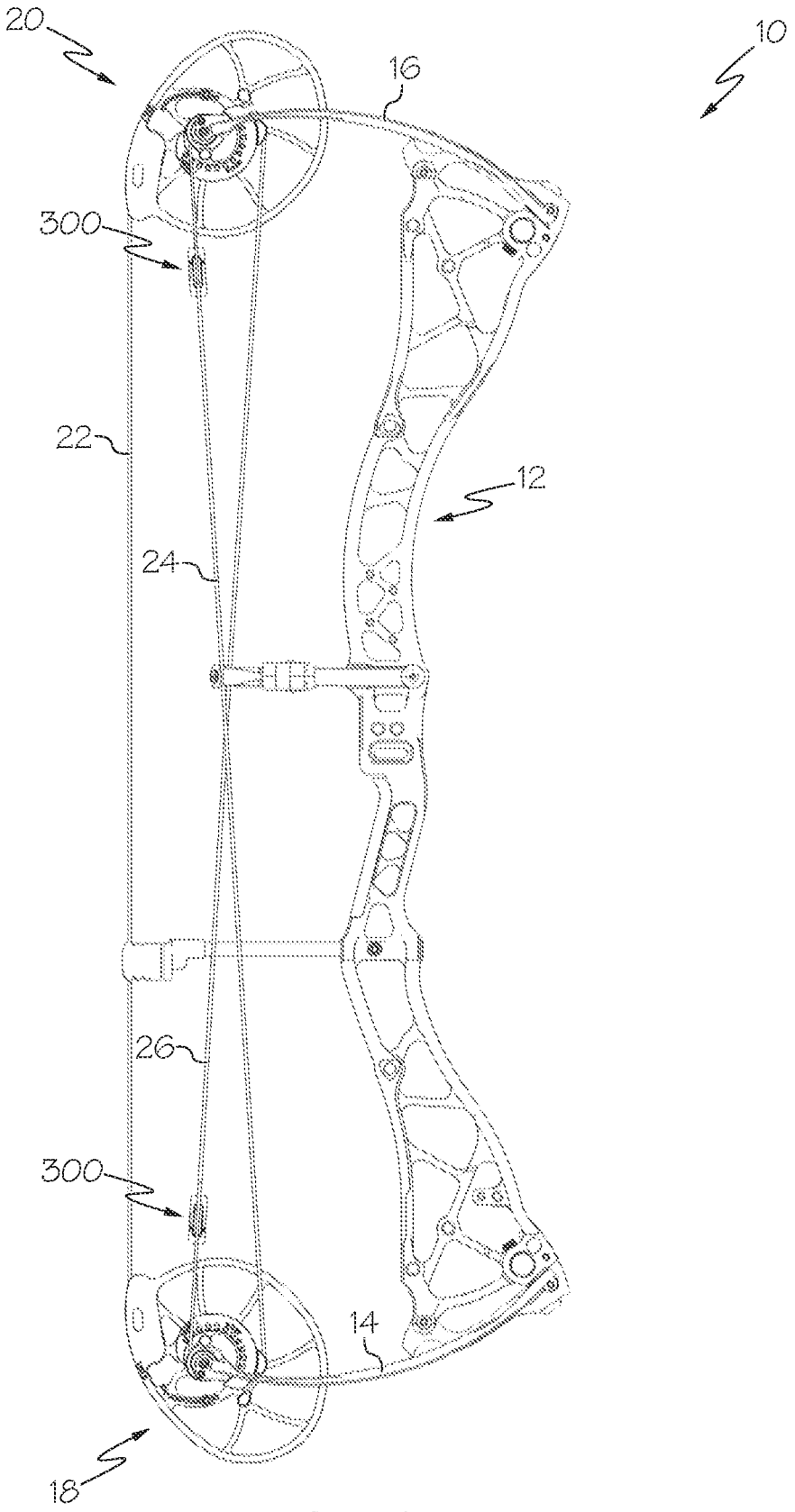



FIG. 9A

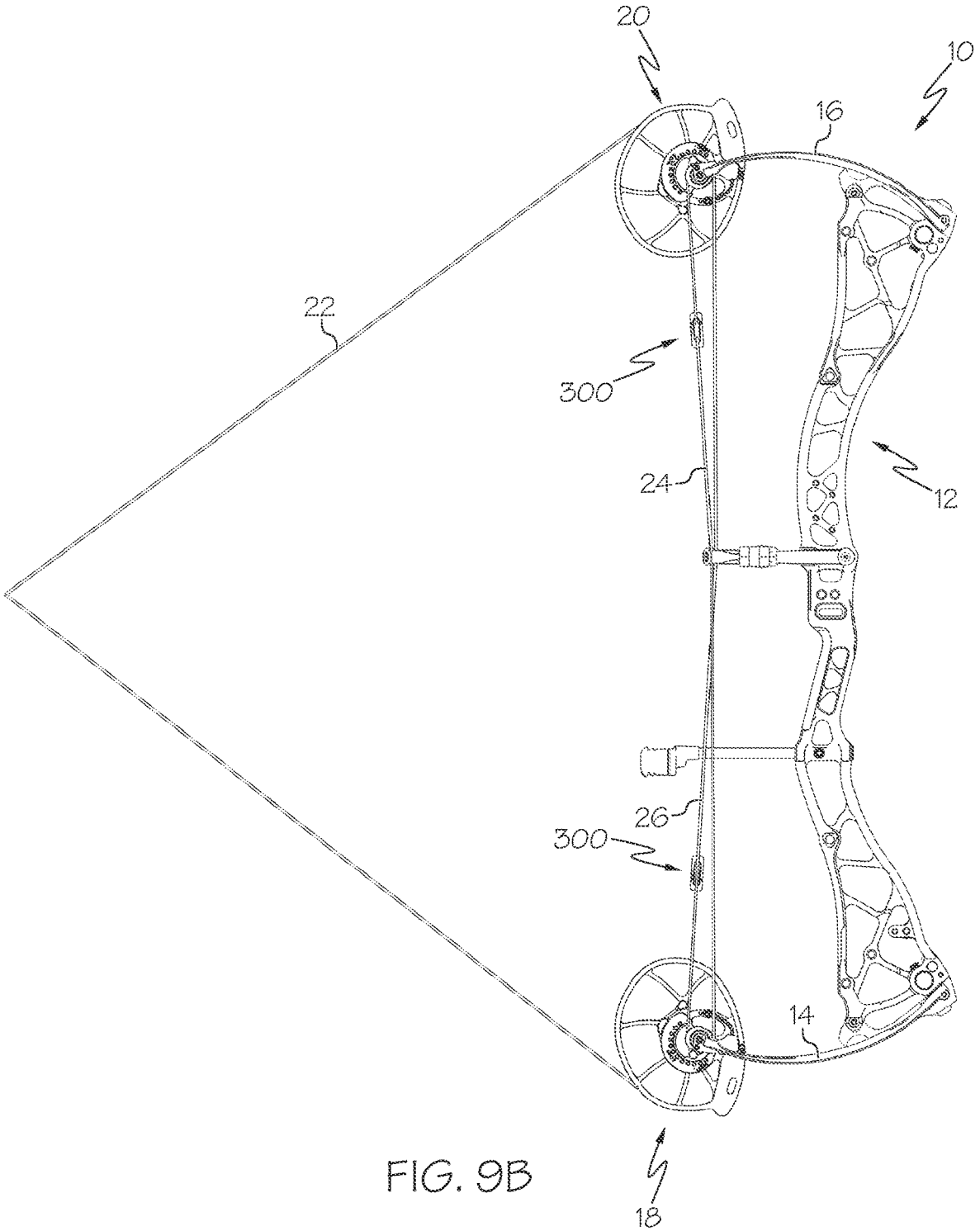



FIG. 9B

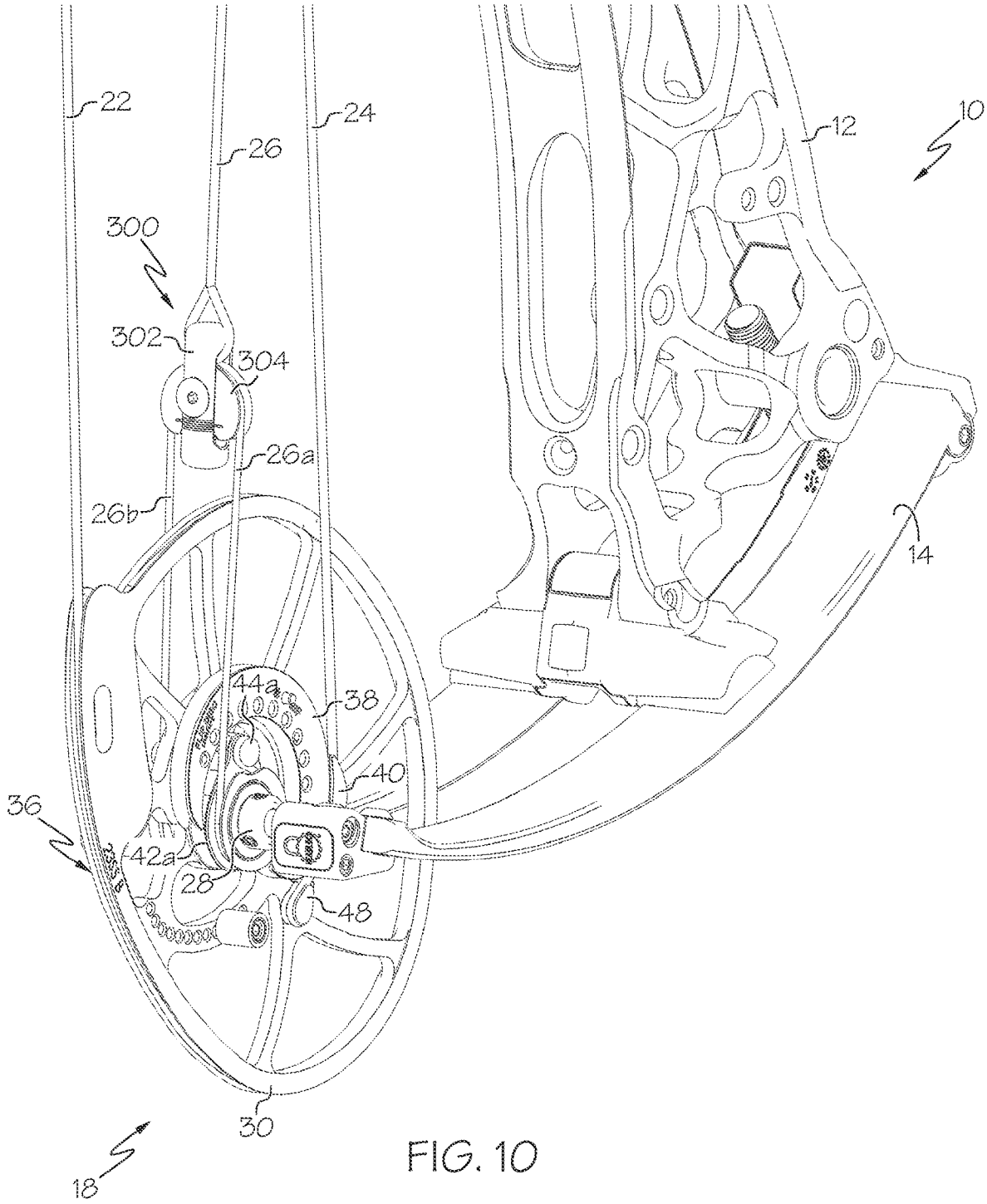



FIG. 10

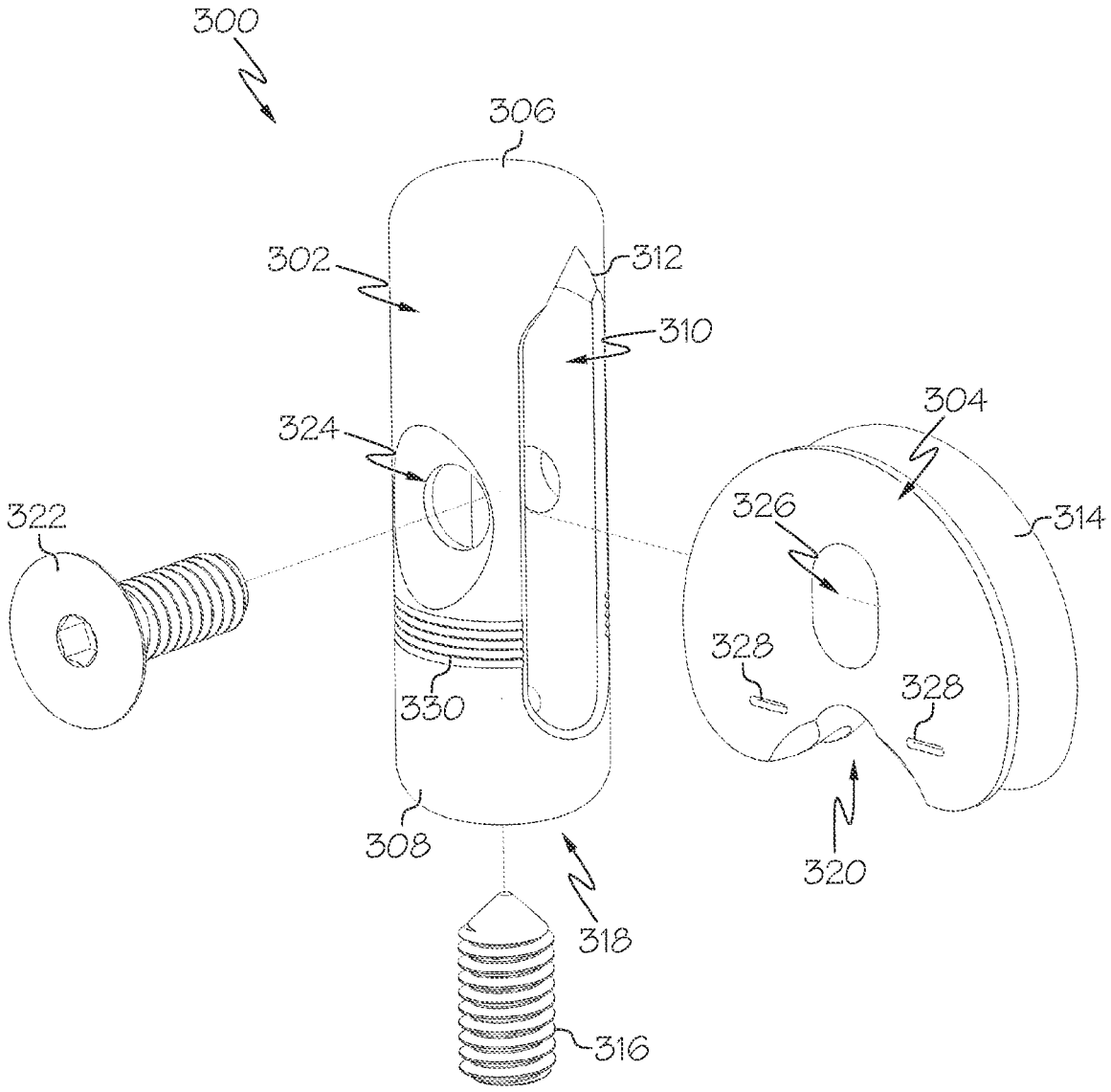

300
306
302
312
310
304
324
326
314
322
328
328
330
308
320
318
316

FIG. 11A

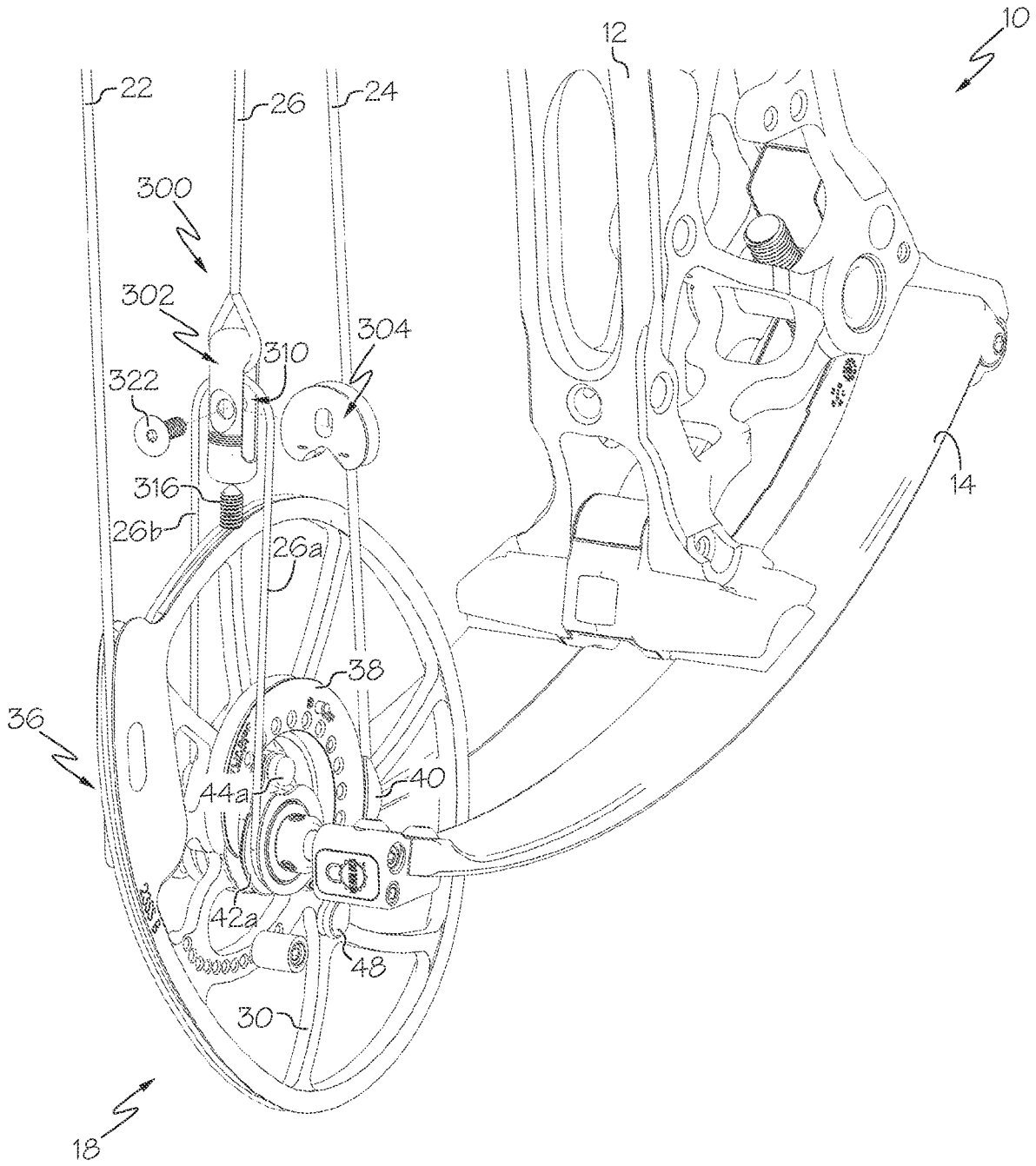

10
12
22
26
24
300
302
304
310
322
316
26b
26a
14
