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(54) **TRIGGER ASSEMBLY FOR AN ARCHERY DEVICE**

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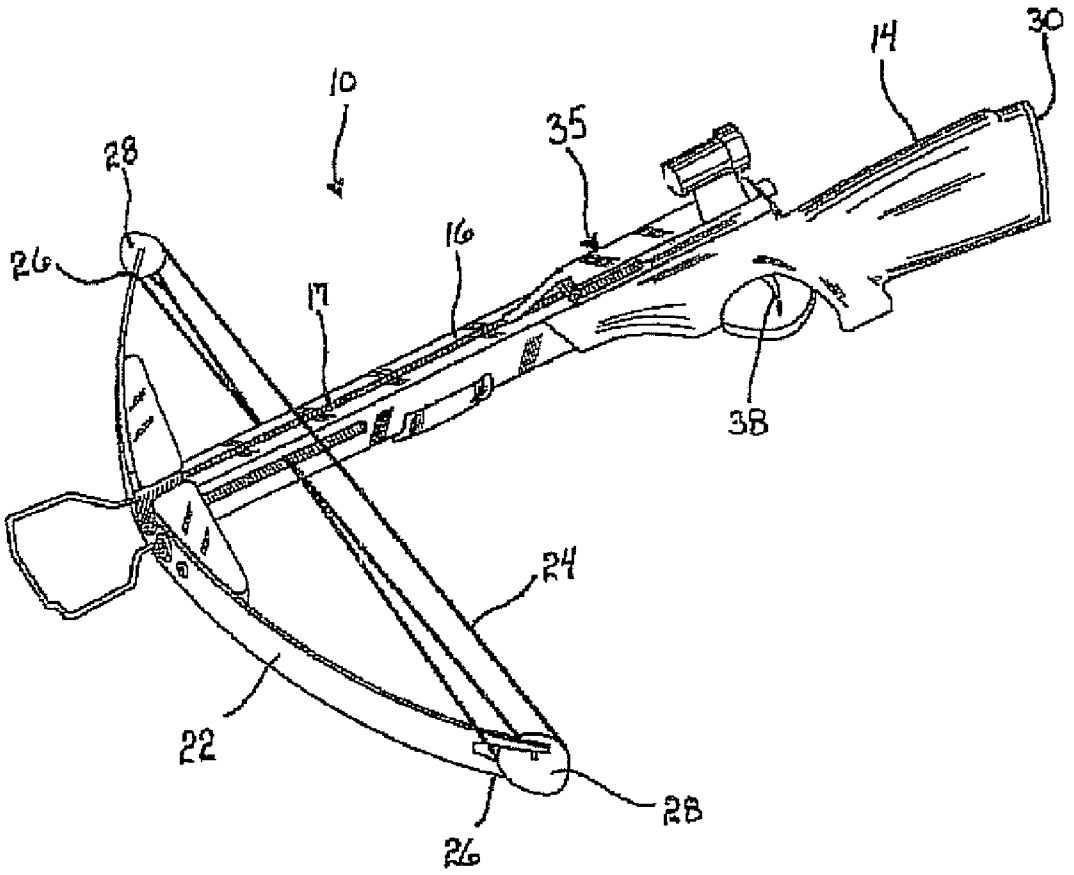
(57) **ABSTRACT**

A trigger assembly is disclosed for releasing a bowstring of an archery device from a drawn position to propel an arrow from the archery device toward a target. The trigger assembly includes a guide along which the bowstring is retracted and held in the drawn position; and a pivotal string latch that can be adjusted between a first orientation in which the string latch contacts the bowstring in the drawn position to interfere with the release of the bowstring from the guide, and a second orientation in which the string latch allows the bowstring to be released from the guide. A trigger lever that can be manually actuated by an archer is provided to cause adjustment of the string latch between the first and second orientations, and a roller assembly rolls over a surface of the string latch when the trigger lever is actuated to adjust the orientation of the string latch.



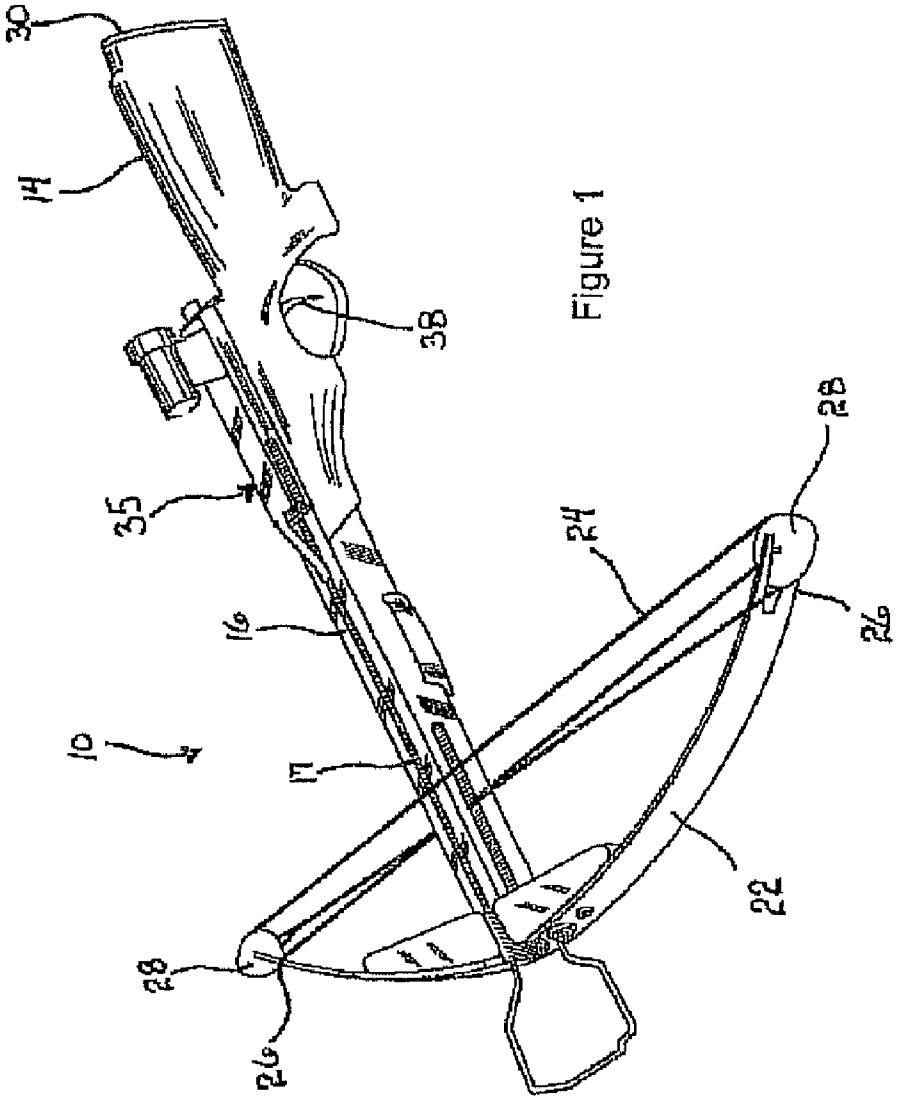


Figure 1

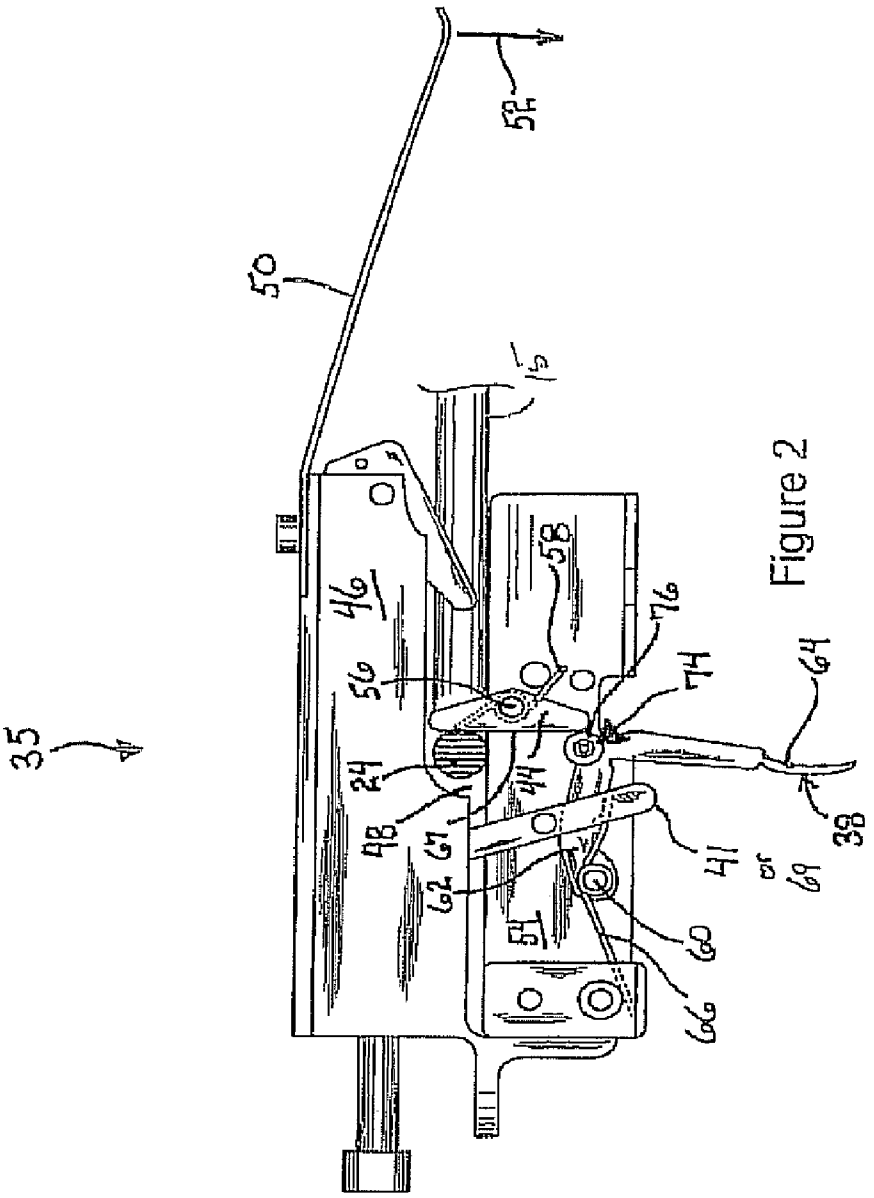


Figure 2

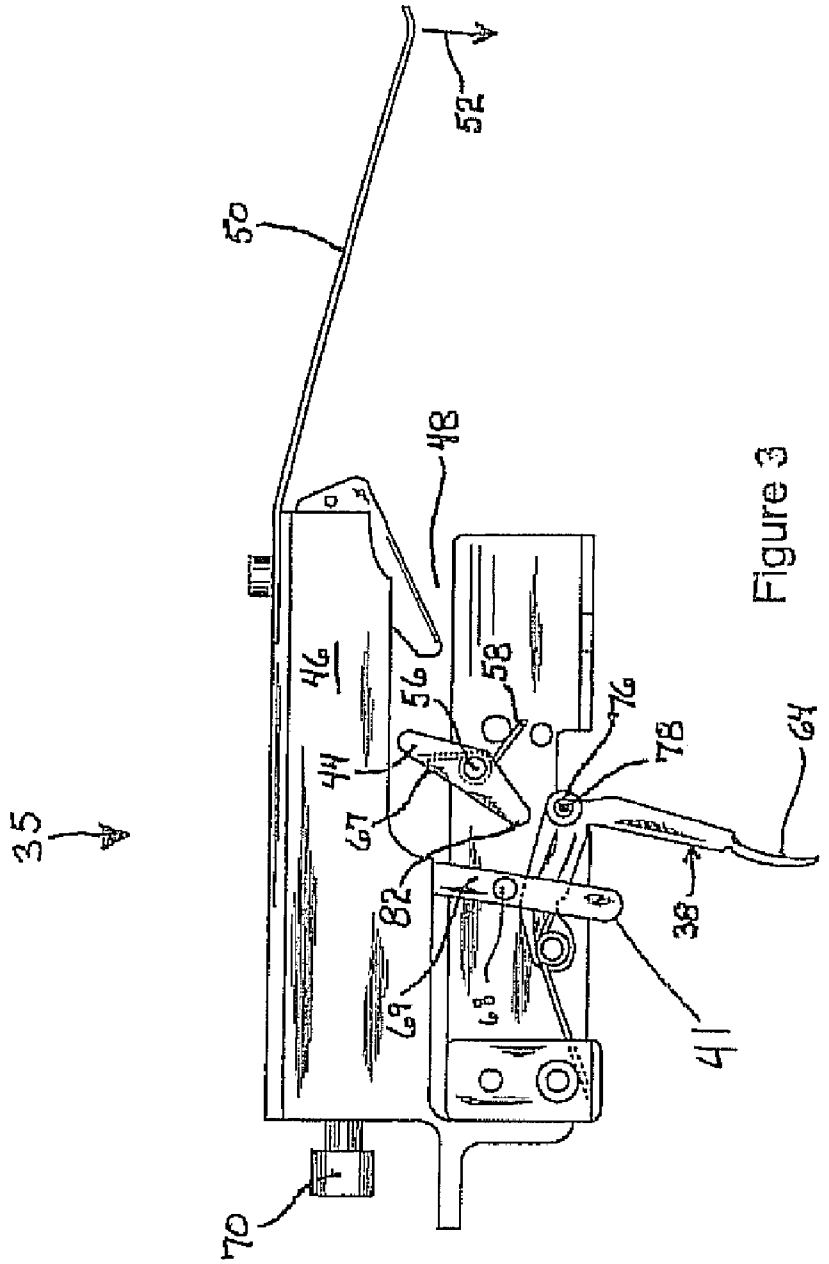


Figure 3

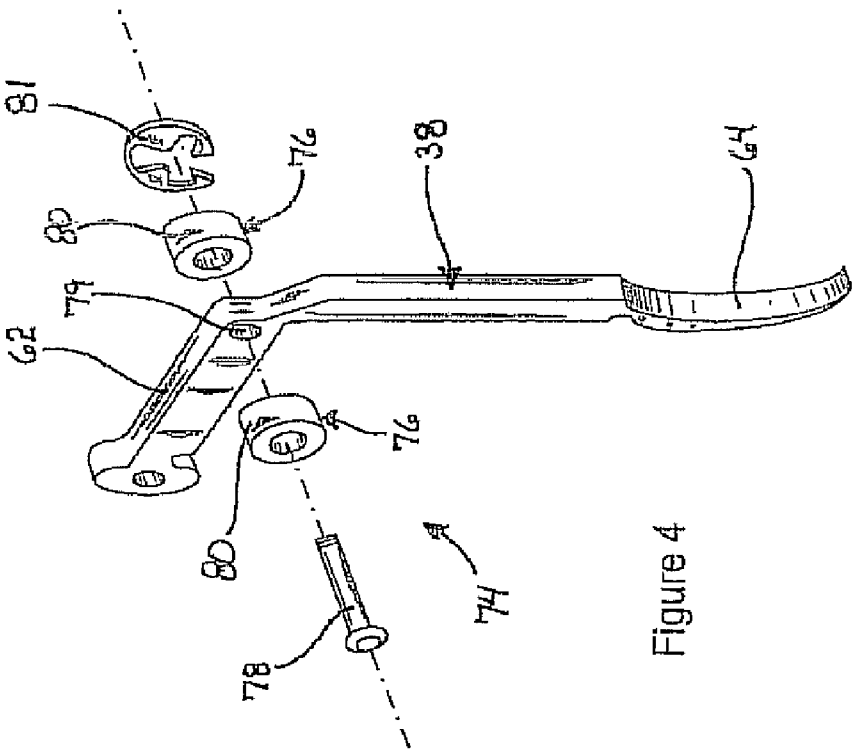


Figure 4

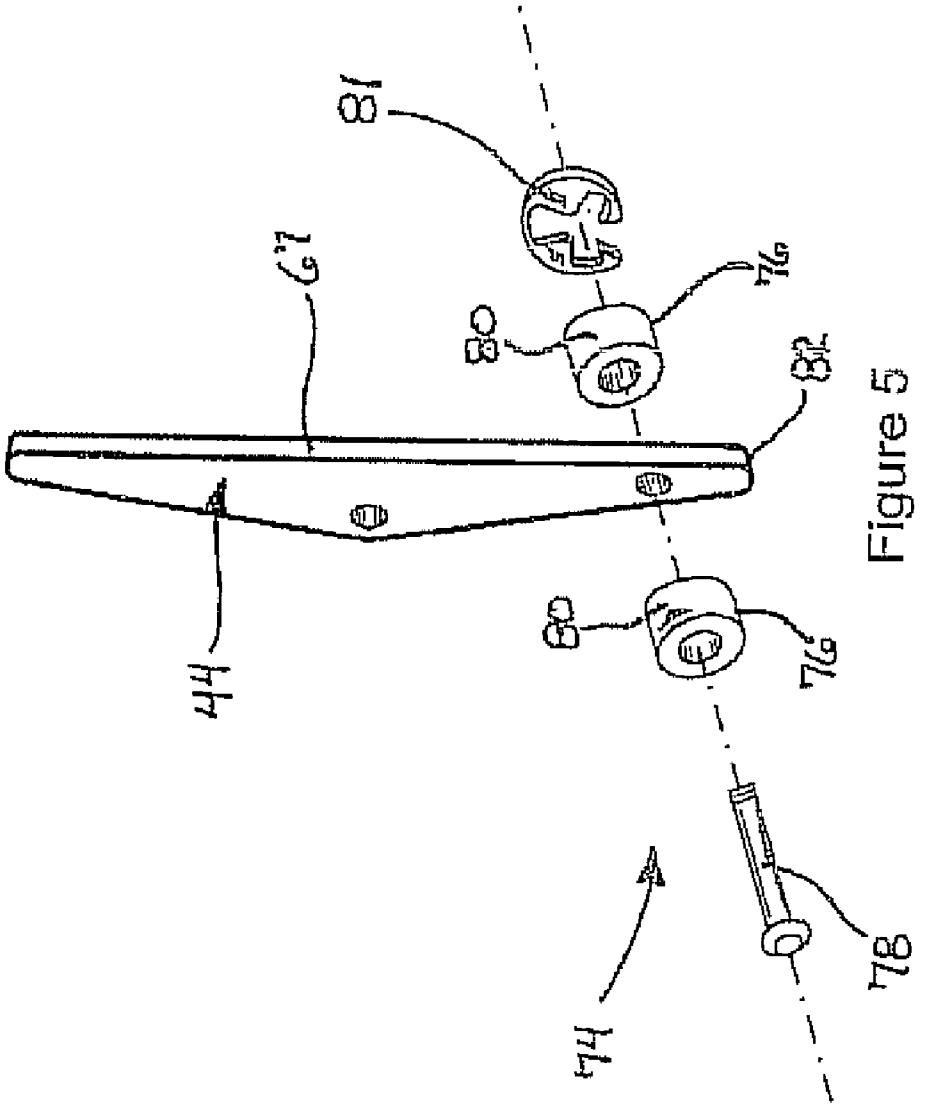


Figure 5

TRIGGER ASSEMBLY FOR AN ARCHERY DEVICE

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention is directed generally to a trigger assembly, and more specifically, to a trigger assembly for releasing a bowstring from a cocked position via the action of a roller to minimize the force required to be applied to the trigger to cause said release.

[0003] 2. Description of Related Art

[0004] Traditionally, crossbows have normally included a bow having two outwardly extending arms and a bowstring strung between the distal end of each arm for launching an arrow. Similar to a rifle, however, the crossbow also has a stock that can be placed against the shoulder of an archer and a sight that allows the archer to aim the crossbow in a manner similar to aiming the rifle. To load the crossbow, the bowstring is drawn rearwardly toward the stock until it is received within a chamber and locked in place by a latch called the "string latch." Due to the large forces required of an archer to draw the bowstring rearward, a force referred to as the "draw weight," the crossbow offers the advantage that the bowstring is held back without requiring the archer to manually hold it. An arrow is placed in the flight deck of the crossbow in front of the bowstring, and a trigger is pulled by the archer to release the bowstring, causing the arrow to be propelled from the crossbow.

[0005] Conventional crossbow triggers have included complex mechanical components required to withstand the draw force of the crossbow and maintain the bowstring in the drawn position. Among these components, a string latch was included to engage both the bowstring in the drawn position and a member that is actuated along with the trigger to release the bowstring when the trigger is pulled. Due to the large forces imparted on the string latch by the bowstring when drawn, the interface between the string latch and the trigger has typically required overlapping metal components that clear each other when the trigger is pulled to allow the string latch to pivot and release the bowstring.