38
36
44a
40
42a
48
30
18

FIG. 11B

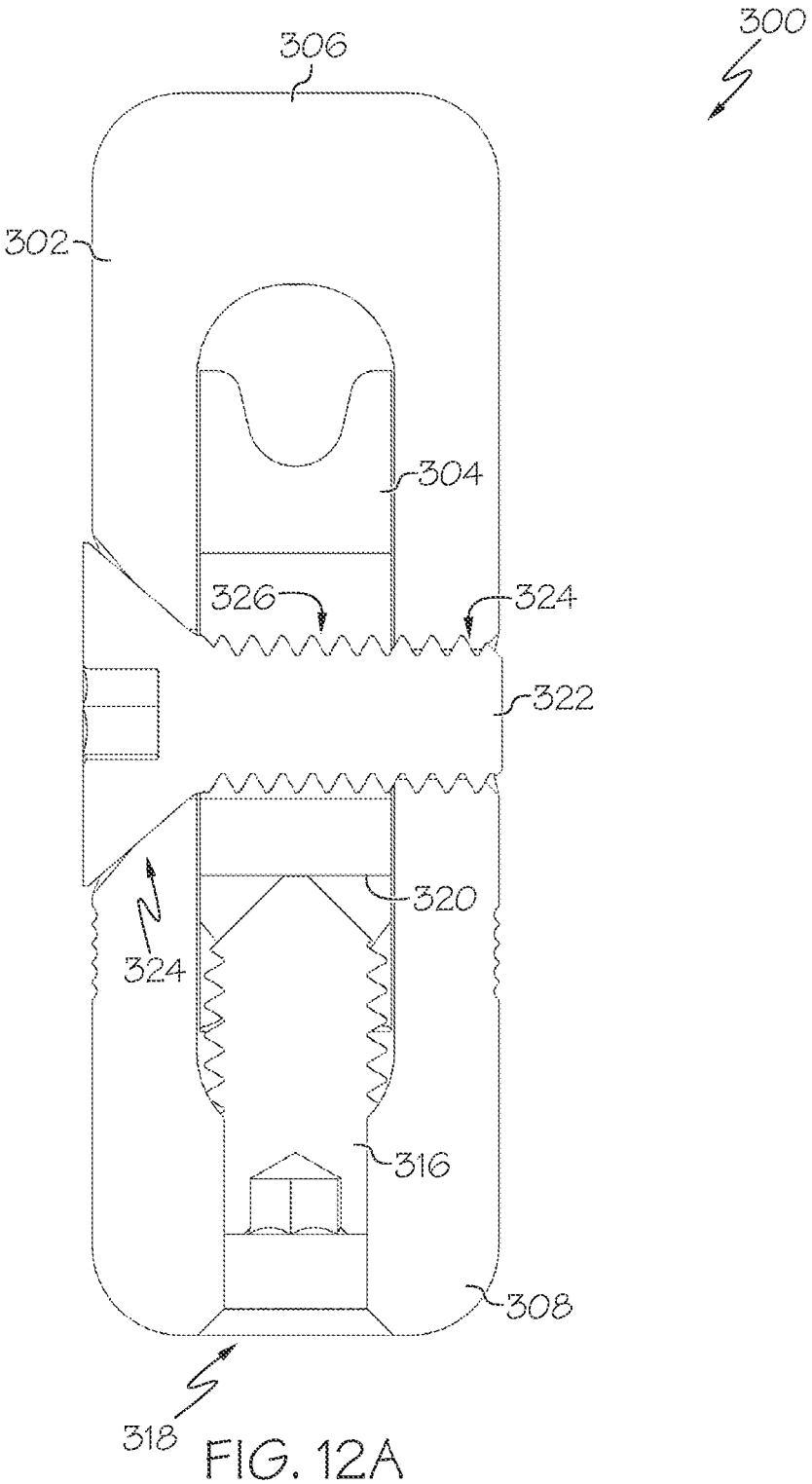



FIG. 12A

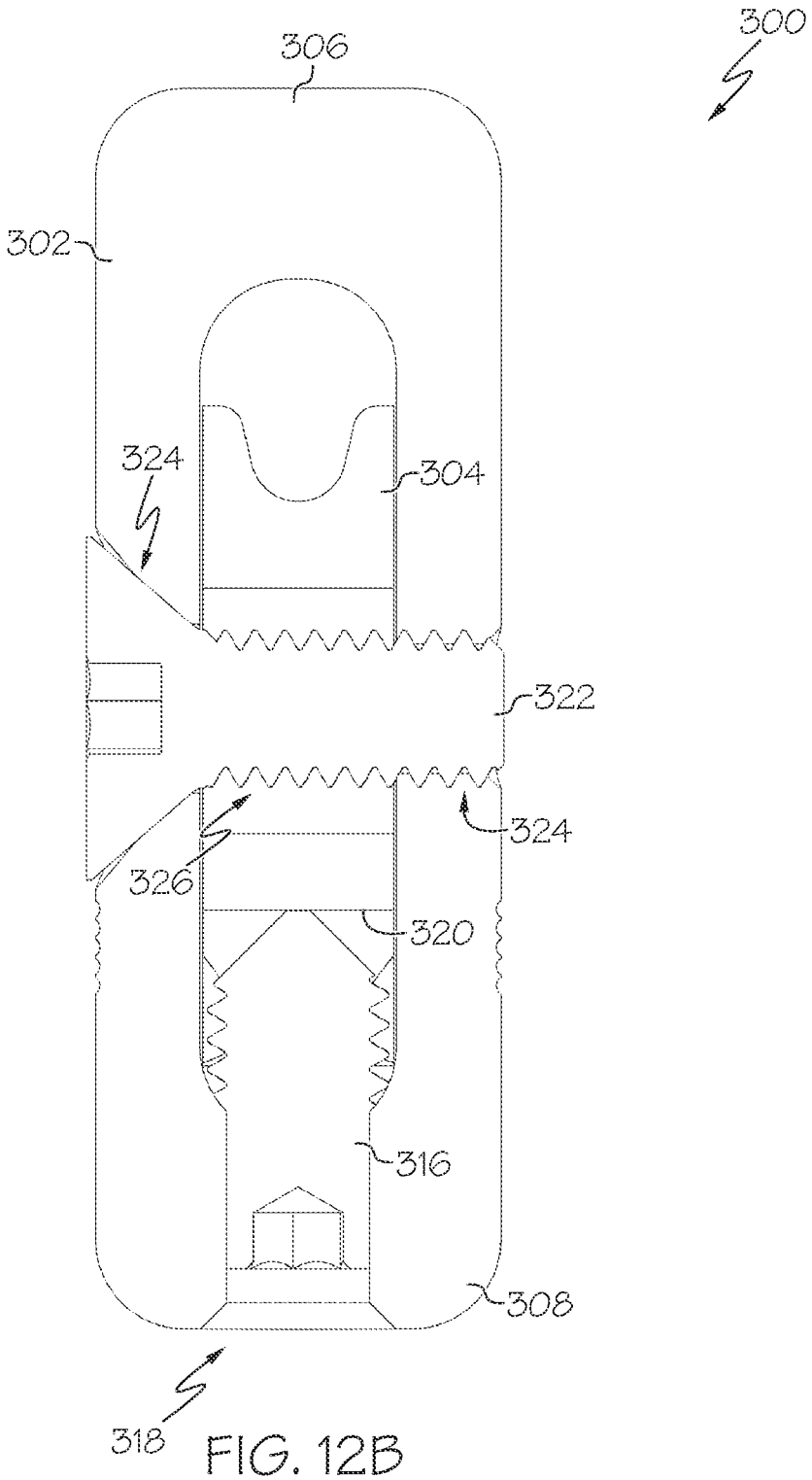



FIG. 12B

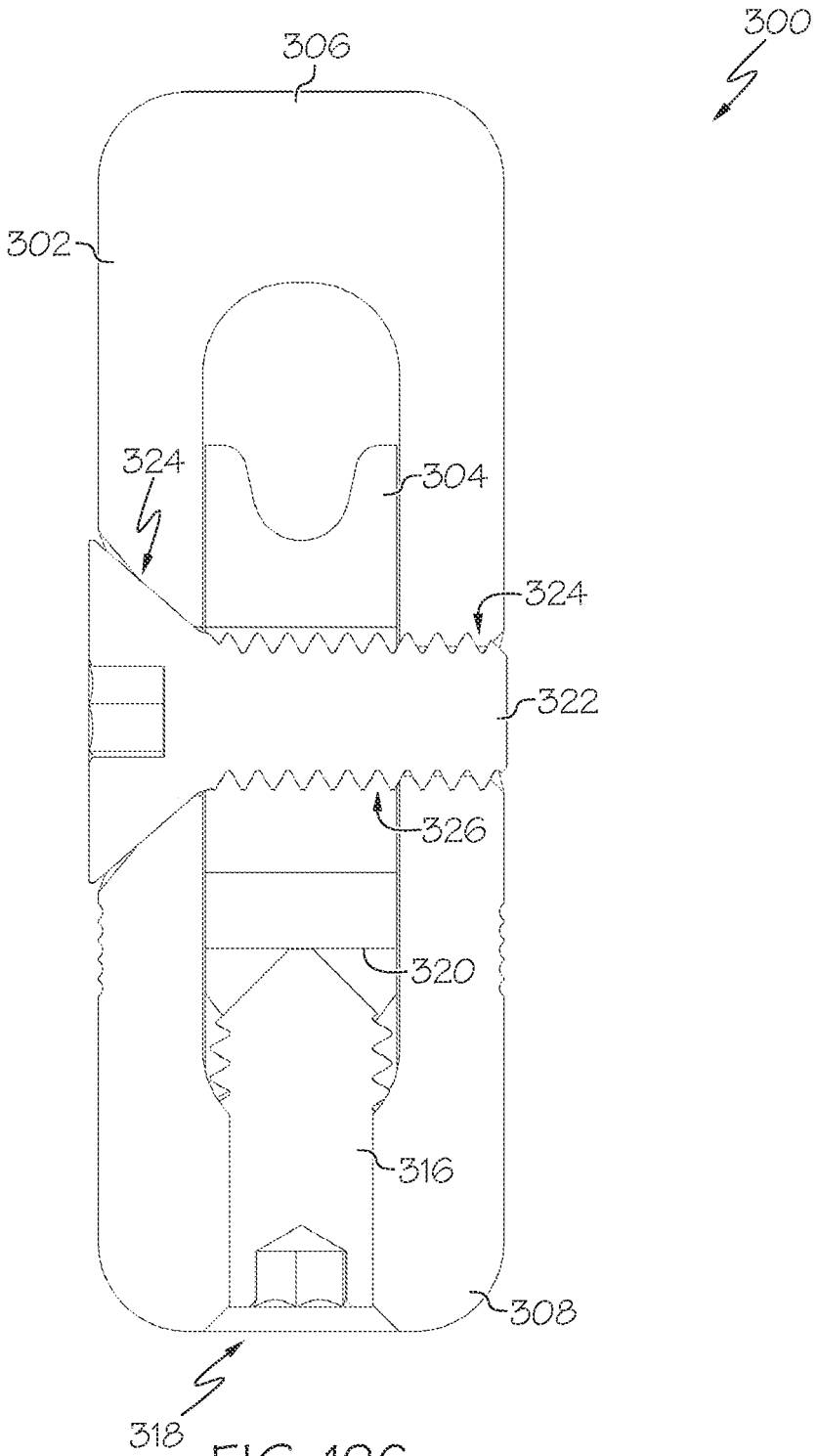



FIG. 12C

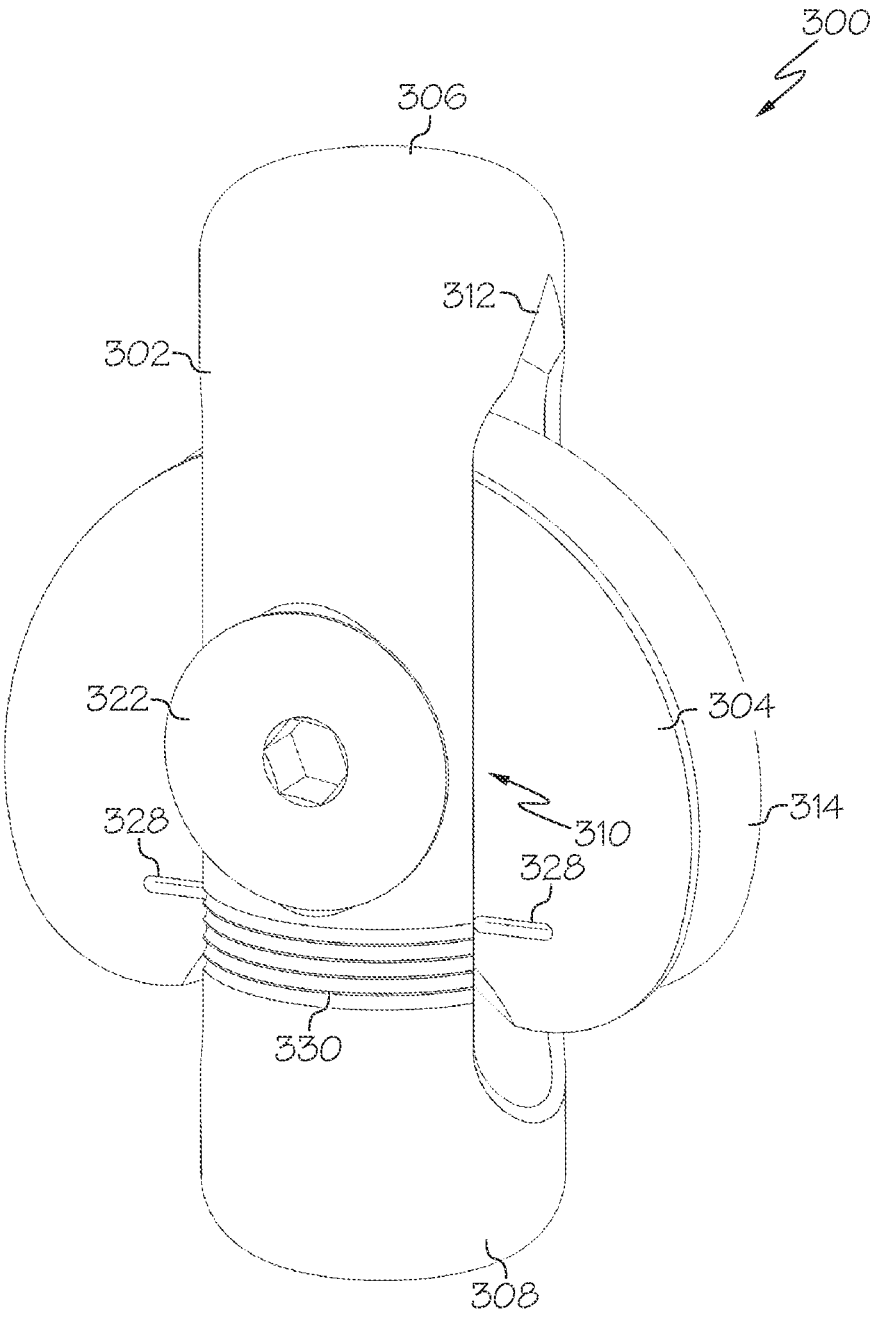



FIG. 12D

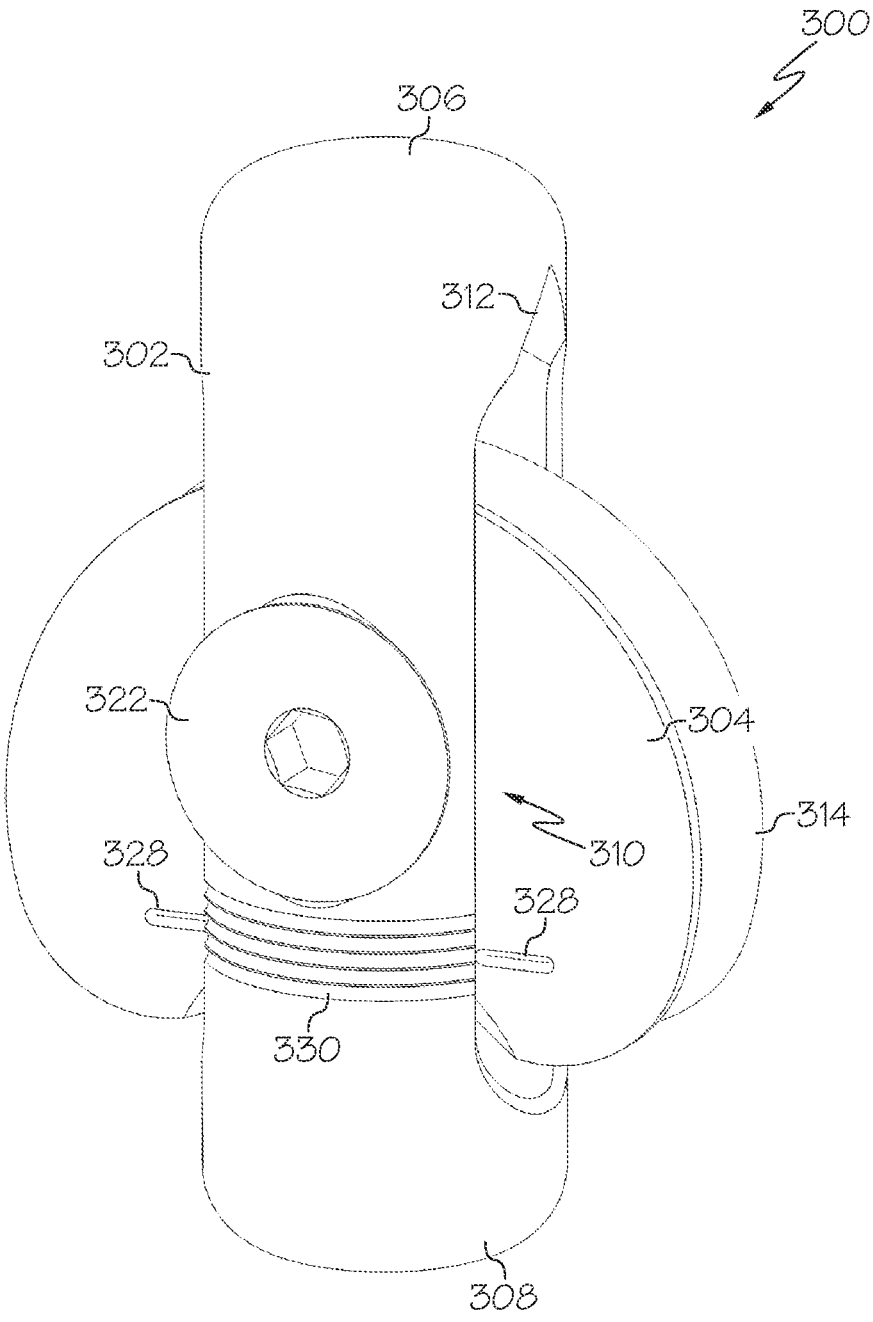



FIG. 12E

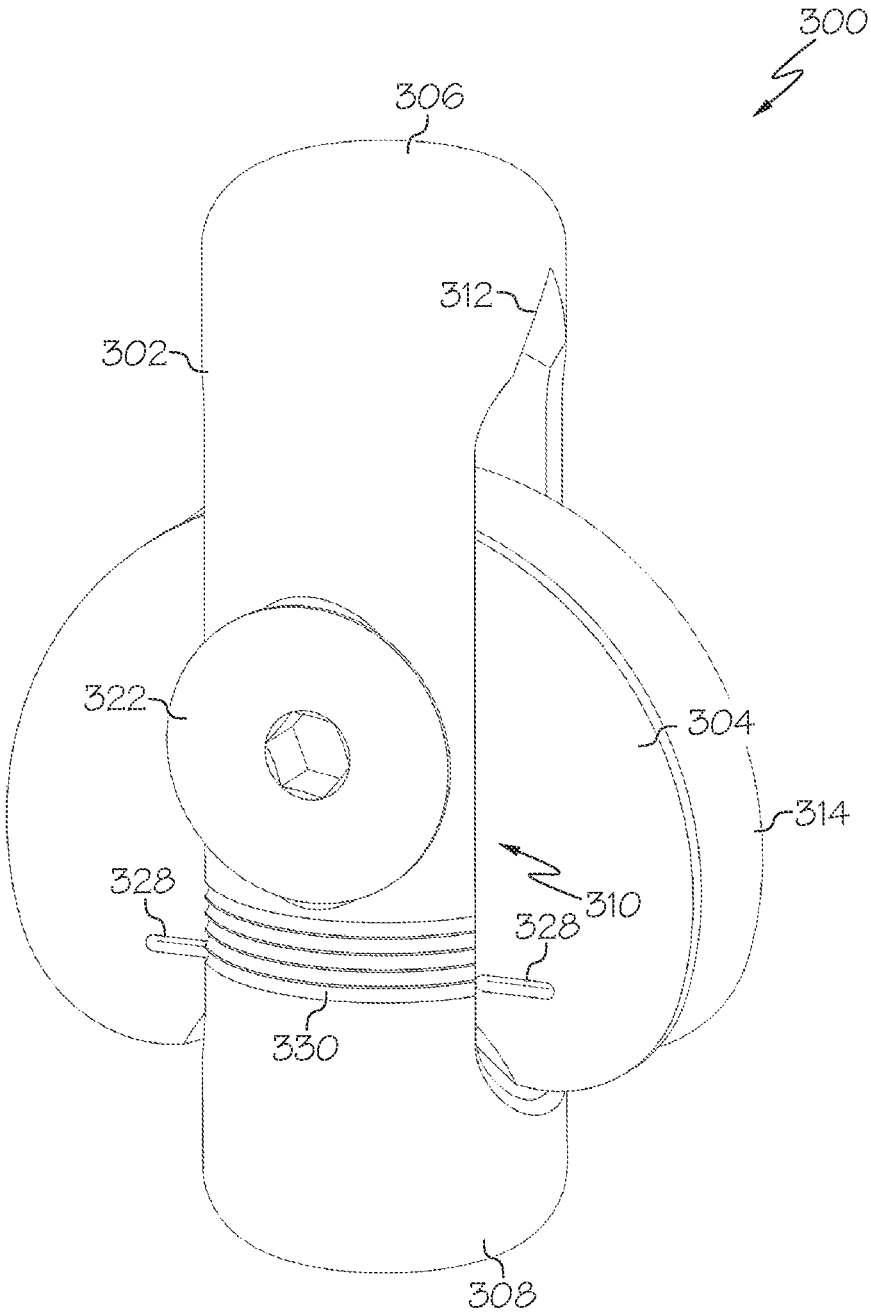



FIG. 12F

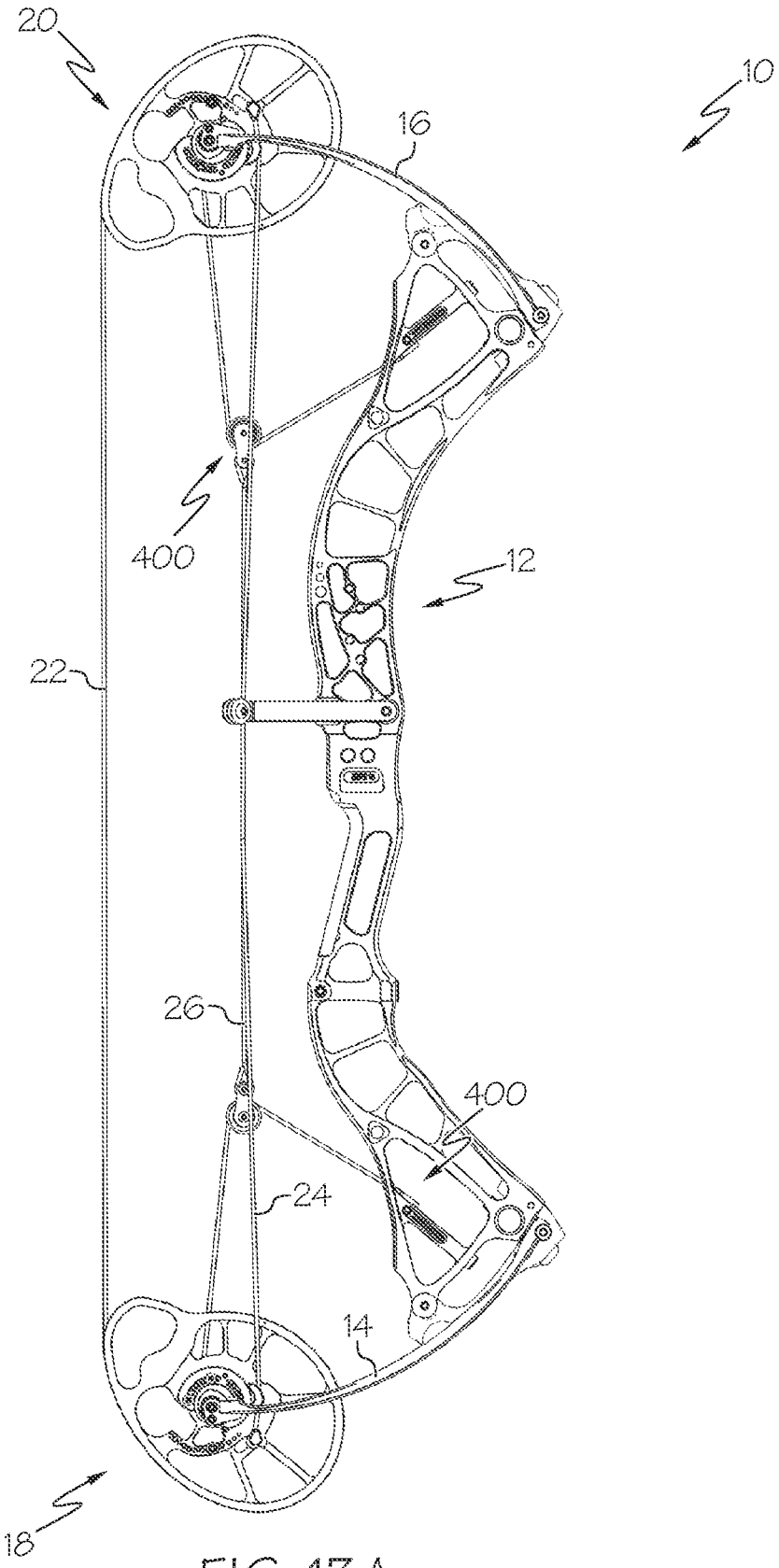



FIG. 13A

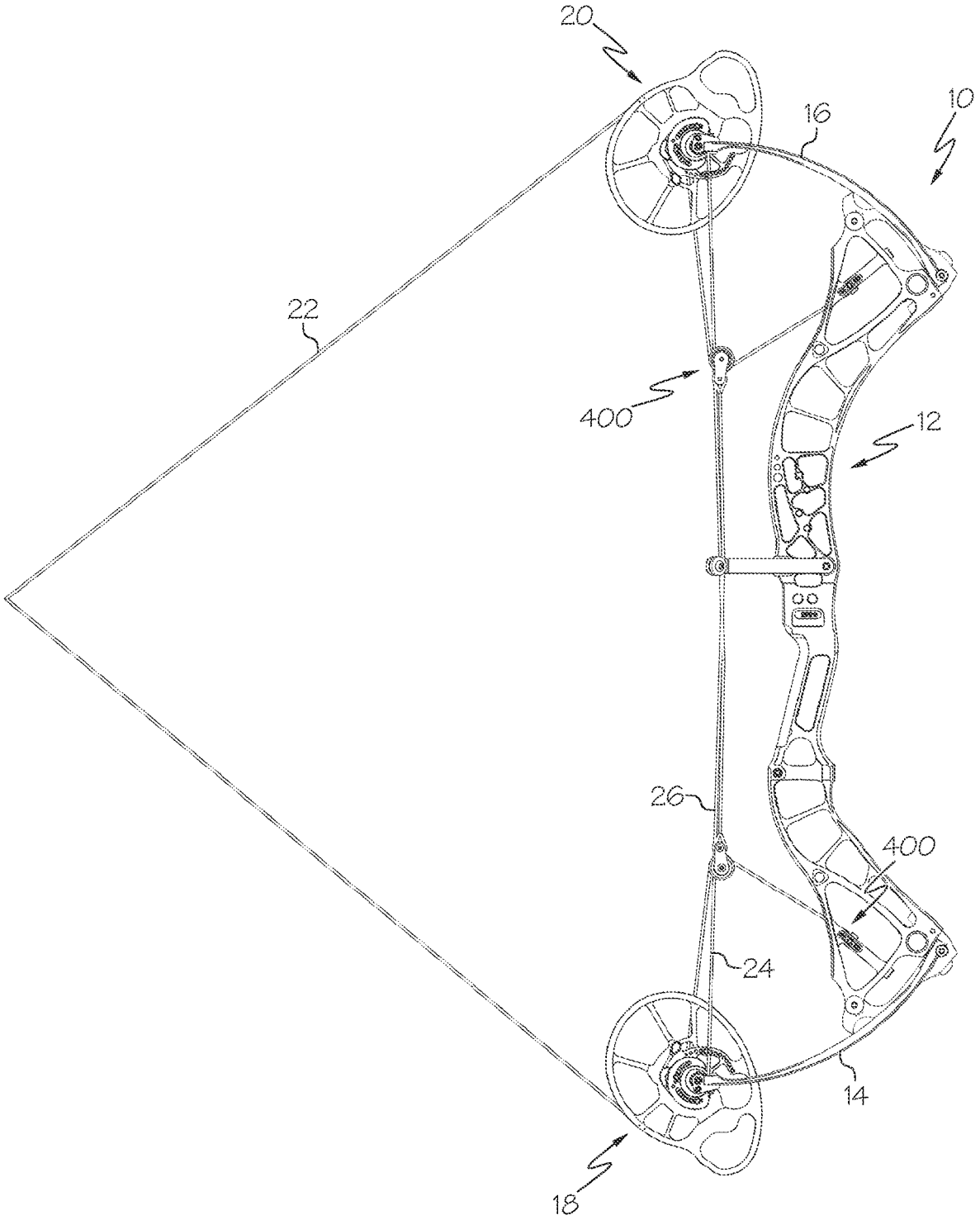



FIG. 13B

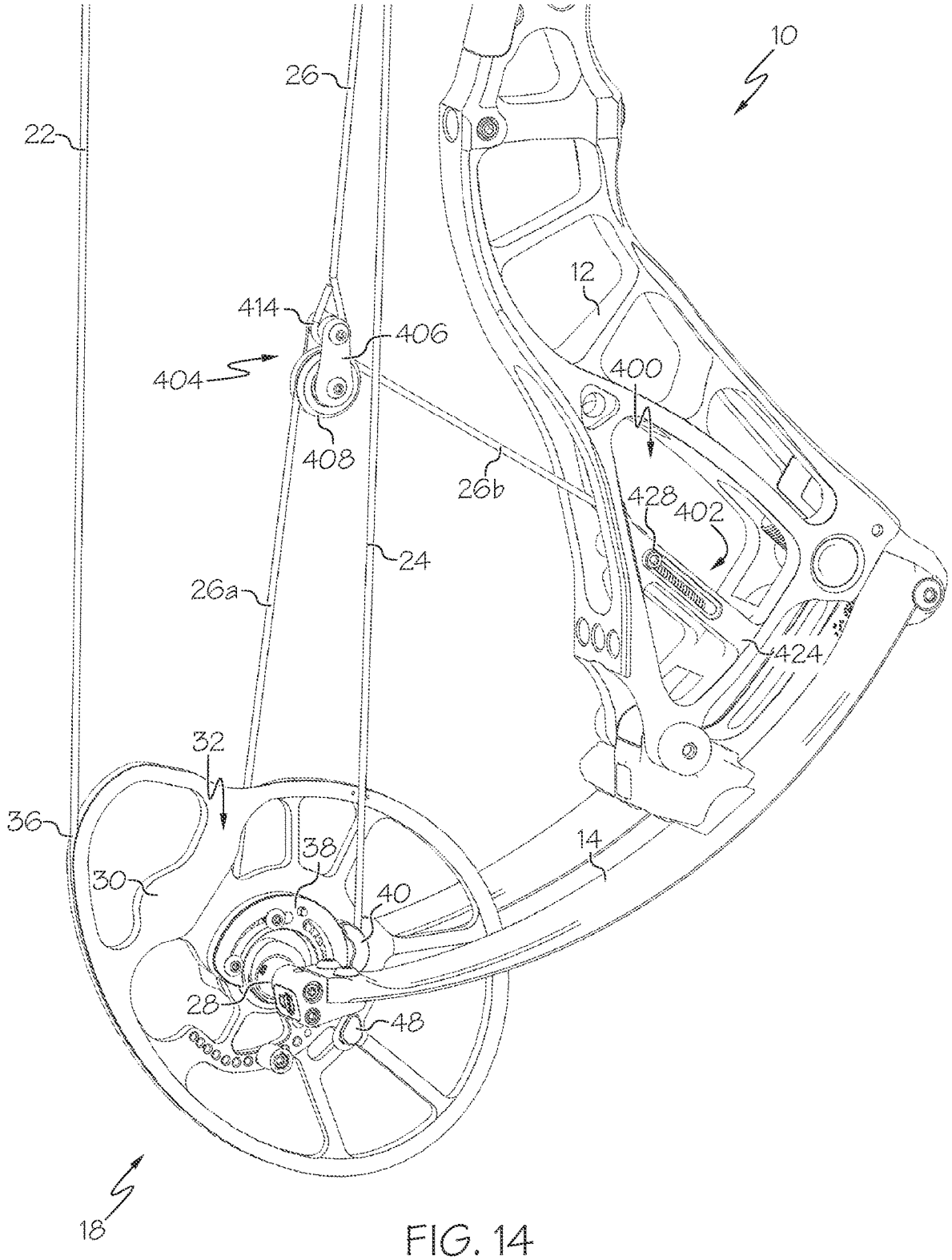

10
26
22
12
414
406
404
400
408
26b
428
402
24
26a
424
32
36
38
14
30
40
28
48
18

FIG. 14

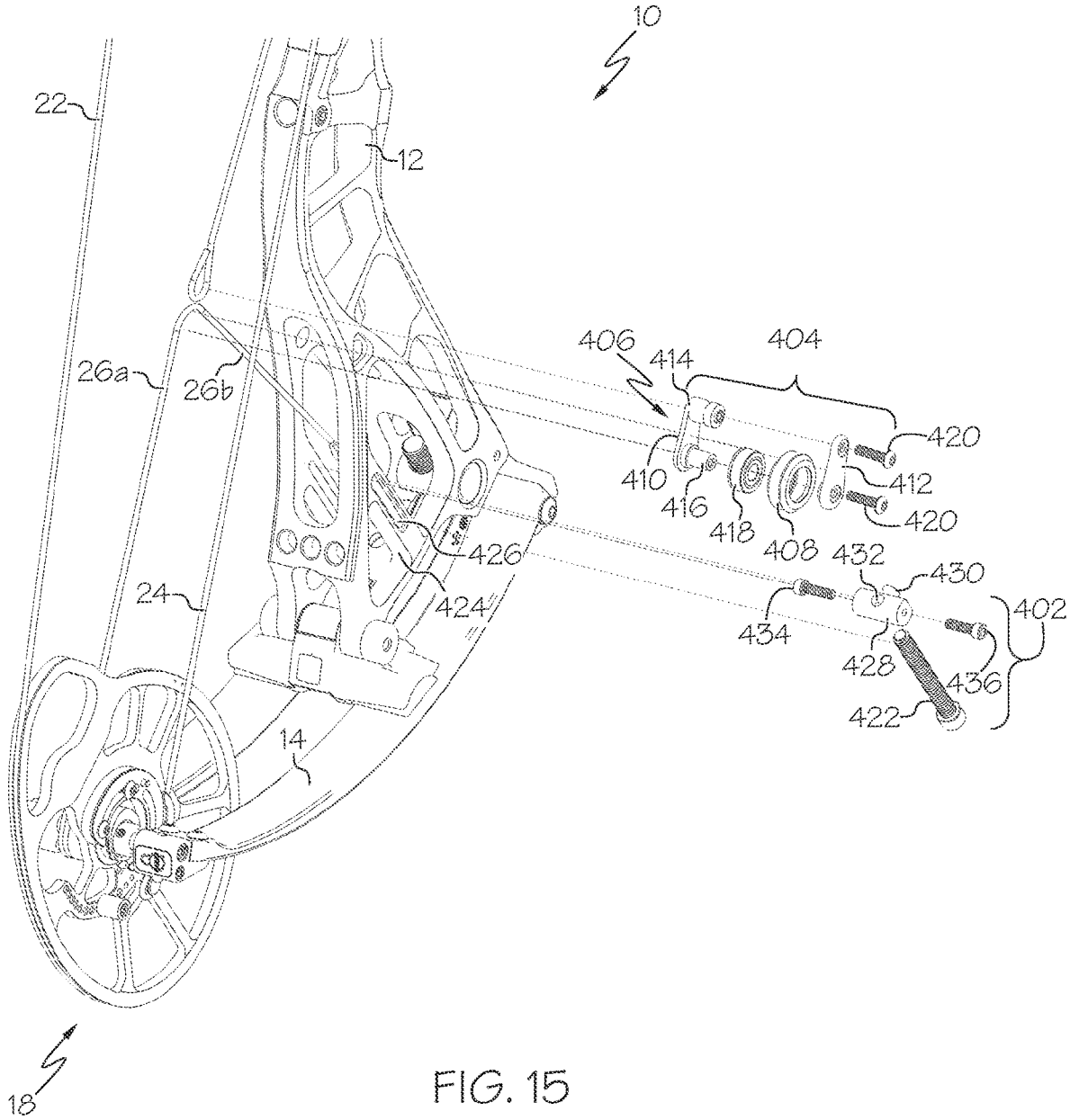

10
22
12
26a
26b
406
414
404
420
410
412
416
418
408
420
426
432
430
24
424
434
402
428
436
422
14
18