[0006] Some known crossbow trigger assemblies have included a string latch that is abutted against a portion of the trigger with the bowstring in the drawn position, ready to fire. When the trigger is pulled by the shooter, the portion of the trigger butting up against the string latch is slid along the surface of the string latch and repositioned to permit the string latch to be rotated, thereby releasing the bowstring. However, the significant force exerted on the string latch by the bowstring while drawn, often reaching hundreds of pounds, is transmitted to the interface between the string latch and the trigger, creating a substantial sliding friction between those components. This sliding friction between the trigger and the string latch makes moving the trigger relative to the string latch difficult, requiring a significant force to be exerted by the shooter on the trigger to fire the arrow. Applying a suitable force to release the bowstring on a conventional trigger makes the crossbow less stable in the grasp of the archer, thereby decreasing the ability of the archer to accurately hit a target.

[0007] Attempts to minimize the force required to be applied to pull a trigger lever to release the bowstring have used a roller assembly to minimize friction between components of the trigger assembly that move when the trigger lever is pulled. Such assemblies typically replace the sliding friction between two translatable components that do not contact the bowstring in the drawn position with rolling friction. However, these assemblies are complex, including many compatible components that must be coordinated to achieve a release of the bowstring from the drawn position. Due to this complexity the cost of said assemblies is high, and, despite the high cost, there are many opportunities for the trigger assembly to fail.