FIG. 15

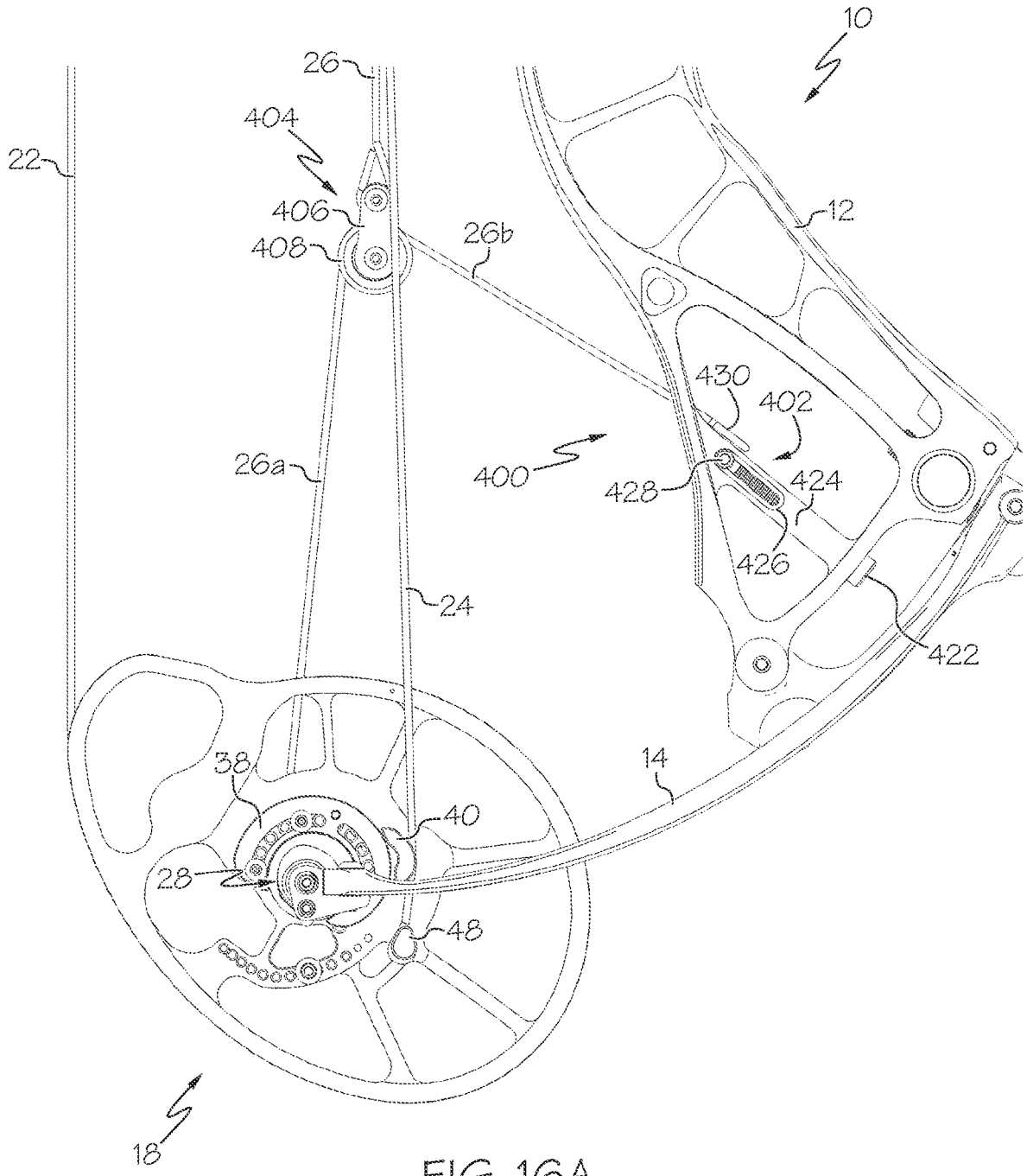

10
26
404
22
406
408
26b
12
430
402
400
26a
428
424
426
24
422
38
14
40
28
48
18

FIG. 16A

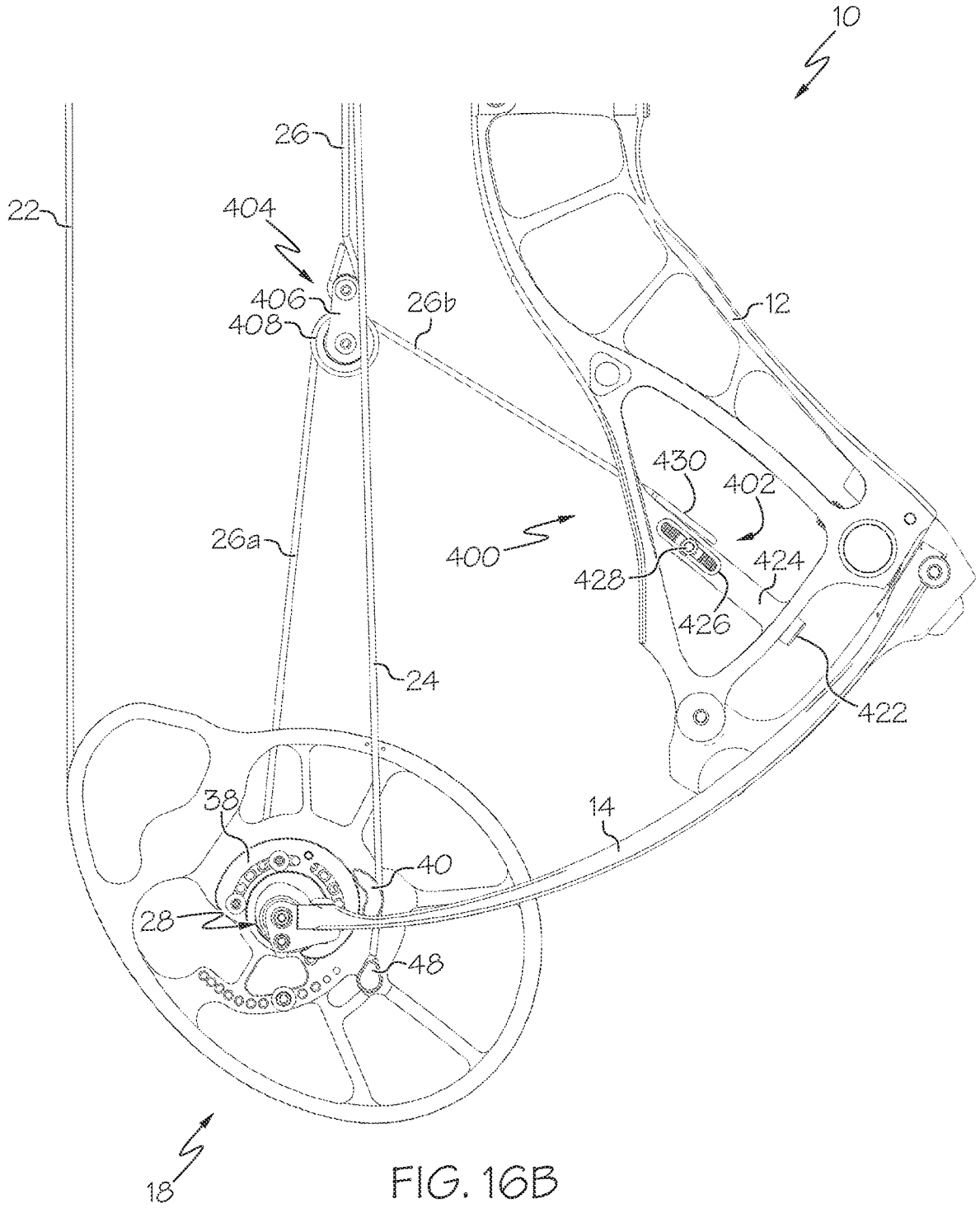

10
26
22
404
406
408
26b
12
430
402
400
26a
428
424
426
24
422
38
14
40
28
48
18

FIG. 16B

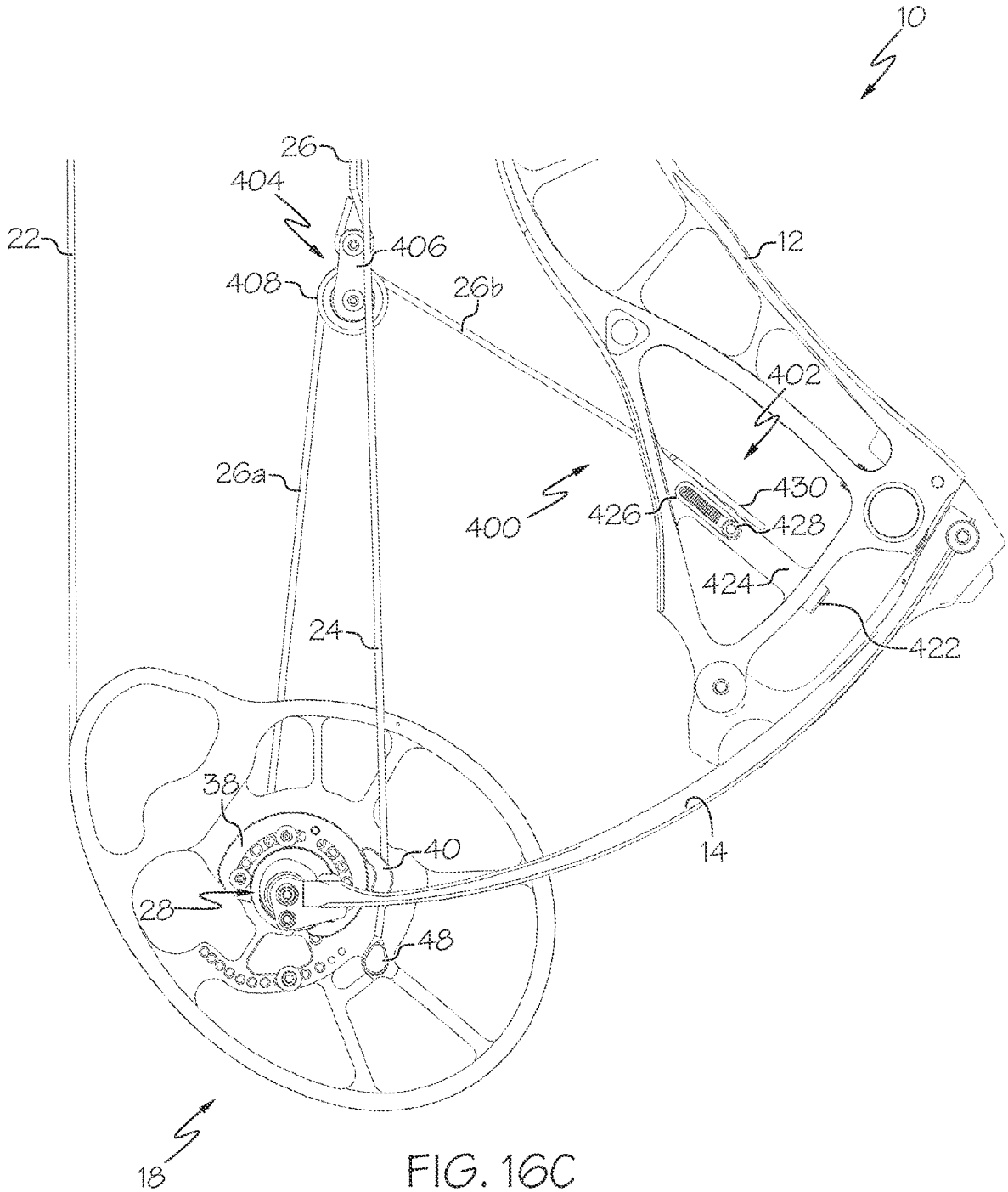

10
26
404
406
22
12
408
26b
402
26a
400
426
430
428
424
24
422
38
40
14
28
48
18

FIG. 16C

# CAM SYNCHRONIZATION DEVICE FOR ARCHERY BOW

## CROSS-REFERENCE TO RELATED APPLICATIONS

**[0001]** None.

## BACKGROUND OF THE INVENTION

**[0002]** The field of the present invention relates generally to compound archery bows and particularly to timing adjustment mechanisms for synchronizing the cams or pulley assemblies of a compound archery bow.

**[0003]** Cam or pulley synchronization is one of the most important steps in tuning any dual cam, binary cam, or hybrid cam archery bow. When initially setting up an archery bow, often one of the first steps is to adjust the pulley assemblies for synchronization. Typically, to tune a bow, a bow technician or archer would put the bow in a bow press, compress the limbs in order to relieve tension from the string and/or cables, and add or remove twists from the string and/or cables in order to change their effective lengths, thereby slightly changing the rotational orientation of one cam with respect to the other. The timing and synchronization can subsequently be checked by drawing the bow back by hand or with a drawboard to check that the cams "stop" at the same time when at full draw. This is to ensure that the forces the cams transfer in the system are balanced throughout the draw and shot process. Additionally, synchronizing the cams has a benefit to what the archer feels at full draw. Cams that are out of sync or not properly timed may cause the draw to have a spongey feel to the shooter, or they can cause the bow to feel "jumpy," thereby signaling a decrease in effective let-off of the bow. If, after initial adjustment, the bow is still not properly timed, the bow must be placed back in a bow press and the process is repeated until proper timing and synchronization is achieved. While this is not necessarily a difficult process, it is time consuming and requires specialized tools.

**[0004]** There have been devices and inventions designed to enable cam and pulley synchronization through timing adjustment mechanisms that do not required the use of a bow press or other specialized tools. Examples of such devices are disclosed in U.S. Pat. Nos. 9,739,562 and 10,260,833 entitled "Adjustable Pulley Assembly for a Compound Archery Bow" and have been marketed by Bowtech, LLC under the Micro Sync Dial' name. However, some previously developed devices only allow for limited adjustment, while others do not adjust the orientation of the cam or pulley systems at brace. This can make it more difficult to determine proper synchronization.

**[0005]** Accordingly, a need exists for a timing adjustment mechanism that can synchronize a compound archery bow and adjust the timing of its cam or pulley assemblies at the brace position without the use of a bow press or any specialized tools. A further need exists for a timing adjustment mechanism that provides an adequate degree of adjustment.

## BRIEF SUMMARY OF THE INVENTION

**[0006]** The present invention is directed generally to a timing adjustment assembly for a compound archery bow. The timing adjustment assembly can be configured to selectively adjust the effective length of a power cable incorporated into the bow. The change of power cable effective length can be utilized for synchronizing and fine-tuning the alignment and timing of the cam or pulley assemblies on the bow. In particular, the timing adjustment can change the effective length of a power cable while the bow is in the brace position and enables cam timing and synchronization to be performed without derigging the bow and without the need of a bow press or other specialized tools.

**[0007]** According to a first embodiment, the timing adjustment assembly can include an adjustable anchor component that is moveably coupled to a pulley assembly of a compound bow. The adjustable anchor component can be received within a stationary receiving slot formed into the cam body of the pulley assembly and configured to move between multiple different positions within the receiving slot. The adjustable anchor component includes an anchor post for receiving an end loop of a power cable and anchoring the power cable to the pulley assembly. The adjustable anchor component can be adjusted between one of several different positions within the receiving slot through the use of an adjustment fastener or the like. Each different position results in a different anchor point on the pulley assembly for the power cable and corresponding effective length of the power cable.

**[0008]** According to a second embodiment, the timing adjustment assembly can include a stationary housing secured to a pulley assembly of a compound bow and an adjustable pusher component that is moveably coupled to the housing. The adjustable pusher component is configured to engage the power cable and cause a deflection thereto by selectively moving the adjustable pusher component into and out of the housing. By imparting a deflection to the power cable, the timing adjustment assembly changes the effective length of the power cable. The adjustable anchor component can be selectively placed into any one of a set of multiple deflection positions to adjust the amount of deflection applied to the power cable, which results in a change in effective length of the power cable.

**[0009]** According to a third embodiment, the timing adjustment assembly can be incorporated into a compound archery bow along the length of a power cable connected between two pulley assemblies. The timing adjustment assembly includes a stationary coupler component and a yoke component that is adjustable in position relative to the coupler component. The adjustable yoke component can be positioned within an interior of the coupler component and configured to move in a linear path relative to the coupler component. The coupler component can include an end portion for receiving and anchoring a looped end of the power cable. The adjustable yoke component can be configured to receive a second end portion of the power cable with its opposing end anchored to the pulley assembly. The adjustable yoke component can be adjusted between one of several different positions within the interior of the coupler component through the use of an adjustment fastener or the like. Each different position results in a different effective length of the power cable by moving the two portions of the power cable closer together or further apart.

**[0010]** According to a fourth embodiment, the timing adjustment assembly can be incorporated into, or otherwise attached to, the riser of a compound bow. The timing adjustment assembly can include an idler pulley component incorporated along the length of a power cable of the compound bow to split the power cable into two segments,

with one end anchored to a pulley assembly of the compound bow. The timing adjustment assembly can also include a mounting component on the riser for receiving the second end of the power cable. The mounting component can include a mounting fastener fixedly attached to the riser and an adjustable termination block moveably coupled to the mounting fastener. The adjustable termination block can include an anchor post for anchoring the second end of the power cable to the mounting assembly. The adjustable termination block can be adjusted between one of several different positions along the length of the mounting fastener through the use of an adjustment fastener. Each different position results in a different effective length of the power cable by increasing or decreasing the length of the first end of the power cable between the idler pulley component and the pulley assembly.

**[0011]** Each embodiment of the timing adjustment assembly can enable a user to adjust and change the effective length of a power cable for a compound bow. By changing the effective length of a power cable, the timing adjustment assembly can be utilized for synchronizing and fine-tuning the alignment and timing of the compound archery bow, and particularly, the cam or pulley assemblies of the bow. The timing adjustment assembly can be advantageously employed with any type of compound archery bow, including dual cam, binary cam, solo cam, and hybrid cam bows. The timing adjustment assembly can further be employed to cause a change in the effective length of the bow string or draw cable of the compound bow by coupling the timing adjustment assembly to the bow string in place of the power cable. It will be appreciated that various embodiments of the present invention are suitable to be employed in vertical bows, crossbows, hybrid bows, and other bows having cam or pulley assemblies, irrespective of whether such cam or pulley assemblies are mounted on the limbs, riser, frame, or other bow structure.

**[0012]** Objects and advantages pertaining to the pulley and cam synchronization and adjustment for archery bows may become apparent upon referring to the example embodiments illustrated in the drawings and disclosed in the following written description or appended claims.

**[0013]** This Summary is provided to introduce a selection of concepts in a simplified form that are further described below in the Detailed Description. This Summary is not intended to identify key features or essential features of the claimed subject matter, nor is it intended to be used as an aid in determining the scope of the claimed subject matter.

## DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

**[0014]** In the accompanying drawings, which form a part of the specification and are to be read in conjunction therewith in which like reference numerals are used to indicate like or similar parts in the various views:

**[0015]** FIG. **1**A is a right side elevation view of a compound bow incorporating a timing adjustment assembly in accordance with a first embodiment of the present invention, illustrating the compound bow in a brace position;

**[0016]** FIG. **1**B is a right side elevation view of the compound bow and timing adjustment assembly of FIG. **1**A illustrating the compound bow in a drawn position;

**[0017]** FIG. **2**A is a partial right side perspective view of the compound bow of FIG. **1**A illustrating a pulley incorporating the timing adjustment assembly;

**[0018]** FIG. **2**B is a partial left side perspective view of the compound bow of FIG. **1**A illustrating a pulley incorporating the timing adjustment assembly;

**[0019]** FIG. **3**A is an exploded partial right side perspective view of the compound bow of FIG. **1**A illustrating a pulley incorporating the timing adjustment assembly;

**[0020]** FIG. **3**B is an exploded partial left side perspective view of the compound bow of FIG. **1**A illustrating a pulley incorporating the timing adjustment assembly;

**[0021]** FIG. **4**A is a partial right side elevation view of the compound bow of FIG. **1**A illustrating the pulley and timing adjustment assembly in a first adjusted position;

**[0022]** FIG. **4**B is a partial right side elevation view of the compound bow of FIG. **1**A illustrating the pulley and timing adjustment assembly in a second adjusted position;

**[0023]** FIG. **4**C is a partial right side elevation view of the compound bow of FIG. **1**A illustrating the pulley and timing adjustment assembly in a third adjusted position;

**[0024]** FIG. **5**A is a right side elevation view of a compound bow incorporating a timing adjustment assembly in accordance with a second embodiment of the present invention, illustrating the compound bow in a brace position;

**[0025]** FIG. **5**B is a right side elevation view of the compound bow and timing adjustment assembly of FIG. **5**A illustrating the compound bow in a drawn position;

**[0026]** FIG. **6**A is a right side perspective view of a pulley of the compound bow of FIG. **5**A, the pulley incorporating the timing adjustment assembly;

**[0027]** FIG. **6**B is a left side perspective view of a pulley of the compound bow of FIG. **5**A, the pulley incorporating the timing adjustment assembly;

**[0028]** FIG. **7**A is an exploded right side perspective view of a pulley of the compound bow of FIG. **5**A, the pulley incorporating the timing adjustment assembly;

**[0029]** FIG. **7**B is an exploded left side perspective view of a pulley of the compound bow of FIG. **5**A, the pulley incorporating the timing adjustment assembly;

**[0030]** FIG. **8**A is a partial right side elevation view of the compound bow of FIG. **5**A illustrating the pulley and timing adjustment assembly in a first adjusted position;

**[0031]** FIG. **8**B is a partial right side elevation view of the compound bow of FIG. **5**A illustrating the pulley and timing adjustment assembly in a second adjusted position;

**[0032]** FIG. **8**C is a partial right side elevation view of the compound bow of FIG. **5**A illustrating the pulley and timing adjustment assembly in a third adjusted position;

**[0033]** FIG. **9**A is a right side elevation view of a compound bow incorporating a timing adjustment assembly in accordance with a third embodiment of the present invention, illustrating the compound bow in a brace position;

**[0034]** FIG. **9**B is a right side elevation view of the compound bow and timing adjustment assembly of FIG. **9**A illustrating the compound bow in a drawn position;

**[0035]** FIG. **10** is a partial right side perspective view of the compound bow of FIG. **9**A illustrating the timing adjustment assembly;

**[0036]** FIG. **11**A is a schematic exploded perspective view of the timing adjustment assembly incorporated into the compound bow of FIG. **9**A;

**[0037]** FIG. **11**B is an exploded partial right side perspective view of the compound bow of FIG. **9**A illustrating the timing adjustment assembly;

**[0038]** FIG. **12**A is a schematic sectional view of the timing adjustment assembly of FIG. **9**A illustrating the timing adjustment assembly in a first adjusted position;

**[0039]** FIG. **12**B is a schematic sectional view of the timing adjustment assembly of FIG. **9**A illustrating the timing adjustment assembly in a second adjusted position;

**[0040]** FIG. **12**C is a schematic sectional view of the timing adjustment assembly of FIG. **9**A illustrating the timing adjustment assembly in a third adjusted position;

**[0041]** FIG. **12**D is a schematic rear perspective view of the timing adjustment assembly of FIG. **12**A illustrating the timing adjustment assembly in a first adjusted position;

**[0042]** FIG. **12**E is a schematic rear perspective view of the timing adjustment assembly of FIG. **12**B illustrating the timing adjustment assembly in a second adjusted position;

**[0043]** FIG. **12**F is a schematic rear perspective view of the timing adjustment assembly of FIG. **12**A illustrating the timing adjustment assembly in a third adjusted position;

**[0044]** FIG. **13**A is a right side elevation view of a compound bow incorporating a timing adjustment assembly in accordance with a fourth embodiment of the present invention, illustrating the compound bow in a brace position;

**[0045]** FIG. **13**B is a right side elevation view of the compound bow and timing adjustment assembly of FIG. **13**A illustrating the compound bow in a drawn position;

**[0046]** FIG. **14** is a partial right side perspective view of the compound bow of FIG. **13**A illustrating the timing adjustment assembly;

**[0047]** FIG. **15** is an exploded partial right side perspective view of the compound bow of FIG. **13**A illustrating the timing adjustment assembly;

**[0048]** FIG. **16**A is a partial right side elevation view of the compound bow of FIG. **13**A illustrating the timing adjustment assembly in a first adjusted position;

**[0049]** FIG. **16**B is a partial right side elevation view of the compound bow of FIG. **13**A illustrating the timing adjustment assembly in a second adjusted position; and

**[0050]** FIG. **16**C is a partial right side elevation view of the compound bow of FIG. **13**A illustrating the timing adjustment assembly in a third adjusted position.