[0008] Accordingly, there is a need in the art for a trigger assembly for an archery device that minimizes the force required to be applied to the trigger by the archer for releasing the bowstring and firing an arrow. A suitable trigger assembly includes a minimal number of components to facilitate release of the bowstring from a drawn position, and provides an archer with a sensitive feel when firing an arrow.

BRIEF SUMMARY OF THE INVENTION

[0009] According to one aspect, the present invention provides a trigger assembly is disclosed for releasing a bowstring of an archery device from a drawn position to propel an arrow from the archery device toward a target. The trigger assembly comprises a guide along which the bowstring is retracted and held in the drawn position; and a pivotal string latch that can be adjusted between a first orientation in which the string latch contacts the bowstring in the drawn position to interfere with the release of the bowstring from the guide, and a second orientation in which the string latch allows the bowstring to be released from the guide. A trigger lever that can be manually actuated by an archer is included to cause adjustment of the string latch between the first and second orientations, and a roller assembly rolls over a surface of the string latch when the trigger lever is actuated to adjust the orientation of the string latch.

[0010] According to another aspect, the present invention provides a trigger assembly for releasing a bowstring of an archery device from a drawn position to propel an arrow from the archery device toward a target. The trigger assembly comprises a guide along which the bowstring is retracted and held in the drawn position; and a pivotal string latch that can be adjusted between a first orientation in which the string latch contacts the bowstring in the drawn position to interfere with the release of the bowstring from the guide, and a second orientation in which the string latch allows the bowstring to be released from the guide. The trigger assembly further comprises a trigger lever that can be manually actuated by an archer to cause adjustment of the string latch between the first and second orientations, and a roller assembly that rolls over a surface of the trigger lever when the trigger lever is actuated to adjust the orientation of the string latch.

[0011] According to another aspect, the present invention provides a crossbow for propelling an arrow toward a target comprising a stock to be placed against a shoulder of an archer when firing the crossbow, a flight deck extending along an axis that is generally parallel with a desired flight pattern of the arrow to be propelled from the crossbow. The crossbow further comprises an arm transverse to the flight deck and extending generally away therefrom, and a bowstring coupled adjacent to each distal end of the arm that can be drawn rearward to a drawn position to increase the tension of the bowstring relative to the tension of the bowstring when not in the drawn position. A trigger assembly is provided for selectively releasing the bowstring from the drawn position. The trigger assembly comprises a guide along which the bowstring is retracted and held in the drawn position; and a pivotal string latch that can be adjusted between a first orien-

tation in which the string latch contacts the bowstring in the drawn position to interfere with the release of the bowstring from the guide, and a second orientation in which the string latch allows the bowstring to be released from the guide. The trigger assembly further comprises a trigger lever that can be manually actuated by an archer to cause adjustment of the string latch between the first and second orientations, and a roller assembly that rolls over a surface of the string latch when the trigger lever is actuated to adjust the orientation of the string latch.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The invention may take physical form in certain parts and arrangement of parts, embodiments of which will be described in detail in this specification and illustrated in the accompanying drawings which form a part hereof and wherein:

[0013] FIG. **1** is perspective view of a crossbow that can be used to propel an arrow towards a target;

[0014] FIG. **2** is a cutaway view of a trigger assembly for receiving a bowstring in a drawn position until a trigger of the trigger assembly is actuated, wherein a safety feature is engaged;

[0015] FIG. **3** is a cutaway view of the trigger assembly in FIG. **2** having been fired by actuation of the trigger following the disengagement of the safety feature;

[0016] FIG. **4** is an exploded view of a trigger and a roller for minimizing the force required to be exerted on the trigger to release the bowstring; and

[0017] FIG. **5** is an exploded view of a string latch and a roller for minimizing the force required to be exerted on the trigger to release the bowstring.

DETAILED DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

[0018] Certain terminology is used herein for convenience only and is not to be taken as a limitation on the present invention. Relative language used herein is best understood with reference to the drawings, in which like numerals are used to identify like or similar items. Further, in the drawings, certain features may be shown in somewhat schematic form.

[0019] FIG. **1** illustrates an archery device commonly referred to as a crossbow **10**. Crossbows **10** such as that shown in FIG. **1** typically include a stock **14** to be placed against a shoulder of an archer when shooting an arrow from the crossbow **10**. A flight deck **16** is coupled to the stock **14** and extends along an axis that is generally parallel with a desired flight pattern of the arrow to be propelled from the crossbow **10**. The flight deck **16** is typically fabricated from a metal, a metal alloy, or any rigid material and includes a channel **17** formed therein that receives a member of the arrow's fletching, which is commonly a plastic vane or feather, and acts as a guide to direct the arrow from the crossbow **10**. The arrow's fletching creates wind drag and also can cause the arrow to spin similar to a rifle bullet, providing stability and accuracy while the arrow is in flight. While the arrow is being propelled from the flight deck **16**, however, the member of the arrow's fletching disposed within the channel **17** serves to guide the arrow towards the terminal end of the flight deck **16**.

[0020] The crossbow **10** also includes an arm **22** that is affixed adjacent to a distal end of the flight deck **16** and extends transversely thereto in opposite directions generally away from the flight deck **16**. The arm **22** can be a single member, or two or more separate members each coupled to the crossbow **10** independently of the others. A bowstring **24** is coupled adjacent to each distal end **26** of the one or more members forming the arm **22** by a series of cams **28** that rotate as the bowstring **24** is drawn rearward and then released. The cams **28** are oblong shaped pulley mechanisms over which the bowstring **24** travels as it is drawn and released. Once the bowstring **24** is drawn passed a predetermined point rearward towards a butt end **30** of the stock **14**, the cams **28** serve to minimize the force that must be imparted on the bowstring **24** to maintain it in this drawn position. Similarly, as the bowstring **24** is released and passes a predetermined point in the forward direction generally away from the butt end **30** of the stock **14**, the cams **28** provide a mechanical advantage that serves to enhance the force with which the arrow is propelled from the crossbow **10**. The tension of the bowstring **24** in the drawn position is greater than the tension of the bowstring **24** when not in the drawn position. A bow or crossbow that includes the cams **28** is commonly referred to as a compound bow or compound crossbow **10**, respectively, whereas a bow or crossbow that lacks the cams **28** is instead commonly referred to as a long bow or long crossbow, respectively.

[0021] As the bowstring **24** is drawn rearward, it eventually reaches a trigger assembly **35** that is provided for maintaining the bowstring **24** in the fully-drawn position and selectively releasing the bowstring **24** from said position when the archer desires to propel or "shoot" the arrow from the crossbow **10**. Shown in FIG. **2**, the trigger assembly **35** generally maintains the bowstring **24** in the drawn position, and releases the bowstring **24** when the archer pulls a trigger lever **38**. To minimize the likelihood of undesired releases of the bowstring **24** from the trigger assembly **35**, a safety latch **41** can be provided to interfere with the actuation of the trigger lever **38** itself, or with the transmission of the force imparted on the trigger to other components, such as a string latch **44**, described in detail below.

[0022] A cutaway view of an embodiment of the trigger assembly **35** is shown in FIG. **2**. According to such an embodiment, the trigger assembly **35** comprises a guide **46** along which the bowstring **24** is retracted to be held in the drawn position. The guide **46** includes a recess **48** in which the bowstring **24** is located when pulled rearward into the drawn position. The recess **48** can optionally be oval shaped and open at one end to permit the bowstring **24** an unobstructed ingress and egress to and from the guide **46**, respectively. A biasing lever **50** is provided to the guide **46** to urge an arrow placed on the flight deck **16** downward generally toward the channel **17** in the direction indicated by the arrow **52**. The force imparted by the lever **50** maintains the arrow on the flight deck **16** even when the orientation of the crossbow **10** deviates from a horizontal orientation.