## DETAILED DESCRIPTION OF THE INVENTION

**[0051]** Various embodiments of the present invention are described and shown in the accompanying materials, descriptions, instructions, and drawings. For purposes of clarity in illustrating the characteristics of the present invention, proportional relationships of the elements have not necessarily been maintained in the drawings. It will be understood that any dimensions included in the drawings are simply provided as examples and dimensions other than those provided therein are also within the scope of the invention.

**[0052]** The description of the invention references specific embodiments in which the invention can be practiced. The embodiments are intended to describe aspects of the invention in sufficient detail to enable those skilled in the art to practice the invention. Other embodiments can be utilized and changes can be made without departing from the scope of the present invention. The present invention is defined by the appended claims and the description is, therefore, not to be taken in a limiting sense and shall not limit the scope of equivalents to which such claims are entitled.

**[0053]** The present invention is directed generally to a timing adjustment assembly for a compound archery bow, and particularly, a timing adjustment assembly for adjusting the effective length of one or more power cables or bow strings incorporated into the compound archery bow. By changing the effective length of a power cable and/or bow string, the timing adjustment assembly can be utilized for synchronizing and fine-tuning the alignment and timing of the compound archery bow. In particular, the various embodiments of the timing adjustment assembly of the present invention enable the timing adjustment and synchronization of the one or more of the cam or pulley assemblies of the bow. For example, the timing adjustment assembly of the present invention can be used to fine-tune and adjust the effective length of a power cable and/or bow string while the bow is in the brace position. The change in effective length can result in changing the orientation of one or more of the pulley assemblies of the bow so that the two pulley assemblies are properly timed and synchronized both at brace and when drawn. Significantly, each of the different embodiments of the timing adjustment assembly can enable the adjustment of the power cable and/or bow string effective length, and resulting synchronization and timing of the pulley assemblies, without derigging the bow (i.e., without removing one or more cables from the bow) and without the need of a bow press or other specialized tools.

**[0054]** The present invention is directed to several different embodiments **100**, **200**, **300** and **400** of a timing adjustment assembly for a compound bow, and each of the different embodiments **100**-**400** of the timing adjustment assembly can be incorporated into any configuration or arrangement of a compound archery bow. In embodiments **100** and **200**, the timing adjustment assembly is incorporated into one or both of the pulley assemblies of the bow. In another embodiment **300**, the timing adjustment assembly is incorporated along the length of a power cable or bow string and not directly attached to a pulley assembly. In yet another embodiment **400**, the timing adjustment assembly is incorporated into the riser of the bow rather than the pulley assembly.

**[0055]** Turning to the several figures, the timing adjustment assembly **100**-**400** of the present invention can be incorporated into any type of compound archery bow, including dual cam, binary cam, solo cam, and hybrid cam bows. The several figures illustrate one exemplary type of compound archery bow **10** configured with the timing adjustment assembly of the present invention; however, the specific configuration of bow **10** disclosed herein is not intended in any way to limit the application and use of the timing adjustment assembly of the present invention, which can be incorporated into any type of compound archery bow. It will be appreciated that various embodiments of the present invention are suitable to be employed in, for example, vertical bows, crossbows, hybrid bows, and other bows having cam or pulley assemblies, irrespective of whether such cam or pulley assemblies are mounted on the limbs, riser, frame, or other bow structure.

**[0056]** FIGS. **1**A-**1**B (as well as FIGS. **5**A-**5**B, **9**A-**9**B, and **13**A-**13**B) illustrate a standard compound bow **10** with a timing adjustment assembly **100**, **200**, **300** or **400** incorporated therein. The general components of compound bow **10** are well-known and not necessarily considered part of the present invention for the timing adjustment assembly **100**, **200**, **300**, or **400**. As shown in FIGS. **1**A-**1**B, compound bow

10 can include a central riser 12, first and second bow limbs 14 and 16 secured to opposing ends of riser 12, first and second pulley assemblies 18 and 20 rotatably mounted on the first and second bow limbs 14 and 16, respectively, a draw cable (or bow string) 22, and first and second power cables 24 and 26. FIGS. 1A-1B illustrate compound bow 10 configured as a so-called dual cam archery bow, where first and second pulley assemblies 18 and 20 are configured as cams and may optionally be substantially identical or substantially mirror images of each other. Starting from a rest position (FIG. 1A), upon drawing dual cam compound bow 10 (FIG. 1B), the draw cable 22 is let out by both pulley assemblies 18 and 20, first power cable 24 (which is attached, directly or indirectly, to second pulley assembly 20 and/or to the second bow limb 16) is taken up by first pulley assembly 18, and second power cable 26 (which is attached, directly or indirectly, to first pulley assembly 18 and/or first bow limb 14 as described below) is taken up by second pulley assembly 20.

[0057] While not shown herein, timing adjustment assembly 100, 200, 300, or 400 can also suitably be incorporated into so-called solo cam bows where the second pulley assembly 20 is configured as an idler wheel instead of a cam, or a so-called hybrid cam bow where the bow includes an additional coupling cable connected between the first and second pulley members 18 and 20. Further, the various embodiments 100-400 of the inventive timing adjustment assembly disclosed herein, or equivalents thereof, can be advantageously employed with any type of compound archery bow, including dual cam, binary cam, solo cam, and hybrid cam bows described. In a dual or binary cam bow, the various embodiments of the inventive timing adjustment assembly can be employed for both pulley assemblies; in a solo or hybrid cam bow, the various embodiments of the inventive timing adjustment assembly can be employed for only one pulley assembly, or in some instances of a hybrid cam bow for both pulley assemblies.

[0058] Further, while the timing adjustment assembly embodiments 100-400 disclosed herein are directed particularly to a power cable (and changing the effective length thereof), such timing adjustment assembly embodiments can also suitably be incorporated and adapted to adjust the effective length of the drawstring or bow string of a compound bow in alternative embodiments.

[0059] First Embodiment of Timing Adjustment Assembly

[0060] Turning to FIGS. 1A-4C, a timing adjustment assembly 100 in accordance with a first embodiment of the present invention is illustrated and described herein. FIGS. 1A and 1B illustrate a standard compound bow 10 with timing adjustment assembly 100 incorporated therein. As described above, the general components of compound bow 10 are well-known and not necessarily considered part of the present invention for the timing adjustment assembly 100.

[0061] As best shown in FIGS. 1A and 1B, compound bow 10 is configured as a dual cam archery bow, with first and second pulley assemblies 18 and 20 configured as cams and first and second power cables 24 and 26. In such a configuration, a timing adjustment assembly 100 can be incorporated into both pulley assemblies 18 and 20, which operate as mirror images of one another, to allow to the adjustment and change in the effective length of each power cable 24 and 26. However, it is recognized that timing adjustment assembly 100 can also suitably be incorporated into different configurations of a bow 10 with different configurations of pulley assemblies as described above.

[0062] Turning to FIGS. 2A-4C, pulley assembly 18 is illustrated with timing adjustment assembly 100 illustrated in additional detail. Pulley assembly 18 (with the exception of the inventive timing adjustment assembly 100 incorporated therein) can be configured as any standard or suitable cam or pulley configuration now known or hereafter developed. It is further recognized that pulley assembly 20 can be configured as a mirror image of pulley assembly 18 and the following description can apply to both pulley assemblies 18 and 20 with like reference numbers referring to like components, particularly for a dual cam bow 10 as illustrated in FIGS. 1A and 1B.

[0063] As best shown in FIGS. 2A and 2B, pulley assembly 18 is rotatably mounted to bow limb 16 at an axle assembly 28 and can include a cam body 30 having a first side 32 (see FIG. 2A) and a second side 34 (see FIG. 2B). Cam body 30 includes a perimeter draw string track or groove 36 extending around the periphery of the pulley assembly 18 and configured to receive the draw string 22 that is anchored at an anchor post provided on the cam body 30 (see FIG. 2B). Pulley assembly 18 can be configured to anchor and receive draw string 22 and one end of both first and second power cables 24 and 26. In particular, pulley assembly 18 includes timing adjustment assembly 100 formed within pulley assembly 18 for both anchoring first power cable 24 and adjusting the effective length of first power cable 24 as described in greater detail below.

[0064] As shown in FIG. 2A, first side 32 of cam body 30 can be configured as the take-up side for first power cable 24. Cam body 30 can include a cam module 38 formed around axle 28 on and secured on the first side 32 of cam body 30. Cam module 38 can operate as a take-up means for first power cable 24 and can include a groove or track that receives a portion of first power cable 24 when pulley assembly 18 rotates during operation. Cam module 38 can be optionally adjustable for modifying the draw length of draw string 22. Cam body 30 can include an intermediate secondary post or routing post 40 formed onto or coupled to the first side 32 of cam body 30 with a formed track or groove for receiving first power cable 24 before it terminates at timing adjustment assembly 100.

[0065] As shown in FIG. 2B, second side 34 of cam body 30 can be configured as the let-out side for second power cable 26. Cam body 30 can include a power cable track 42 formed around and adjacent the opening for axle 28 that is configured to receive and let out second power cable 26 on second side 34 of cam body 30. Cam body 30 can further include an anchor post 44 formed onto or coupled to cam body 30 for securing the end of second power cable 26 to cam body 30. As further shown in FIG. 2B, second side 34 of cam body 30 can include an intermediate anchor post between anchor post 44 and power cable track 42 around which second power cable 26 is passed. Collectively, power cable track 42 and anchor post 44 form the let out means for second power cable 26. It is also recognized that pulley assembly 18 can alternatively be configured with any suitable let-out means for securing second power cable 26 to cam body 30 and letting out second power cable 26 during operation of bow 10 and, thus, it will be further recognized that the configuration shown in the figures and described above is for exemplary purposes only.

**[0066]** Timing adjustment assembly **100** will now be described in greater detail with reference to FIGS. **2**A-**4**C. As best shown in FIGS. **2**A and **2**B, timing adjustment assembly **100** can be secured to, or otherwise incorporated into cam body **30** of pulley assembly **18** (and similarly pulley assembly **20** at the other end of bow **10**). As shown, timing adjustment assembly **100** can be located in the interior of cam body **30** radially inward of draw string peripheral groove **36** and offset from the axle **28** so that clockwise rotation of pulley assembly **18** will result in take-up of first power cable **24**. As best shown in FIGS. **3**A and **3**B, timing adjustment assembly **100** can include an adjustable anchor component **102** that is adjustably securable to cam body **30** and configured to anchor the end of first power cable **24** to pulley assembly **18**. As described herein, adjustable anchor component **102** can be configured to be at least partially received in and slide linearly (parallel along the surface of cam body **30**) with respect to cam body **30**.

**[0067]** As shown, adjustable anchor component **102** can include a base portion **104**, a connecting portion **106**, an extended or top sliding portion **108**, and an anchor post **110**. Base portion **104** can be configured to be received within (and slide along) a slot **112** formed into the surface of cam body **30** on its first side **24** (see FIG. **3**A). Slot **112** can be configured and operate as a stationary component that adjustable anchor component **102** moves in a translating motion relative thereto. As shown in FIGS. **3**A and **3**B, base portion **104** can have a generally rectangular shape with a length, width, and thickness generally conforming to the shape of slot **112**. In particular, base portion **104** can have a thickness that enables adjustable anchor component **102** to be at least partially received within slot **112** and articulate or move linearly therein. It is also recognized that base portion **104** (and adjustable anchor component **102** generally) can be configured with any suitable shape and need not necessarily be rectangular or orthogonal.

**[0068]** Connecting portion **106** can extend beyond or upward from the upper surface of base portion **104** and sliding top portion **108** can extend from connection portion **106**. As best shown in FIG. **3**A, connecting portion **106** operates to connect sliding top portion **108** to base portion **104** in a spaced apart arrangement. As shown, connecting portion **106** can be configured with a width slightly less than the width of base portion **104** so that it forms a narrowed groove or channel between base portion **104** and sliding top portion **108**. This arrangement can assist in maintaining base portion **104** within slot **112** while adjustable anchor component **102** slides relative to cam body **30**.

**[0069]** In one embodiment, sliding portion **108** can be configured to translate linearly (i.e., move or slide in a straight path) along the surface of cam body **30** above slot **112** and base portion **104**. When adjustable anchor component **102** is adjusted (as described below), base portion **104** moves within slot **112** while sliding top portion **108** moves equally with base portion **104** (and connecting portion **106**) above slot **112** and across cam body **30**. Sliding top portion **108** can be configured with a length slightly longer than the length of base portion **104** so that one end extends a distance beyond receiving slot **112** in cam body **30** when adjustable anchor component **102** is connected to cam body **30**. As further shown in FIGS. **3**A and **3**B, anchor post **110** can extend beyond or upward from sliding top portion **108** and be configured to allow cable **24** to be anchored or secured thereto.

**[0070]** Adjustable anchor component **102** can be configured as one integral component with base portion **104**, connecting portion **106**, sliding top portion **108** and anchor post **110** all integrally formed together from a single material. However, it is also recognized that one or more of the individual portions **104**-**110** of adjustable anchor component **102** can be separately formed and secured or otherwise coupled or attached to the remaining portions in alternative suitable embodiments.

**[0071]** As best shown in FIG. **3**A, slot **112** can be formed into cam body **30**. Slot **112** can be configured as an indentation, channel, groove or other recessed configuration formed into the thickness of cam body **30** and can have a shape generally conforming to that of adjustable anchor component **102**, and specifically, base portion **104** and connecting portion **106**. Slot **112** can also be formed onto cam body **30** and positioned onto the surface of cam body **30** in certain embodiments of the invention (not shown). In such a configuration, slot **112** can include raised sidewalls and end walls formed or otherwise attached to cam body **30** that define the perimeter of slot **112**. As further shown, slot **112** can include a lip **114** that partially defines the upper edge of slot **112** so that the width between the edges of lip **114** is slightly less than the width between the edges of the lower portion of slot **112**. Further, the width of lip **114** can be configured to generally conform to the width of connecting portion **106** of adjustable anchor component **102** and enable base portion **104** to slide within slot **112** while also be retained therein.

**[0072]** As further shown in FIGS. **3**A and **3**B, adjustable anchor component **102** can be secured and retained within slot **112** by a locking fastener **116** and adjustment fastener **118**. Locking fastener **116** can be configured to extend vertically or perpendicular relative to slot **112** and base portion **104** while adjustment fastener **118** can be configured to extend horizontally or parallel relative to slot **112** and base portion **104**. As best shown in FIG. **3**A, slot **112** can include a locking fastener opening **120** defined through its lower portion (opposite lip **114**) that is configured to receive locking fastener **116** when inserted therein. As best shown in FIG. **3**B, base portion **104** can include an elongated opening **122** that is configured to receive locking fastener **116** when inserted therein. Elongated opening **122** can be configured with an elongated or slotted shape in order to allow base portion **104** to be adjusted linearly within slot **112** (and relative to cam body **30**) while still allowing locking fastener **116** to be received within base portion **104**.

**[0073]** Locking fastener **116** can be configured as a screw, bolt, pin, or other threaded-type fastener, or any other suitable threaded or non-threaded fastening means that can be inserted and secured within openings **120** and **122**. As shown, locking fastener **116** is inserted through slot opening **120** and then into base portion elongated opening **122** and operates to secure base portion **104** (and adjustable anchor component **102** generally) in a fixed position relative to slot **112** and cam body **30**. Both slot opening **120** and base portion elongated opening **122** can have a diameter or width approximately equal to that of locking fastener **116** (and/or retaining threads) so that locking fastener **116** can be inserted therethrough and generally retained by openings **120** and **122**.

**[0074]** As also shown in FIG. **3**A, adjustable anchor component **102** can include an adjustment fastener opening **124** extending generally horizontally through base portion

104 and/or connecting portion 106 for receiving adjustment fastener 118. Similar to locking fastener 116, adjustment fastener 118 can be configured as a bolt, screw, pin, or other threaded-type fastener or any other suitable fastening means that can be inserted and secured within opening 124. Adjustment fastener opening 124 can also be configured with a diameter (and/or retaining threads) to securely receive adjustment fastener 118 and enable adjustment fastener 118 to be fully or partially inserted, adjusted, and retained by opening 124.

[0075] As further shown in FIGS. 2A-4C, timing adjustment assembly 100 can include guide markers 126 and 128 configured to enable a user to easily determine and track the position of timing adjustment assembly and the resulting effective length of power cable 24/26 secured thereby. As best shown in FIG. 3A, adjustable anchor component 102 can include a movement guide marker 126 provided on sliding top portion 108. Movement guide marker 126 can be configured as any suitable indicator means to indicate the linear position of adjustable anchor component 102 relative to cam body 30. Movement guide marker 126 can be defined into the surface of top portion 108 and/or applied to the surface of top portion 108. Similarly, cam body 30 can include a slide position indicator 128 configured as any suitable indicator means and can be defined into the surface of cam body 30 and/or applied to the surface of cam body 30. According to certain embodiments, slide position indicator 128 can be configured as a series of markings designating specific lengths or distances under the metric or imperial systems. When adjustable anchor component 102 is positioned within slot 112 and on cam body 30, movement guide marker 126 can be aligned with slide position indicator 128 in order to indicate the precise position of adjustable anchor component 102 relative to cam body 30 and the resulting change in the "effective length" of power cable 24/26 due to the adjustment of timing adjustment assembly 100.