[0023] The bowstring **24** is maintained in the drawn position by a pivotal string latch **44** that protrudes into the recess **48** of the guide **46** between the bowstring **24** in the drawn position and the open end of the recess **48**. The string latch **44** is a metallic or other rigid-material member that contacts the bowstring **24** while the bowstring **24** is in the drawn position within the recess **48** of the guide **46**. When the string latch **44** contacts the bowstring **24**, the string latch **44** acts as a catch that blocks the bowstring's release from the guide **46**.

[0024] To allow the string latch **44** to pivot, the string latch **44** can be pivotally supported between opposing lateral walls **54** of the trigger assembly **35** by a transverse axle **56** that extends between said lateral walls **54**. Such an axle **56** can

extend through an aperture formed in, and extending entirely through the string latch **44**. Other embodiments include a string latch **44** that is pivotally coupled to any member of the trigger assembly **35** to pivot on an axis that is generally perpendicular to the direction in which the bowstring **24** is released from the trigger assembly **35**. Coupled to the trigger assembly **35** in this manner, the string latch **44** can be adjusted between a first orientation and a second orientation. In the first orientation, the string latch **44** contacts the bowstring **24** while the bowstring **24** is in the drawn position to interfere with the release of the bowstring **24** from the guide **46**. In the second orientation, however, the string latch **44** is pivoted clockwise (as shown in FIG. **2**) about the axle **56** from the first orientation such that the string latch **44** no longer protrudes into the recess **48** of the guide **46**. Thus, in the second orientation, the string latch **44** is recessed below the surface of recess **48**, thereby allowing the bowstring **24** to exit the recess **48** through the open end and propel an arrow **15** on the flight deck **16** from the crossbow **10**. A spring **58**, such as a helical spring or a torsion spring, for example, can optionally be provided to bias the string latch **44** generally toward the first orientation in the absence of an external force such as that from the bowstring **24** in the drawn position.

[0025] A trigger lever **38** that can be manually actuated by an archer is provided to the trigger assembly **35** to release the string latch **44** and allow it to pivot between the first and second orientations, and thereby selectively release the bowstring **24** from the guide **46**. The trigger lever **38** can be pivotally coupled to the trigger assembly **35** in a manner analogous to that of the pivotal connection of the string latch **44**. A transverse trigger pin **60** can extend through an aperture formed in a cantilevered portion **62** of the trigger lever **38**. The trigger pin **60** can optionally extend between the side walls **54** of the trigger assembly **35**, or between any other suitable support structures. The pivotal connection of the trigger lever **38** allows the trigger lever **38** to rotate about the trigger pin **60** when the archer's finger applies a force on a finger pad **64** of the trigger lever **38**. A spring **66**, such as a helical spring or a torsion spring, for example, can optionally be provided to bias the trigger lever **38** to a ready position, which is in a counter-clockwise direction about the trigger pin **60** as shown in FIG. **2**.

[0026] While the string latch **44** is oriented in the first orientation to prevent the release of the bowstring **24** from the guide **46**, a roller assembly **74** including at least one generally round wheel **76** or other rollable member contacts a sear surface **67** of the string latch **44**. As shown in FIG. **4** or **5**, rolling surface **80** of the wheel **76** contacts the sear surface **67** of the string latch **44** to stand in the way of, or prohibit the clockwise rotation of the string latch **44** in FIG. **2**. The rolling surface **80** allows adjustment of the position of the trigger lever **38** relative to the string latch **44** while minimizing the sliding friction therebetween. The rolling surface **80** of the wheel **76** primarily rolls over the sear surface **67** of the string latch **44**, thereby reducing the force required to be imparted on the trigger lever **38** to adjust the position of the trigger lever **38**, and accordingly the roller assembly **74**, relative to the string latch **44**.

[0027] As shown in FIG. **4**, the roller assembly **74** allows the trigger lever **38** to roll off the sear surface **67** of the string latch **44** instead of sliding off of it when the archer pulls on the finger pad **64** to release the bowstring **24** from the drawn position and propel the arrow toward a target. According to one embodiment, the roller assembly **74** is coupled to the trigger lever **38** and includes at least one, and optionally two or more round, rigid wheels **76** that roll over a surface of the string latch **44** as the trigger lever **38** is actuated. The one or more wheels **76** can circumferentially extend around a generally cylindrical pin **78** extending transverse to the plane in which the one or more wheels **76** rotate. Once the trigger lever **38** has rotated a suitable distance in the clockwise direction about trigger pin **60**, the wheel(s) **76** of the roller assembly **74** roll off the sear surface **67** of the string latch **44**, allowing the string latch **44** to pivot from the first orientation in FIG. **2** to the second orientation shown in FIG. **3**. The force of the bowstring **24** causes the pivotal adjustment of the orientation of the string latch **44** about the transverse axle **56** when the wheel(s) **76** roll off the sear surface **67**, allowing the bowstring **24** to exit the guide **46**.

[0028] As mentioned above, a safety latch **41** can be provided to interfere with the actuation of the trigger lever **38** itself, or with the transmission of the force imparted on the trigger lever **38** to the string latch **44**, to minimize the likelihood of inadvertent releases of the bowstring **24** from the guide **46**. The embodiment of the safety latch **41** shown in FIG. **2** is of the type that interferes with the actuation of the trigger lever **38** itself. As shown, the safety latch **41** is adjusted to a forward position that engages the safety feature and prevents rotation of the trigger lever **38** about the trigger pin **60** to prevent the bowstring **24** from being released from the guide **46**.

[0029] The safety latch **41** shown in FIG. **2** includes an arm **69** supporting a transversely-extending locking pin (hidden in FIG. **2** by the arm **69**, and thus, not shown) that extends generally perpendicular through the plane in which the trigger lever **38** rotates about trigger pin **60**. When the archer's finger pulls on the finger pad **64** of the trigger lever **38**, the trigger lever **38** ordinarily rotates about trigger pin **60**. This rotation causes the cantilevered portion **62** of the trigger lever **38** to rotate downward about the trigger pin **60**, in a clockwise direction as that direction is shown in FIG. **2**. However, when the safety feature of the crossbow **10** is engaged by adjusting the safety latch **41** to the forward position, the locking pin contacts the cantilevered portion **62** of the trigger lever **38**, thereby preventing the clockwise rotation of that cantilevered portion **62** and the rest of the trigger lever **38**. Thus, the release of the bowstring **24** from the guide **46** is prevented even if a typical force required to bring about said release is imparted on the finger pad **64** of the trigger lever **38**.

[0030] FIG. **3** shows an embodiment of the trigger assembly **35** with the safety feature disengaged and the trigger lever **38** adjusted to the fire position. Controlling whether the safety latch **41** is positioned to interfere with the firing of the crossbow **10** can be accomplished by manually adjusting an insert **70** that extends to communicate with a distal end of the arm **69**. When the insert **70** is pulled outwardly to translate away from the trigger assembly **35** the distal end of the arm **69** is also so translated, thereby causing rotation of the arm **69** about a transversely extending pivot point **68**. This positions the safety latch **41** to prevent rotation of the cantilevered portion **62** of the trigger lever **38**, thereby preventing the bowstring **24** from being released from the guide **46**.

[0031] FIG. **4** shows an exploded view of the trigger lever **38** and the roller assembly **74**. The roller assembly **74** of the embodiment shown in FIG. **4** comprises a pin **78** extending transversely through a passage **79** formed in the trigger lever **38** adjacent to an end of the cantilevered portion **62**. A wheel **76** is rotatably coupled to the pin **78** on each side of the trigger

lever **38**, wherein the wheels **76** are concentric with the pin **78**. Examples of suitable wheels **76** include, but are not limited to a bearing, a rigid metallic ring, and the like. The outside diameter of the wheels **76** is suitably large such that the rolling surface **80** of each wheel **76** extends beyond the edge of the trigger lever **38** where the trigger lever **38** would otherwise slide over the surface of the string latch **44**. A washer **81** or other obstacle is provided to prevent removal of the pin **78** from the interior passage of the trigger lever **38** and the one or more wheels **76**. As the archer pulls on the finger pad **64** of the trigger lever **38**, the rolling surface **80** of each wheel **76** rolls over the surface of the string latch **44** until they reach a terminal end **82** (FIGS. **2** and **3**) of the string latch **44**, at which time the wheels **76** fall off the terminal edge **82** of the string latch **44**.

[0032] Operation of an embodiment of the crossbow lo and trigger assembly **35** will be described with reference to FIGS. **2-4**. To prepare the crossbow **10** for shooting an arrow **15**, the crossbow **10** must first be cocked and loaded. To cock the crossbow **10**, the bowstring **24** must be drawn rearward towards the butt end **30** of the stock **14** and maintained in the drawn position by the trigger assembly **35**. The archer can apply a pulling force on the bowstring **24**, thereby drawing it rearward. The pulling force must be applied on the bowstring **24** long enough to pass it over the string latch **44**. When the bowstring **24** contacts the string latch **44** while being drawn rearward, the string latch **44** pivots counterclockwise as that direction is shown in FIGS. **2** and **3** about the transverse axle **56**. Pivoting the string latch **44** in the counterclockwise direction causes the torsion spring **58** to wind about the transverse axle **56**, creating a force that urges the string latch **44** in the opposite, clockwise direction (i.e., back toward its naturally-biased orientation that is approximately vertical). Once the bowstring **24** has cleared the string latch **44**, the torsion spring **58** forces the string latch **44** to rotate clockwise about the transverse axle **56** until the sear surface adjacent to the terminal end **82** of the string latch **44** contacts the wheels **76** of the roller assembly **74**. The archer is notified that the bowstring **24** has been drawn rearward a suitable distance to be maintained by the trigger assembly **35** by an audible click that is sounded when the string latch **44** returns to contact the wheels **76**, by a pulse transmitted through the bowstring **24** by the string latch **44**, by any other indication, and any combination thereof. The safety feature can be engaged automatically or by pulling the insert **70** from the trigger assembly, which inhibits rotation of the trigger lever **38** about the trigger pin **60** and therefore prevents the release of the bowstring **24** from the drawn position being maintained by the string latch **44**.

[0033] With the bowstring **24** in the drawn position, the archer can place an arrow **15** upon the flight deck **16** with a fletching member such as a feather extending into the channel **17**. A terminal end of the arrow **15** (not shown) opposite the arrowhead is slid along the channel **17** and backed under the lever **50** to a location adjacent to the string latch **44**. Once a target is located by the archer, the safety feature can be disengaged by pushing the insert **70** inward toward the trigger assembly **35**. The translation of the insert **70** forces the arm **69** of the safety latch **41** to rotate clockwise about the pivot point **68**, thereby disengaging the safety feature and allowing the archer to pull the trigger **38** at position **64** allowing the bowstring **24** to be released from the guide **46**. Rotation of the arm **69** in this manner moves a laterally-extending locking pin from a position where it inhibited actuation of the trigger lever **38** to a position where it would not inhibit actuation of the trigger lever **38**. With the insert **70** suitably adjusted, the crossbow **10** is now ready to shoot.

[0034] After taking aim, the archer can manually actuate the trigger lever **38** by gradually applying a force on the finger pad **64** of the trigger lever **38**, causing the trigger lever **38** to rotate about the trigger pin **60**. Rotation of the trigger lever **38** about the trigger pin **60** causes the wheels **76** of the roller assembly **74** coupled to the trigger lever **38** to roll over the surface of the string latch **44**, and fall off the sear surface upon reaching a terminal end **82** of the string latch **44**. When the wheels **76** fall off of the sear surface, the force of the bowstring **24** in the direction generally away from the trigger assembly **35** and parallel with the flight deck **16** forces the string latch **44** to rotate about the lateral axis **56**. The rotation of the string latch **44** moves the portion of string latch **44** that once extended into the recess **48** of the guide **46** to block the release of the bowstring beneath the surface of the flight deck **16**. As the bowstring **24** leaves the recess **48** it catches the arrow **15** and propels the arrow **15** from the crossbow **10**. Once the bowstring **24** has cleared the string latch **44** during the release, the torsion spring **58** returns the string latch **44** to a generally vertical orientation so the bowstring **24** can once again be placed in the drawn position.