[0076] Turning to FIGS. 4A-4C, the operation of timing adjustment assembly 100 will now be described in greater detail. As shown, power cable 24 is anchored to anchor post 110 of adjustable anchor component 102, which is secured within slot 112 to cam body 30. The effective length power cable 24 can be defined as the length of power cable 24 from its engagement to anchor post 110 on pulley assembly 18 to its engagement to anchor post 44 on second pulley assembly 20. When draw string 22 is drawn and pulley assemblies 18 and 20 rotate with the draw of draw string 22, power cable 24 is taken-up by first pulley assembly 18 and let-out by second pulley assembly 20 (similarly, power cable 26 is let-out by first pulley assembly 18 and taken-up by second pulley assembly 20 as depicted in FIGS. 1A and 1B). If the take-up and let-out of both power cables 24 and 26 is not properly timed and synchronized due to the rotational arrangement of pulley assemblies 18 and 20, the operation of bow 10 can be adversely affected. The timing and synchronization of pulley assemblies 18 and 20 can be achieved by increasing or decreasing the effective length of one or both of power cables 24 and 26.

[0077] Timing adjustment assembly 100 can allow a user to easily adjust and synchronize pulley assemblies 18 and 20 in by changing the "effective length" of either power cable 24 or 26. Specifically, timing adjustment assembly 100 enables the terminating anchor position of power cable 24 or 26 on pulley assembly 18 or 20 (i.e., at anchor post 110) to be moved, which increases or decreases the effective length of the power cable 24/26. In order to adjust timing adjustment assembly (and change the anchored position of power cable 24 or 26, locking fastener 116 can be unwound or otherwise let out of openings 120 and 122 to unlock adjustable anchor component 102 from receiving slot 112. Then adjustment fastener 118 can be inserted further into or let out from opening 124 (e.g., wound or unwound) to slide the adjustable anchor component 102 forward or backward linearly relative to cam body 30 and as indicated by markers 126 and 128. Locking fastening means 116 can then be re-secured into openings 120 and 122 once adjustable anchor component 102 is in the desired position to secure it in place. Timing adjustment assembly 100 can be structurally arranged to allow for any desired positional arrangements of anchor post 110 (relative to cam body 30) by moving adjustable anchor component 102 within receiving slot 112. Three such positional arrangements are shown in FIGS. 4A-4C for exemplary purposes. However, it will be appreciated that anchor component 102 may be continuously adjustable within receiving slot 112 and, therefore, the present invention is suitable for making micro adjustments. As shown in FIG. 4A, power cable 24 can be anchored to anchor post 110 and adjustable anchor component 102 can be secured at a first position on cam body 30 of pulley assembly 18 as indicated by indicator markings 126 and 128. This provides a "first effective length" of power cable 24. If this "first effective length" does not establish a synchronized arrangement of pulley assemblies 18 and 20, which can be indicated by the alignment indicator markings 46 commonly applied to pulley assemblies, then timing adjustment assembly 100 can be adjusted. FIG. 4B illustrates adjustable anchor component 102 in a second position to define a "second effective length" of power cable 24. In this second position, it will be noted that power cable 24 is between the two alignment indicator markings 46 when the bow is at brace position, thereby indicating proper cam timing. FIG. 4C illustrates adjustable anchor component 102 in a third position to define a "third effective length" of power cable 24. To achieve either the first, second or third positions (or any positional arrangement therebetween), locking fastener 116 is simply released and adjustment fastener 118 is adjusted to the desired position indicated by markings 126 and 128. As the dynamics of the bow 10 may change over time due to various factors (e.g., cable stretch, etc.), the user can make subsequent adjustments such that cam body 30 and power cable 24 are properly oriented and the power cable 24 is between the two alignment indicator markings 46 when the bow is at brace. At the same time, when the bow is a full draw, the user may ensure that the draw stop 50 of the first pulley assembly 18 contacts the first power cable 24 at the same time the draw stop 50 of the second pulley assembly 20 contacts the second power cable 26, as illustrated in FIG. 1B, to ensure proper cam timing.

[0078] Each different positional arrangement of anchor post 110 of timing adjustment assembly 100 results in a different effective length of first power cable 24 (or second power cable 26 with a respect to a timing adjustment assembly 100 at pulley assembly 20). This results in different effective lengths of the power cable 24 (or second power cable 26) during draw of bow 10 and differing relative synchronizations (with the bow at brace) of first pulley assembly 18 with second pulley assembly 20. As a result, a user can change the orientation and synchronization of

pulley assemblies **18** and/or **20** by adjusting the effective length of power cable **24** and/or **26** through timing adjustment assembly **100**. The adjustment (i.e., moving anchor post **110** of timing adjustment assembly **100** to a new positional arrangement and securing it in place relative to pulley assembly **18**) can also be performed without using a bow press and without derigging the bow (i.e., without removing one or more cables from the bow), even though the power cable **24**/**26** is under tension when bow **10** is rigged and resists lateral deflection. The ability to make the adjustment without derigging the bow or using a bow press is highly advantageous and can be facilitated by using a torque-applying tool to operate locking fastener **116** and/or adjustment fastener **118**. For example, either or both of locking fastener **116** and adjustment fastener **118** can include a hex socket head (or similar-type indention) for receiving a hex head driver or Allen wrench and applying torque with the driver or wrench to adjustment fastener **118** to change the position of adjustable anchor component **102** within receiving slot **112**.

**[0079]** While not illustrated or specifically described herein, timing adjustment assembly **100** can similarly be used in connection with draw string **22**. In such a configuration, timing adjustment assembly can be incorporated into cam body **30** of pulley assembly **18** or **20** to replace the standard draw cable anchor position arranged on the pulley assembly.

**[0080]** Second Embodiment of Timing Adjustment Assembly

**[0081]** Turning to FIGS. **5**A-**8**C, a timing adjustment assembly **200** in accordance with a second embodiment of the present invention is illustrated and described herein. Timing adjustment assembly **200** operates in a similar manner to timing adjustment assembly **100** to enable an adjustment of the "effective length" of a power cable (and/or draw string) and synchronization of the pulley assemblies and power cables of a bow without the need of a bow press or other specialized tools.

**[0082]** FIGS. **5**A and **5**B illustrate timing adjustment assembly **200** incorporated into a standard compound bow **10**, which is configured similarly to bow **10** illustrated and described above (with respect to timing adjustment assembly **100** of FIGS. **1**A-**4**C) and the same reference numbers refer to the similar components of bow **10** and pulley assemblies **18** and **20**. As further illustrated in FIGS. **5**A and **5**B, timing adjustment assembly **200** can be incorporated into one or both pulley assemblies **18** and **20**, which can operate as mirror images of one another, in a manner similar to that described above.

**[0083]** FIGS. **6**A and **6**B illustrate pulley assembly **18** with timing adjustment assembly **200** incorporated therein. Pulley assembly **18** (with the exception of the inventive timing adjustment assembly **200** incorporated therein) can be configured as any standard or suitable cam or pulley configuration, and opposite pulley assembly **20** can be configured as a mirror image of pulley assembly **18** or as a different pulley configuration). As shown, pulley assembly **18** according to one embodiment can include a cam body **30** having a first side **32** (see FIG. **6**A) and a second side **34** (see FIG. **6**B).

**[0084]** As best shown in FIG. **6**A, the first side **32** of cam body **30** can be configured as the take-up side for first power cable **24** and can include a cam module **38** provided adjacent the opening for axle **28**, an intermediate routing post **40**, and an anchor post **48**. Each of cam module **38**, routing post **40**, and anchor post **48** can be integrally formed onto cam body **30** or coupled or secured thereto depending on the desired configuration and can be configured as any standard component typically incorporated for cam pulley assemblies known in the art. As illustrated in FIGS. **8**A-C, first power cable **24** can be anchored to and terminate at anchor post **48** and extend to engage along a track or guide formed along the edge of routing post **40**. Further, as illustrated in FIG. **5**B, as pulley assembly **18** rotates during operation of bow **10**, first power cable **24** can engage cam module **38**.

**[0085]** As best shown in FIG. **6**B, the second side **34** of cam body **30** can be configured as the let-out side for second power cable **26**. Cam body **30** can include a power cable track **42** formed round and adjacent the opening for axle **28**, an intermediate routing post, and an anchor post **44**. Track **42**, routing post, and anchor post **44** can be integrally formed on cam body **30** or attached or secured thereto. Second power cable **26** can extend around power cable track **42**, then around the routing post, before terminating at anchor post **44** so that they collectively form the let-out means for second cable **26** in a manner similar to that described above.

**[0086]** As further shown in FIGS. **6**A and **6**B, timing adjustment assembly **200** can be positioned onto cam body **30** between anchor post **48** and routing post **40** in order to selectively engage with first power cable **24**. As described in greater detail below, cam assembly **200** can be configured to deflect power cable **24** at brace in order to adjust the "effective length" of first power cable **24** to synchronize power cables **26** and **26** and pulley assemblies **18** and **20**. Notably (as best illustrated in FIGS. **8**A-**8**C, timing adjustment assembly **200** changes the effective length of power cable **24** (and/or power cable **26**) both while bow **10** is in the brace position and during draw of bow **10**. Timing adjustment assembly **200** can be secured to, or otherwise incorporated into, cam body **30** on first side **32** and located radially inward from the peripheral edge of pulley assembly **18**. A similar timing adjustment assembly **200** can similarly be provided at pulley assembly **20** for second power cable **26** in certain embodiments as illustrated in FIGS. **5**A and **5**B.

**[0087]** As shown in FIGS. **7**A and **7**B, one embodiment of timing adjustment assembly **200** can include an adjustable pusher component **202** and a bracket or housing **204**. Housing **204** can be fixedly mounted or coupled to cam body **30** by one or more fasteners, bolts, screws, pins, or any other suitable means for securely attaching housing **204** to cam body **30**. Housing **204** can further be configured and operate as a stationary component that adjustable pusher component **202** moves in a translating motion relative thereto. According to one embodiment as shown in FIGS. **7**A and **7**B, housing **204** can be attached to cam body **30** by two threaded fasteners that are inserted through openings in both the housing **204** itself and cam body **30** and secured thereto. Any other suitable configuration can also be used to secure housing **204** to cam body **30**. Alternatively, housing **204** may be integrally formed onto or as part of cam body **30**. In another embodiment, the bracket or housing **204** is not present. In such an embodiment, cam body **30** may include a slot (similar to slot **112** described above) into which adjustable pusher component **202** is received and may be slidably adjusted (similar to anchor component **12** described above).

**[0088]** Adjustable pusher component **202** can be configured to selectively slide or move linearly (i.e., move in a straight line path) across the surface of cam body **30** by

sliding relative to housing **204**, which may be fixedly secured to cam body **30**. As shown, adjustable pusher component **202** can include a base portion **206** and a pusher or deflector member **208** extending from one end of base portion **206**. Base portion **206** can be configured to be partially positioned within housing **204** and slide or move into and out of housing **204**. Deflector member **208** extends from the end of base portion **206** that is opposite of housing **204** and positioned away therefrom. As best shown in FIG. **7**A, deflector member **208** can include an engaging or pushing surface **210** that is configured to engage with power cable **24** (or power cable **26** on second pulley assembly **20**) when adjustable pusher component **202** is adjusted into contact with power cable **24**. According to one embodiment, engaging surface **210** can have a rounded, arcuate shape to evenly distribute the forces applied to power cable **24** and increase the deflection of power cable **24** relative to the movement of adjustable pusher component **202**. However, engaging surface **210** can have any other suitable shape and profile in alternative embodiments of the invention.

**[0089]** As further shown in FIGS. **7**A and **7**B, housing **204** can include an outer retaining sidewall and an interior receiving cavity or slot **212** defined by the outer retaining wall. Receiving cavity **212** can be configured for receiving and slidably retaining the base portion **206** of adjustable pusher component **202**. Receiving cavity **212** can have a size and shape generally conforming to the size and shape of base portion **206** to allow base portion **206** to be both retained by housing **204** and slide linearly into and out of housing **204**. As shown in FIGS. **7**A and **7**B, base portion **206** of adjustable pusher component **202** can have a generally orthogonal cubic shape and receiving cavity **212** of housing **204** can have a substantially similar shape defined by the outer retaining sidewall of housing **204**; however, a rounded or any other suitable shape and arrangement may alternatively be used.

**[0090]** As best shown in FIG. **7**B, receiving cavity **212** of housing **204** can include an inner seating edge or lip **214** that separates cavity **212** into a first portion **216** and a second portion **218**. Inner lip **214** can be configured as a protruding edge that extends partially inward into cavity **212** as best illustrated in FIG. **7**B. Inner lip **214** can also extend from or otherwise form a part of the inner surface of the outer retaining sidewall of housing **204**. First portion **216** can be configured to receive base portion **206** of adjustable pusher component **202** so that when base portion **206** is fully inserted into cavity **212** it seats against and is restrained by inner lip **214**. One end of first portion **216** can be defined by lip **214** and the second end of first portion can remain open to allow base portion **206** to move relative to housing **204**. Second portion **218** of cavity **212** can be configured to receive the end portion of an adjustment fastener **220** that can be used to selectively move and adjust adjustable pusher component **202** as described below.

**[0091]** As further shown in FIGS. **7**A and **7**B, timing adjustment assembly **200** can include an adjustment fastener **220** configured to selectively move or slide adjustable pusher component **202** into and out of housing **204**. Adjustment fastener **220** can be configured as a threaded (or unthreaded) screw, bolt, fastener, pin, or any other suitable fastening means and can be received within a corresponding opening or hole **222** defined into the end of base portion **206** of adjustable pusher component **202**. Adjustment fastener **220** can positioned within cavity **212** of housing **204** and inserted into opening **222** of adjustable pusher component **202**. As best shown in FIG. **7**B, the end wall of housing **204** opposite base portion **20** of adjustable pusher component **202** can include an opening or slot **224** that enables a user to insert a screwdriver, Allen wrench, hex key, or similar torque-style tool or adjustment means into second cavity portion **218**. When the user inserts the adjustment means into cavity **218** and in contact with adjustment fastener **220**, the user can adjust the position of adjustable pusher component **202** relative to housing **204** and cam body **30** by twisting adjustment fastener **220**, which in turn causes adjustable pusher component **202** to slide (or move parallel along the surface of cam body **30**) into or out of housing **204**. As adjustable pusher component **202** moves out of housing **204**, the engaging surface **210** of deflector member **208** contacts and deflects power cable **24** to alter the path of power cable **24** and change its effective length.

**[0092]** As best shown in FIG. **7**A, timing adjustment assembly **200** can include a locking fastener **226** for securing or locking adjustable pusher component **202** in its current position relative to housing **204**, cam body **30**, and power cable **24**. As shown, deflector member **208** can include an opening or hole **228** defined perpendicularly into its surface for receiving locking fastener **226**. Locking fastener **226** can be configured as a threaded (or non-threaded) screw, bolt, or any other suitable fastening means. Opening **228** into deflector member **208** can extend through the interior of deflector member **208** and in communication with opening **222** extending horizontally through adjustable pusher component **202** from base portion **206**. As a result, locking fastener **226** can restrict or prevent the further movement of adjustment fastener **220** into adjustable pusher component **202** and effectively lock the position of adjustable pusher component **202** in place (relative to housing **204**, cam body **30**, and power cable **24**). Locking mechanism for timing adjustment assembly **200** can also include a locking nut or anchor **230** that engages with the end of locking fastener **226** within opening **228**. Collectively, locking fastener **226** and locking nut **230** can secure adjustment fastener **220** in its current location within adjustable pusher component **202** and lock adjustable pusher component **202** in place.

**[0093]** Turning to FIGS. **8**A-**8**C, the operation of timing adjustment assembly **200** will now be described in greater detail. As shown in FIG. **8**A, timing adjustment assembly **200** is provided on cam body **30** with housing **204** fixedly secured to cam body **30** and adjustable pusher component **202** provided in a retracted position with base portion **206** located entirely within cavity **212** of housing **204**. As further shown, in this retracted position, engaging surface **210** of deflector member **208** may be in contact or engagement with power cable **24** between routing post **40** and anchor post **48**; however, engaging surface **210** does not deflect power cable **24**. In the event that pulley assembly **18** is out of sync and requires adjustment to synchronize pulley assemblies **18** and **20** and/or power cables **24** and **26**, a user can easily change the "effective length" of power cable **24** by using timing adjustment assembly **200**. Similar to the previous embodiment, the effective length power cable **24** can be defined as the length of power cable **24** from its engagement to anchor post **48** on pulley assembly **18** to its engagement to anchor post **44** on second pulley assembly **20**.

**[0094]** Similar to the previous embodiment, timing adjustment assembly **200** can be structurally arranged to allow for

any number of different deflection amounts of power cable **24** by changing the positional arrangement of pusher component **202** relative to power cable **24** (as well as housing **204** and the surface of cam body **30**). The different deflection amounts result in different effective lengths of power cable **24**. FIGS. **8**A-**8**C illustrate a few exemplary different deflection amounts and resulting effective lengths of power cable **24**. FIG. **8**A illustrates timing adjustment assembly **200** with adjustable pusher component **202** in a fully retracted position where power cable **24** is not deflected and defines a "first effective length" of power cable **24**. FIG. **8**B illustrates timing adjustment assembly **200** with adjustable pusher component **202** in a partially extended (or partially retracted) position where power cable **24** is slightly deflected and defines a "second effective length" of power cable **24**. As shown in FIG. **8**B, base portion **206** of adjustable pusher component **202** has been extended partially from cavity **212** of housing **204** and engaging surface **210** of deflector member **208** has engaged and deflected power cable **24**. FIG. **8**C illustrates timing adjustment assembly **200** with adjustable pusher component **202** in a fully extended position where power cable **24** is deflected and defines a "third effective length" of power cable **24**. As shown in FIG. **8**C, base portion **206** of adjustable pusher component **202** has been extended fully from cavity **212** of housing **204** and engaging surface **210** of deflector member **208** has engaged and deflected power cable **24** an amount greater than the deflection occurring in the partially extended position.

**[0095]** To adjust timing adjustment assembly **200** and the effective length of power cable **24**, a user can loosen or untighten locking fastener **226** from opening **228** and subsequently adjusting adjustment fastener **220** by either loosening or tightening fastener **220**. When tightening adjustment fastener **220**, pusher component **202** will extend outward from housing **204** and engaging surface **210** of deflector member **208** will deflect power cable **24** by engaging and "pushing" on power cable **24**. When loosening adjustment fastener **220**, pusher component **202** will retract inward into housing **204** and reduce the amount of deflection of power cable **24**. By increasing or decreasing the deflection amount of power cable **24** created by adjustable pusher component **202** and timing adjustment assembly, a user can change the "effective length" of power cable **24** to synchronize bow **10**, pulley assemblies **18** and **20**, and power cables **24** and **26**. Once the desired change to the effective length of power cable **24** by achieving the desired deflection due to timing adjustment assembly **200**, locking fastener **226** can be tightened within opening **228** to lock the position of adjustable pusher component **202** relative to housing **204**.

**[0096]** The adjusted deflection amount of power cable **24** caused by timing adjustment assembly **200** results in a change in the effective length of power cable **24** as described above. This allows timing adjustment assembly **200** to be used to properly time and synchronize bow **10** and pulley assemblies **18** and **20**. Notably, the deflection of power cable **24** imparted by timing adjustment assembly **200** occurs while bow **10** is at the brace position, which allows a user to determine a necessary adjustment to the effective length of power cable **24** to properly time and synchronize the pulley assemblies. The timing and synchronization of pulley assemblies **18** and **20** can be achieved by using timing adjustment assembly **200** to increase or decrease the amount of deflection applied to power cable **24** and/or **26** thereby increasing or decreasing the effective length of one or both of power cables **24** and **26**.

**[0097]** Third Embodiment of Timing Adjustment Assembly

**[0098]** Turning to FIGS. **9**A-**12**D, a timing adjustment assembly **300** in accordance with a third embodiment of the present invention is illustrated and described herein. Similar to the embodiments of timing adjustment assemblies **100** and **200**, timing adjustment assembly **300** can enable an adjustment of the "effective length" of a power cable (and/or compound bow string) and synchronization of the pulley assemblies and power cables of a bow without the need of a bow press or other specialized tools. As described in greater detail herein, timing adjustment assembly **300** can be located along the path of one or both of the power cables of a bow and can be separate from each pulley assembly. As a result, timing adjustment assembly **300** need not be provided on or otherwise attached or connected to one of the pulley assemblies as in the embodiments of timing adjustment assemblies **100** and **200** disclosed previously. Accordingly, timing adjustment assembly **300** may be included as a standard or optional original equipment feature for new bows when manufactured, may be implemented as an add-on feature, or may be used to retrofit existing bows.

**[0099]** FIGS. **9**A and **9**B illustrate timing adjustment assembly **300** incorporated into a standard compound bow **10**, which is configured similarly to bow **10** illustrated and described above (with respect to timing adjustment assembly **100** of FIGS. **1**A-**4**C and assembly **200** of FIGS. **5**A-**8**C) and the same reference numbers refer to the similar components of bow **10** and pulley assemblies **18** and **20**. However, as further illustrated in FIGS. **9**A and **9**B, timing adjustment assembly **300** can be incorporated directly into one or both of power cables **24** and **26** at a distance away from pulley assemblies **18** and **20**. In such a configuration, timing adjustment assembly **300** can be provided at an intermediate position along the length of power cable **24** and/or **26** between the two pulley assemblies **18** and **20**.

**[0100]** FIG. **10** illustrates pulley assembly **18** and power cables **24** and **26** in greater detail with timing adjustment assembly **300** incorporated along the path of power cable **24**. As shown, timing adjustment assembly **300** can be incorporated into power cable **26** adjacent to pulley assembly **20**. Similarly, a second timing generally adjustment assembly **300** can be incorporated into power cable **24** generally adjacent to second pulley assembly **20** as shown in FIGS. **9**A and **9**B. Pulley assembly **18** can be configured as any standard or suitable cam or pulley configuration, and opposite pulley assembly **20** can be configured as a mirror image of pulley assembly **18** or as a different pulley configuration).

**[0101]** As shown in FIG. **10**, pulley assembly **18** according to one embodiment can include a cam body **30** with take-up means and let-out means for both power cables **24** and **26**. For the take-up means associated with first power cable **24**, pulley assembly **18** can include a cam module **38** provided adjacent the opening for axle **28**, an intermediate routing post **40**, and an anchor post **48**, each provided on or integral with cam body **30**. First power cable **24** can be anchored to and terminate at anchor post **48** and extend to engage along a track or guide formed along the edge of routing post **40**. Further, as illustrated in FIG. **9**B, as pulley

assembly **18** rotates during operation of bow **10**, first power cable **24** can engage cam module **38** as first power cable **24** is taken-up.

**[0102]** As further shown in FIG. **10**, pulley assembly **18** according to one embodiment can be configured to accommodate a split let-out means for second power cable **26**. As shown, power cable **26** can be split into two separate cable ends **26***a* and **26***b* at timing adjustment assembly **300** and both cable ends **26***a* and **26***b* can be anchored to pulley assembly **18** at the first and second sides **32** and **32** of cam body **30**, respectively. First side **32** of cam body **30** can include a power cable track **42***a* formed round and adjacent the opening for axle **28**, an intermediate routing post, and an anchor post **44***a*. Second power cable end **26***a* can extend around power cable track **42***a*, then around the routing post, before terminating at anchor post **44***a*. Second side **34** of cam body **30** can include an identical configuration of a power cable track **42***b*, intermediate routing post, and anchor post **44***b* for anchoring second power cable end **26***b*. Collectively, power cable tracks **42**, intermediate routing posts, and anchor posts **44** can form the let-out means for second power cable **26**. In another embodiment (not shown), second separate portion of power cable **26** (which is illustrated in the figures as split cable ends **26***a* and **26***b*) can alternatively comprise a single cable end **26***a* anchored or attached to timing adjustment assembly **300** at one end and anchored to pulley assembly **18** at its other end via a single anchor post **44**, power cable track **42** and optional intermediate routing post located on one side of pulley assembly **18**.

**[0103]** Turning now to FIGS. **10-12**E, timing adjustment assembly **300** will be described in greater detail. As shown in FIG. **10**, timing adjustment assembly **300** can be configured along the path of second power cable **26** and positioned above and adjacent to first pulley assembly **18**. Timing adjustment assembly **300** can be configured to split cable **26** into two split ends **26***a* and **26***b* that are anchored to first pulley assembly **18** while having an adjustable component that enables the length of power cable **26** to be increased or decreased so that pulley assemblies **18** and **20** and cables **24** and **26** can be synchronized.

**[0104]** As shown, timing adjustment assembly **300** can include a coupler component **302** and an adjustable yoke component **304** coupled to the coupler component **302**. Coupler component **302** can have an elongated shape formed by a sidewall and a first end portion **306** and a second end portion **308** on opposing ends thereof. The sidewall can include a slot or opening **310** defined through the central region of coupler component **302** and between end portions **306** and **308**, which are enclosed ends as illustrated in FIGS. **10-12**E. Slot **310** can be configured to receive adjustable yoke component **304** and can include a height greater than adjustable yoke component **304** to enable adjustable yoke component **304** to move along the length of coupler component **302** within slot **310**. According to one embodiment, adjustable yoke component **304** can move within slot **310** generally vertically in a linear path relative to first and second end portions **306** and **308**. Coupler component **302** can be configured and operate as a stationary component that adjustable yoke component **304** moves in a translating motion relative thereto. FIGS. **10-12**E illustrate coupler component **302** having a generally rounded, rectangular shape and adjustable yoke component **304** having a generally flat disc-shape; however, both components **302** and **304** can have any suitable shape, configuration and dimensions that enable adjustable yoke component **304** to be received within coupler component **302** and slide or move in a linear path therein.

**[0105]** As best shown in FIG. **11**A, first end portion **306** of coupler component **302** can include a groove or receiving surface **312** for second power cable **26** (illustrated in FIGS. **10** and **11**B). Groove **312** can be configured to receive a looped end of second power cable **26** and anchor second power cable **26** to coupler component **302**. As further shown in FIG. **11**A, adjustable yoke component **304** can include a groove or receiving surface **314** for split ends **26***a* and **26***b* of second power cable **26** (also illustrated in FIGS. **10** and **11**B). As best shown in FIG. **11**A, groove **314** can be provided along the perimeter of adjustable yoke component **304** and can have a recessed surface for receiving and retaining the split ends **26***a* and **26***b* of second power cable **26** within timing adjustment assembly **300**. The opposing portions of split ends **26***a* and **26***b* can extend toward pulley assembly **20** and can be anchored thereto as best shown in FIGS. **10** and **11**B. While not illustrated herein, in an alternative embodiment, the second portion of power cable **26** can be configured as a single cable anchored to adjustable yoke component **304** as a looped end and similarly anchored to pulley assembly **18** as described above.

**[0106]** As further shown in FIG. **11**A, timing adjustment assembly **300** can include an adjustment fastener **316** that can be inserted through second end portion **308** of coupler component **304** in order to allow for adjustment of the positioning of adjustable yoke component **304** within slot **310**. Adjustment fastener **316** can be configured as a threaded (or non-threaded) fastener, screw, bolt, pin, or any other suitable fastening means similar to the adjustment fasteners described above with respect to the previous embodiments of the invention. As best shown in FIGS. **11**A and **12**A-**12**C, adjustment fastener **316** can be inserted into and through an opening **318** provided in second end portion **308** of coupler component **302** so that an inserted end of fastener **316** is positioned within the interior of slot **310**. The inserted end of adjustment fastener **316** can further be configured to contact an engaging surface **320** on adjustable yoke component **304**. Engaging surface **320** is illustrated as an indention or recessed grove formed into the lower end of adjustable yoke component **304**; however, engaging surface **320** can have any suitable configuration that allows for the inserted end of fastener **316** to engage and support adjustable yoke component **304** within slot **310** of coupler component **302**. As best shown in FIGS. **12**A-**12**C, when adjustment fastener **316** is inserted into slot **310** of coupler component **302**, the engaging surface **320** of adjustable yoke component **304** will be supported on the inserted end of fastener **316** so that the position of fastener **316** within slot **310** defines the position of adjustable yoke component **304** relative to coupler component **302**. As adjustment fastener **316** is inserted further into slot **310**, it pushes upward adjustable yoke component **304** within slot **310**. Similarly, as adjustment fastener **316** is unwound or pulled out of slot **310**, adjustable yoke component **304** moves downward within slot **310**.

**[0107]** As further shown in FIGS. **11**A and **12**A-**12**C, timing adjustment assembly **300** can include a locking fastener **322**, which can be inserted into and through a corresponding opening **324** in coupler component **302** and a corresponding opening **326** in adjustable yoke component **304**. Locking fastener **322** can be configured as any suitable

threaded fastener, screw, bolt, pin, or other suitable fastening means (threaded or non-threaded) similar to the locking fasteners described above with respect to previous embodiments of the invention. As best shown in FIG. **11**A, opening **324** can be defined through the sidewall of coupler component **302** between the first and second end portions **306** and **308** and configured to receive locking fastener **322** so that locking fastener **322** can be inserted generally horizontally through slot **310** of coupler component **302**. Opening **324** can have a diameter or shape approximately similar to that of locking fastener **322** in order to secure and support fastener **322** once inserted therein.

**[0108]** As further shown, opening **326** can be defined into and through adjustable yoke component **304**. According to one embodiment, opening **326** can be configured with an elongated slotted shape extending generally in the same direction and orientation as slot **310** of coupler component **302**. According to this embodiment, when locking fastener **322** inserted into and through opening **324** of coupler component **302** and opening **326** of yoke component **304**, locking fastener **322** secures yoke component **304** within slot **310** but allows for the vertical position of yoke component **304** within slot **310** to be adjusted by the adjustment fastener **316**, as best illustrated in FIGS. **12**A-**12**C.

**[0109]** FIGS. **12**A-**12**F illustrate the operation, functionality, and adjustment of timing adjustment assembly **300** when incorporated into a bow **10** in accordance with one embodiment of the invention. FIGS. **10** and **11**B best illustrate timing adjustment assembly **300** configured into bow **10**, and particularly incorporated into power cable **26** above pulley assembly **18**. Power cable **26** can be anchored to first end portion **306** of coupler component **302** while the split ends of power cable **26***a* and **26***b* can be anchored to adjustable yoke component **304** at timing adjustment assembly **300** and then to pulley assembly **18** on each side thereof. In the event bow **10** is not properly synchronized (particularly pulley assemblies **18** and **20** and/or power cables **24** and **26**), timing adjustment assembly **300** can be used to change the "effective length" of power cable **26** to lengthen or shorten power cable **26** and synchronize pulley assembly **18**. As best illustrated in FIGS. **12**A-**12**C, the position of adjustable yoke component **304** relative to coupler component **302** may be adjusted up or down by the adjustment fastener **316** inserted into the lower second end portion **308** of coupler component **302**. As adjustment fastener **316** is inserted further into slot **310** of coupler component **302**, the end of adjustment fastener **316** engages the engaging surface **320** of yoke component **304** and forces yoke component **304** upward within slot **310**. By moving yoke component **304** upward within slot **310**, the effective length of power cable **26** is shortened because of the split ends **26***a* and **26***b* anchored to yoke component **304**. Similarly, as adjustment fastener **316** is moved out of slot **310**, yoke component **304** is lowered within slot **310** and lengthens the effective length of power cable **26**. The engaging surface **320** of yoke component **304** us supported on and by the end of adjustment fastener **316** and results in the position of the adjustment fastener **316** determining the position of the yoke component **304** within slot **310** of coupler component **302**. Locking fastener **322**, which is inserted through coupler component **302** and yoke component **304** secures yoke component **304** within slot **310**.

**[0110]** Similar to previous embodiments, timing adjustment assembly **300** can be structurally arranged to allow for any desired positional arrangement of timing adjustment assembly **300** (and specifically adjustable yoke component **304**) to impart any desired differing effective length of power cable **24** or **26** by moving adjustable yoke component **304** relative to coupler component **302**. FIGS. **12**D-**12**F illustrate three possible different positions of the adjustable yoke component **304** within slot **310** of coupler component **302** for exemplary purposes, each of which correspond to a particular "effective length" of power cable **26** in accordance with one embodiment of the invention. The different "effective lengths" of power cable **26** can be used to adjust and synchronize bow **10** and pulley assembly **18**.

**[0111]** As shown in FIGS. **12**D-**12**F, adjustable yoke component **304** can include a movement guide marker **328** that can be configured as any suitable indicator means to indicate the linear position of yoke component **304** relative to coupler component **302** (i.e., the location of yoke component **304** within slot **310** that corresponds to an effective length of power cable **26**). Movement guide marker **328** can be defined into the surface of yoke component **304** and/or applied to the surface thereof to provide a visual indication of the position of the yoke component **304**. Similarly, coupler component **302** can include a slide position indicator **330** configured as any suitable indicator means and can be defined into the surface of the sidewall of coupler component **302** and/or applied to the surface thereof. According to certain embodiments, slide position indicator **330** can be configured as a series of markings designating specific lengths or distances under the metric or imperial systems. When adjustable yoke component **304** is positioned within slot **310** of coupler component **302**, movement guide marker **328** can be aligned with slide position indicator **330** in order to indicate the precise position of adjustable yoke component **304** relative coupler component **302** and the resulting change in "effective length" of power cable **26** due to the adjustment of timing adjustment assembly **300**.

**[0112]** FIG. **12**D illustrates timing adjustment **300** where adjustable yoke component **304** is placed into a first position (relative to coupler component **302**), which corresponds to a first effective length of power cable **26**. Similarly, FIG. **12**D illustrate yoke component **304** in second and third positions, respectively, with each corresponding to second and third effective lengths of power cable **26**. The third position of yoke component **304** is positioned further downward within slot **310** of coupler component **302** and results in the third effective length of power cable **26** being greater than second effective length. In the event that pulley assembly **18** is not synchronized properly, then a user can change the effective length of power cable **26** though timing adjustment assembly **300**. A user may use timing adjustment assembly **300** and adjust the position of adjustable yoke component **304** relative to coupler component **302** by screwing or unscrewing adjustment fastener **316**. When the user unscrews fastener **316**, yoke component **304** slides linearly in the vertical direction within slot **310** of coupler component **302** and moves from the first position (FIG. **12**D) to the second position (FIG. **12**E) to the third position (FIG. **12**F), or any other position therebetween, as indicated by movement guide marker **328**. Using the timing adjustment assembly **300**, the user can increase (or decrease) the effective length of power cable **26** to synchronize pulley assemblies **18** and **20** of bow **10**. Similarly, a user may adjust the effective length of power cable **24** having a second timing

adjustment assembly **300** incorporated into power cable **24** adjacent pulley assembly **20** as illustrated in FIGS. **9**A and **9**B.

**[0113]** Fourth Embodiment of Timing Adjustment Assembly

**[0114]** Turning to FIGS. **13**A-**16**C, a timing adjustment assembly **400** in accordance with a fourth embodiment of the present invention is illustrated and described herein. Similar to the embodiments of timing adjustment assemblies **100**, **200**, and **300**, timing adjustment assembly **400** can enable an adjustment of the "effective length" of a power cable (and/or compound bow string) and synchronization of the pulley assemblies and power cables of a bow without the need of a bow press or other specialized tools. As described in greater detail herein, timing adjustment assembly **400** can be located on the riser of a bow and can be separate from each pulley assembly. As a result, timing adjustment assembly **400** need not be provided on or otherwise incorporated into one of the pulley assemblies as in the embodiments of timing adjustment assemblies **100** and **200** disclosed previously.

**[0115]** FIGS. **13**A and **13**B illustrate timing adjustment assembly **400** incorporated into a standard compound bow **10**, which is configured similarly to bow **10** illustrated and described above with respect to prior embodiments of the timing adjustment assembly, and the same reference numbers refer to the similar components of bow **10** and pulley assemblies **18** and **20**. Timing adjustment assembly **400** can also be incorporated into any suitable bow configuration containing at least one power cable.

**[0116]** As shown in FIGS. **13**A and **13**B, bow **10** can include a riser **12**, opposing bow limbs **14** and **16** with pulley assemblies **18** and **20** rotatably attached to the ends thereof via and axle arrangement, a bowstring or drawstring **22**, and first and second power cables **24** and **26** extending between the pulley assemblies **18** and **20**. The take-up end of first power cable **24** is anchored to pulley assembly **18** and the let-out end is anchored to pulley assembly **20** and a second timing adjustment assembly **400** located at riser **12**. Similarly, in a generally mirror image configuration, the take-up end of second power cable **26** is anchored to pulley assembly **20** and extends toward and the let-out end is anchored to pulley assembly **18** and a first timing adjustment assembly **400** located at riser **12**. As described in greater detail below, timing adjustment assembly **400** can include an idler pulley component **404** that splits the let-out end of each power cable into split ends with one split end anchored to the pulley assembly and the second end anchored to the mounting component **402** at riser **12**.

**[0117]** FIGS. **14** and **15** illustrate timing adjustment assembly **400** configured for second power cable **26** and its let-out end at pulley assembly **18**. A second timing adjustment assembly **400** can similarly be configured and adapted for first power cable **24** at pulley assembly **20** in a mirror image arrangement at the other end of bow **10** as shown in FIGS. **13**A and **13**B. As best shown in FIG. **14**, pulley assembly **18** can include a cam body **30** with take-up means and let-out means for both power cables **24** and **26**. For the take-up means associated with first power cable **24**, pulley assembly **18** can include a cam module **38** provided adjacent the opening for axle **28**, an intermediate routing post **40**, and an anchor post **48**, each provided on or integral with cam body **30**. Timing adjustment assembly **400** can also alternatively be configured and adapted for the take-up end of power cable **24** or **26**. In such an arrangement, the take-up end of power cable **24** (as illustrated in FIGS. **14** and **15**) would be split into separate ends with one anchored to pulley assembly **18** and the other end to mounting component **402** at riser **12**.

**[0118]** As shown in FIGS. **14** and **15**, timing adjustment assembly **400** can include a mounting component **402** and a pulley component **404**. Mounting component **402** can be located at riser **12**. As shown, mounting component **402** can be located at the lower end of riser **12** adjacent to pulley assembly **18**. Mounting component **402** can be located at any suitable position along the height of riser **12** and need not necessarily be positioned near or adjacent to pulley assembly **18**.

**[0119]** Pulley component **404** can operate to connect timing adjustment assembly **400** to pulley assembly **18** and enable the let-out component of pulley assembly **18** for second power cable **26**. As shown in FIG. **14**, pulley component **404** receives power cable **26** and provides split ends **26***a* and **26***b* for second power cable **26** that anchor to both the let-out means of pulley assembly **18** and the mounting component **402** on riser **12**. Pulley component **404** can be located at a spaced distance from pulley assembly **18** in line with second power cable **26**. Pulley component **404** can receive second power cable **26** (that extends from the take-up means at pulley assembly **20** at the opposing end of bow **10**) and then split or divide second power cable **26** into first and second ends **26***a* and **26***b*, respectively. Split end **26***a* extends to and is anchored at pulley assembly **18**. According to one embodiment as described above, pulley assembly **18** can include a cable track **42** and anchor post **44** configured as a let-out means for receiving and anchoring second cable end **26***a*. The opposing split end **26***b* wraps around pulley component **404** and extends toward riser **12** where it is anchored at mounting component **402**.

**[0120]** As best shown in FIGS. **14** and **15**, pulley component **404** can include a bracket **406** that houses an idler pulley **408** for split second cable ends **26***a* and **26***b*. According to one embodiment as best shown in FIG. **15**, bracket **406** can include a base portion **410** and plate portion **412** spaced from base portion **410** so that idler pulley **408** can be positioned therebetween. As further shown in FIG. **15**, pulley component **404** can include one or more fasteners **420** that secure base portion **410** and plate portion **412** together. Other suitable means to secure bracket **406** can also be used and/or bracket **406** can be constructed as a single, unitary component according to certain embodiments.

**[0121]** Bracket **406** can include a termination post **414** provided at one end of base portion **410** for receiving a looped end of second power cable **26**. Termination post **414** provides receives and anchors the end of the main part of second power cable **26** extending from the other end of bow **10** and enables the remainder of second power cable **26** to be split into its separate split ends **26***a* and **26***b*. termination post **414** can extend between base portion **410** and plate portion **412** as best illustrated in FIG. **15**. Bracket **406** can also include an axle shaft **416** at the opposite end (relative to termination post **414**) for receiving a wheel portion **418** of idler pulley **408**, and axle shaft **416** and pulley wheel **418** can collectively form a part of idler pulley **408** of pulley component **42**.

**[0122]** FIGS. **14** and **15** illustrate pulley component **404** and bracket **406** according to one specific embodiment; however, it is also recognized that pulley component **404** can

alternatively have any suitable configuration that includes a termination point for the anchoring of second power cable **26** and an idler pulley for receiving and directing the split ends **26***a* and **26***b* of power cable **26** between pulley assembly **18** and mounting component **402**.

**[0123]** As further shown in FIGS. **14** and **15**, the first split end **26***a* of extends from idler pulley **408** of pulley component **404** to pulley assembly **18**. As described previously, cable end **26***a* can extend around power cable track **42** adjacent axle **28** and anchor to anchor post **44** on cam body **30** to provide the let-out means for second power cable **26**. It is also recognized that any other suitable configuration for coupling second power cable end **26***a* to pulley assembly **18** can alternatively be used in other embodiments.

**[0124]** The second split end **26***b* extend from idler pulley **408** of pulley component **404** toward riser **12** where it is coupled to mounting component **402**. As best shown in FIGS. **14** and **15**, mounting component **402** can include a mounting fastener **422**, a riser bracket or housing **424** with an opening or slot **426** formed therein, and an adjustable cable termination component **428**. Riser housing **424** can be fixedly secured to or otherwise integrally formed within riser **12**. As shown, riser housing **424** can have an elongated shape with a hollow or open interior configured to receiving mounting fastener **422**. Riser housing **424** is configured to mount mounting fastener **422** to riser **12**. In an alternative embodiment (not shown), riser housing **424** can be configured as an opening defined through a portion of riser **12** so that mounting fastener **422** can be inserted and secured thereto in a fixed position.

**[0125]** As shown in FIGS. **14** and **15**, mounting fastener **422** is mounted and secured within riser housing **424** and partially visible through housing opening **426**. Mounting fastener **422** can be configured as an elongated threaded bolt that is inserted and secured to riser **12** through riser housing **424**. In alternative embodiments (not shown), mounting fastener **422** can alternatively be configured as any suitable threaded or non-threaded bolt, screw, pin, shaft, or other suitable fastening means that is suitable for mounting to riser **12** and having adjustable cable termination component **428** moveably coupled thereto. Mounting fastener **422** and/or riser housing **424** can be configured and operate as a stationary component that adjustable cable termination component **428** moves in a translating motion relative thereto.

**[0126]** As further shown in FIGS. **14** and **15**, adjustable cable termination component **428** can be coupled to mounting fastener **422**. Adjustable cable termination component **428** can be configured as any type of block, fixture, post, or similar component and can include an opening **432** for receiving the end of mounting fastener **422** and allowing termination component **428** to slide or move along the length of mounting fastener **422**, which is fixedly mounted to riser **12**. Adjustable cable termination component **428** can further include, or have connected thereto, an anchor post **430** configured for receiving and anchoring second cable split end **26***b* to mounting component **402**. Anchor post **430** can be configured as any suitable attachment means to receiving the end of second cable split end **26***b* and securely attaching it to adjustable component **428**. According to one embodiment, as shown in FIGS. **14** and **16**A-**16**C, adjustable component **428** can be configured to be at least partially received within riser housing **424** with anchor post **430** extending out through housing opening **426**.

**[0127]** Mounting component **402** can further include an adjustment fastener **434** and a locking fastener **436** for operating adjustable component **428** and enabling adjustable component **428** to move up and down along the length of mounting fastener **422**. Both adjustment fastener **434** and locking fastener **436** can be configured as any suitable threaded or non-threaded fastener means, such as a bolt, screw, pin, or similar means, as described above with respect to the previous embodiments of the present invention. Adjustment fastener **434** can be inserted and received within an opening defined into one end of adjustable component **428**. As fastener **434** is wound or unwound relative to the opening defined into adjustable component **428**, adjustable component **428** can slide upward or downward along the length of mounting fastener **422**. Locking fastener **436** can be inserted and received within a second opening defined into an opposite end of adjustable component **428**. When fully inserted into adjustable component **428**, locking fastener **436** can operate to lock adjustable component **428** and secure adjustable component **428** in a fixed position relative to mounting fastener **422** and riser **12**.

**[0128]** FIGS. **16**A-**16**C illustrate the operation, functionality, and adjustment of timing adjustment assembly **400** when incorporated into a bow **10** in accordance with one embodiment of the invention. In particular, timing adjustment assembly **400** can be configured to enable adjustment of the effective length of the power cables in order to synchronize the pulley assemblies (and pulley orientation thereof) and while the bow **10** is at brace and during draw and operation of bow **10**. As described above and shown in FIGS. **16**A-**16**C, one end of second power cable **26** is coupled to pulley assembly **18** and riser **12** of bow **10** through the timing adjustment assembly **400**. A first cable end **26***a* is anchored to pulley assembly **18** and a second cable end **26***a* is anchored to mounting component **402** on riser **12** and both ends are routed through the idler pulley **408** on pulley component **404**. The specific bow configuration illustrated for bow **10** in FIGS. **16**A-**16**C represents just one possible embodiment and it is recognized the timing adjustment assembly **400** can also be easily configured and adapted for different particular bow configurations.

**[0129]** In the event bow **10** is not properly synchronized (particularly pulley assemblies **18** and **20** and/or power cables **24** and **26**), timing adjustment assembly **400** can be used to change the "effective length" of power cable **26** to lengthen or shorten power cable **26** and synchronize pulley assembly **18**. As illustrated in FIGS. **16**A-**16**C, second power cable end **26***b* is anchored to adjustable component **428** of mounting component **402** at riser **12**. In order to adjust timing adjustment assembly **400** to change the "effective length" of second power cable **26**, adjustable termination component **428** can be moved linearly along the length of mounting fastener **422** by sliding termination component **428** forward or backward on mounting fastener **422**. A user can easily operate timing adjustment assembly **400** via adjustable component **428** by loosening locking fastener **436** inserted within termination component **428** and then turning adjustment fastener **434**, which slides adjustable component **428** linearly forward or backward along the length of mounting fastener **422**. Because second power cable end **26***a* is anchored to anchor post **430** at adjustable component **428**, changing the length of power cable end **26***b* (between adjustable component **428** and idler pulley **408**) correspondingly changes the length of power cable end **26***a* (between

pulley assembly **18** and idler pulley **408**). This results in either increasing or decreasing the "effective length" of second power cable **26** by causing slight rotation of pulley assembly **18** and changing the position of the anchored let-out cable end **26***a* on cam body **30** of pulley assembly **18**. When the desired adjustment to timing adjustment assembly **400** and second power cable **26** is made to synchronize pulley assemblies **18** and **20** and power cable **26**, then the position of adjustable component **428** relative to mounting fastener **422** can be locked in place by tightening locking fastener **436**, which secures adjustable component **428** in a fixed position on mounting fastener **422**.

**[0130]** Similar to the previous embodiments, timing adjustment assembly **400** can be structurally arranged to allow for any desired positional arrangement of anchor post **430** relative to mounting fastener **422** and riser **12** by moving the adjustable component **428** along the length of mounting fastener **422**. Each different position arrangement of anchor post **430** results in a different effective length of power cable **26**. FIGS. **16**A-**16**C illustrate timing adjustment assembly **400** where adjustable component **428** has been positioned in three different possible positions relative to mounting fastener **422** to result in three different effective lengths of second power cable **26** for exemplary purposes. FIG. **16**A shows timing adjustment assembly **400** and adjustable component **428** in a first position which results in a first "effective length" of second cable **26**. As shown, adjustable component **428** is located at its extended-most position on mounting fastener **422**, which in turn increases the length of second cable split end **26***a* anchored to pulley assembly **18**. FIG. **16**B shows adjustable component **428** in a second position where it has been moved linearly to a midway point along the length of mounting fastener **422**. This results in a second "effective length" of second cable **26** that decreases the length of second cable split end **26***a* and slightly rotates pulley assembly **18** in a clockwise orientation to synchronize pulley assembly **18**. FIG. **16**C shows adjustable component **428** in a third position where it has been moved linearly to its retracted-most position on mounting fastener **422** and results in a third "effective length" of second cable **426**. In this position, adjustable component **428** has been slid fully along the length of mounting fastener **422** and closer to riser **12**, which results in a decreased length of second cable split end **26***a* that further rotates pulley assembly **18** in a clockwise orientation to synchronize pulley assembly **18**.

**[0131]** As illustrated through FIGS. **16**A-**16**C, timing adjustment assembly **400** can be utilized to change the relative "effective length" of second cable **26** and cause slight rotation of pulley assembly **18** in order to synchronize pulley assembly **18** within bow **10**. The adjustment of timing adjustment assembly **400** can be achieved by changing the position of adjustable component **428** (which has cable end **26***b* anchored thereto) along the length of mounting fastener **422** mounted to riser **10** and then securing the adjustable component **428** in a fixed position. A second timing adjustment assembly **400** located on an opposite end of bow **10** at pulley assembly **20** can be similarly used to rotate and orientate pulley assembly **20** and first power cable **24** to synchronize pulley assembly **20**. Collectively, both timing adjustment assemblies **400** can be used to synchronize bow **10** without the use of any specialty equipment or tools.

**[0132]** In alternative embodiments of timing adjustment assembly **400** (not shown), a winch and ratcheting system can be used in place of mounting component **402** that can couple adjustable component **428** and cable end **26***b* to the riser end of timing adjustment assembly **400**. In yet another alternative embodiment (not shown), timing adjustment assembly **400** can be configured so that second cable end **26** is looped around pulley component **404** and idler pulley **408** and then anchored back to pulley assembly **18** in place of mounting component **402** mounted on riser **12**. In such an embodiment, adjustable component **428** is moveably coupled to cam body **30** of pulley assembly **18**.

**[0133]** From the accompanying materials, it will be seen that the invention is one well adapted to attain all the ends and objects set forth herein with other advantages which are obvious and which are inherent to the structure. It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of the claims. Since many possible embodiments of the invention may be made without departing from the scope thereof, it is also to be understood that all matters herein set forth or shown in the accompanying drawings are to be interpreted as illustrative and not limiting.

**[0134]** The constructions described in the accompanying materials and illustrated in the drawings are presented by way of example only and are not intended to limit the concepts and principles of the present invention. Thus, there has been shown and described several embodiments of a novel invention. As is evident from the description, certain aspects of the present invention are not limited by the particular details of the examples illustrated herein, and it is therefore contemplated that other modifications and applications, or equivalents thereof, will occur to those skilled in the art. The terms "having" and "including" and similar terms as used in the foregoing specification are used in the sense of "optional" or "may include" and not as "required." Many changes, modifications, variations and other uses and applications of the present construction will, however, become apparent to those skilled in the art after considering the specification and the accompanying drawings. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention which is limited only by the claims which follow.

What is claimed is:

**1**. A timing adjustment assembly for a compound archery bow comprising a riser and at least one power cable connected between two pulley assemblies, the timing adjustment assembly comprising:

a stationary component; and

an adjustable component moveably connected to the stationary component and configured to selectively move in a generally linear path relative to the stationary component between two or more different positional arrangements;

wherein the adjustable component is coupled to the at least one power cable;

wherein each positional arrangement of the two or more different positional arrangements of the adjustable component imparts a different effective length of the at least one power cable while the compound archery bow is in a brace position; and

wherein selectively moving the adjustable component between two different positional arrangements changes

the effective length of the at least one power cable when the compound bow is in the brace position.

**2**. The timing adjustment assembly of claim **1**, wherein the stationary component is provided on one of the two pulley assemblies of the compound archery bow in a fixed structural arrangement.

**3**. The timing adjustment assembly of claim **1**, wherein the stationary component is coupled to the at least power cable at an intermediate location along a length of the at least one power cable.

**4**. The timing adjustment assembly of claim **1**, wherein the stationary component is attached to the riser of the compound archery bow.

**5**. The timing adjustment assembly of claim **1**, wherein at least a portion of the at least one power cable is anchored to the adjustable component.

**6**. The timing adjustment assembly of claim **5**, wherein the adjustable component includes an anchor post for anchoring a termination end of the at least one power cable.

**7**. The timing adjustment assembly of claim **1**, further comprising:

a locking fastener connecting the stationary component and the adjustable component, wherein when the locking fastener is in a fully engaged configuration, the adjustable component is secured in a fixed position relative to the stationary component; and

an adjustment fastener, wherein movement of the adjustment fastener causes the adjustable component to move in the generally linear path relative to the stationary component between the two or more different positional arrangements.

**8**. The timing adjustment assembly of claim **1**, wherein:

the stationary component comprises a receiving slot defined into a surface of one of the pulley assemblies of the compound archery bow;

the adjustable component comprises a base portion received within the receiving slot, a sliding portion connected to the base portion and extending outwardly therefrom above the receiving slot, and an anchor post extending from the sliding portion, wherein the base portion is selectively moveable within the receiving slot; and

the at least one power cable is anchored to the anchor post.

**9**. The timing adjustment assembly of claim **1**, wherein:

the stationary component comprises a housing located on one of the pulley assemblies of the compound archery bow, the housing including an interior receiving cavity;

the adjustable component comprises a base portion received within the interior receiving cavity of the housing and a deflector member extending from an end of the base portion, wherein the base portion is selectively moveable within the interior receiving cavity; and

movement of the base portion away from the housing results in the deflector member imparting a deflection amount to the at least one power cable.

**10**. The timing adjustment assembly of claim **1**, wherein:

the stationary component comprises a coupler component having a coupler receiving slot;

the adjustable component comprises an adjustable yoke having a peripheral groove, wherein the adjustable yoke is coupled to the coupler component and selectively moveable within the coupler receiving slot; and

a portion of the at least one power cable is received within the peripheral groove of the adjustable yoke.

**11**. The timing adjustment assembly of claim **1**, wherein:

the stationary component comprises a mounting fastener fixedly attached to a riser of the compound bow;

the adjustable component comprises an adjustable block coupled to the mounting fastener and an anchor post extending from the adjustable block, wherein the adjustable block is selectively moveable along a length of the mounting fastener; and

at least a portion of the at least one power cable is anchored to the anchor post.

**12**. An archery bow comprising:

a riser;

first and second bow limbs secured to opposing ends of the riser;

first and second pulley assemblies;

a draw cable;

at least one power cable connected between the first and second pulley assemblies; and

a timing adjustment assembly comprising:

a stationary component; and

an adjustable component moveably connected to the stationary component and configured to selectively move in a generally linear path relative to the stationary component between two or more different positional arrangements;

wherein the adjustable component is coupled to the at least one power cable;

wherein each positional arrangement of the two or more different positional arrangements of the adjustable component imparts a different effective length of the at least one power cable while the compound archery bow is in a brace position; and

wherein selectively moving the adjustable component between two different positional arrangements changes the effective length of the at least one power cable when the compound bow is in the brace position.

**13**. A pulley assembly for a compound archery bow, the pulley assembly rotatably coupled to an axle located on an end of a bow limb of the compound archery bow, the pulley assembly comprising:

a cam body having a first side and a second side;

a draw string groove extending at least partially around a periphery of the cam body for receiving a draw string of the compound archery bow;

a timing adjustment assembly located on the first side of the cam body, the timing adjustment assembly comprising:

a receiving slot defined into a surface of the cam body; and

an adjustable anchor component having a base portion, a sliding portion, and an anchor post;

wherein the base portion is configured to be at least partially received within the receiving slot and the sliding portion is configured to extend beyond the surface of the cam body when the base portion is positioned within the receiving slot;

wherein the timing adjustment assembly connects a first power cable to the pulley assembly;

wherein the adjustable anchor component is structurally arranged to translate in a generally linear path along the surface of the cam body between two or more positional arrangements; and

wherein each positional arrangement results in a different effective length of the first power cable.

**14**. The pulley assembly of claim **13**, wherein the timing adjustment assembly further comprises a locking fastener configured to selectively secure the adjustable anchor component to the receiving slot, the locking fastener insertable through a wall of the receiving slot and into the base portion of the adjustable anchor component to secure the adjustable anchor component in a fixed location relative to the receiving slot.

**15**. The pulley assembly of claim **14**, wherein the timing adjustment assembly further comprises an adjustment fastener configured to selectively change the position of the adjustable anchor component between the two or more positional arrangements, wherein the adjustment fastener is insertable into an opening defined through the adjustable anchor component, wherein rotating the adjustment fastener within the opening causes movement of the adjustable anchor component when the locking fastener is removed from the base portion of the adjustable anchor component.

**16**. The pulley assembly of claim **13**, wherein the pulley assembly further comprises a first set of positional indicators provided on the first side of the cam body adjacent to the receiving slot and a second set of positional indicators provided on the sliding portion of the adjustable anchor component, where the positional indicators provide visual indication of the selected positional arrangement of the adjustable anchor component relative to the cam body.

**17**. The pulley assembly of claim **13**, wherein the receiving slot comprises a lip defined at an upper edge of the receiving slot, wherein the lip is configured to retain the base portion of the adjustable anchor component within the receiving slot.

**18**. A timing adjustment assembly for use on a pulley assembly of a compound bow having at least one power cable coupled to the pulley assembly, the timing adjustment assembly comprising:

a receiving slot defined into a surface of the pulley assembly; and

an adjustable anchor component comprising a base portion and an anchor post, wherein the base portion is at least partially receivable within the receiving slot and configured to move in a generally linear path within the receiving slot, and wherein the anchor post extends away from base portion and beyond the surface of the pulley assembly and is configured for connection to a loop end of the at least one power cable;

wherein the adjustable anchor component is structurally arranged so as to enable substantially rigid attachment of the adjustable anchor component within the receiving slot in any one of a set of multiple anchor arrangements;

wherein each one of the set of multiple anchor arrangements corresponds to a different anchor position of the at least one power cable relative to the surface of pulley assembly when the compound bow is in a brace position;

wherein selective movement of the adjustable anchor component from one anchor arrangement to another anchor arrangement imparts a change in the timing of the pulley assembly and at least one power cable.

**19**. The timing adjustment assembly of claim **18**, wherein each one of the multiple anchor arrangements corresponds to a different effective length of the at least one power cable when the compound bow is in the brace position.

**20**. The timing adjustment assembly of claim **18**, further comprising:

a locking fastener for selectively securing the adjustable anchor component within the receiving slot in substantially rigid engagement in one of the set of multiple anchor arrangements, wherein the locking fastener is receivable within a first opening defined through a wall of the receiving slot and second opening defined into the base portion of the adjustable anchor component; and

an adjustment fastener for selectively moving the adjustable anchor component within the receiving slot between the set of multiple anchor arrangements, wherein the adjustment fastener is receivable within a third opening defined into the adjustable anchor component transversely to the second opening.

**21**. The timing adjustment assembly of claim **18**, further comprising a first set of visual anchor position indicators defined on the surface of the pulley assembly adjacent to the receiving slot and a second set of visual anchor position indicators defined on the adjustable anchor component, wherein the first and the second set of visual anchor position indicators provide visual indication of a position of the adjustable anchor component.

* * * * *