[0035] According to another embodiment, shown best in FIG. **5**, the roller assembly **74** is coupled to the string latch **44** instead of the trigger lever **38**, and includes at least one, and optionally two or more round, rigid wheels **76** that roll over a surface of the trigger lever **38** as the trigger lever **38** is actuated. Once the trigger lever **38** has rotated a suitable distance in the clockwise direction as shown in FIG. **5** about trigger pin **60**, the wheels **76** roll off of the trigger lever **38** and the force of the bowstring **24** causes pivotal adjustment of the orientation of the string latch **44** about the transverse axle **56**, allowing the bowstring **24** to exit the guide **46**.

[0036] The embodiments described herein eliminate the need for a complex trigger assembly that includes an intermediate member other than the trigger lever **38** or the string latch **44** to be provided with a roller assembly. Thus, other embodiments of the present invention include a trigger assembly with the roller assembly **74** coupled directly to either the trigger lever **38** or the string latch **44** that is devoid of any intermediary members for transmitting the force applied to the trigger lever **38** to the string latch **44**.

[0037] Although the embodiments described above include a roller assembly **74** with a plurality of wheels **76**, the present invention is not so limited. A roller assembly **74** with a single wheel **76**, such as a single bearing centrally located within the trigger lever **38** or string latch **44**, for example, is also within the scope of the present invention.

[0038] Further, the embodiments discussed above make reference to translation, movement, and rotation of various features of the present invention in specific directions. However, it should be noted that the scope of the attached claims encompasses variations to the present invention that translate, move and rotate features differently than described above.

[0039] Illustrative embodiments have been described, hereinabove. It will be apparent to those skilled in the art that the above devices and methods may incorporate changes and modifications without departing from the general scope of this invention. It is intended to include all such modifications and alterations in so far as they come within the scope of the appended claims.

What is claimed is:

1. A trigger assembly for releasing a bowstring of an archery device from a drawn position to propel an arrow from the archery device toward a target, the trigger assembly comprising:

a guide along which the bowstring is retracted and held in the drawn position;

a pivotal string latch that can be adjusted between a first orientation in which the string latch contacts the bowstring in the drawn position to interfere with the release of the bowstring from the guide, and a second orientation in which the string latch allows the bowstring to be released from the guide;

a trigger lever that can be manually actuated by an archer to cause adjustment of the string latch between the first and second orientations; and

a roller assembly that rolls over a surface of the string latch when the trigger lever is actuated to adjust the orientation of the string latch.

2. The trigger assembly according to claim **1**, wherein the string latch is pivotally supported between lateral walls of the trigger assembly by a transverse axle that extends between said lateral walls.

3. The trigger assembly according to claim **1** further comprising a spring to bias the string latch generally toward the first orientation in the absence of an external force.

4. The trigger assembly according to claim **1** further comprising a spring to bias the trigger lever generally toward a ready position.

5. The trigger assembly according to claim **1**, wherein the roller assembly is coupled to the trigger lever.

6. The trigger assembly according to claim **5**, wherein the roller assembly comprises:

a pin extending transversely through a portion of the trigger lever; and

a rigid roller provided adjacent to each opposing side of the trigger lever to be generally concentric with the pin.

7. The trigger assembly according to claim **1**, wherein the roller assembly rolls over a lowermost surface of the string latch.

8. A trigger assembly for releasing a bowstring of an archery device from a drawn position to propel an arrow from the archery device toward a target, the trigger assembly comprising:

a guide along which the bowstring is retracted and held in the drawn position;

a pivotal string latch that can be adjusted between a first orientation in which the string latch contacts the bowstring in the drawn position to interfere with the release of the bowstring from the guide, and a second orientation in which the string latch allows the bowstring to be released from the guide;

a trigger lever that can be manually actuated by an archer to cause adjustment of the string latch between the first and second orientations; and

a roller assembly that rolls over a surface of the trigger lever when the trigger lever is actuated to adjust the orientation of the string latch.

9. The trigger assembly according to claim **8**, wherein the string latch is pivotally supported between lateral walls of the trigger assembly by a transverse axle that extends between said lateral walls.

10. The trigger assembly according to claim **8** further comprising a spring to bias the string latch generally toward the first orientation in the absence of an external force.

11. The trigger assembly according to claim **8** further comprising a safety latch that interferes with actuation of the trigger lever when positioned in a safety position.

12. The trigger assembly according to claim **8** further comprising a safety latch that interferes with the transmission of the force imparted on the trigger lever to the string latch when in a safety position.

13. The trigger assembly according to claim **8** further comprising a spring to bias the trigger lever generally toward a ready position.

14. The trigger assembly according to claim **8**, wherein the roller assembly is coupled to the string latch.

15. The trigger assembly according to claim **14**, wherein the roller assembly comprises:

a pin extending transversely through a portion of the string latch; and

a rigid roller provided adjacent to each opposing side of the string latch to be concentric with the pin.

16. The trigger assembly according to claim **8**, wherein the roller assembly rolls over a knuckle surface of the trigger lever.

17. A crossbow for propelling an arrow toward a target comprising:

a stock to be placed against a shoulder of an archer when firing the crossbow;

a flight deck extending along an axis that is generally parallel with a desired flight pattern of the arrow to be propelled from the crossbow;

an arm transverse to the flight deck and extending generally away therefrom;

a bowstring coupled adjacent to each distal end of the arm that can be drawn rearward to a drawn position to increase the tension of the bowstring relative to the tension of the bowstring when not in the drawn position; and

a trigger assembly for selectively releasing the bowstring from the drawn position, said trigger assembly comprising:

a guide along which the bowstring is retracted and held in the drawn position;

a pivotal string latch that can be adjusted between a first orientation in which the string latch contacts the bowstring in the drawn position to interfere with the release of the bowstring from the guide, and a second orientation in which the string latch allows the bowstring to be released from the guide;

a trigger lever that can be manually actuated by an archer to cause adjustment of the string latch between the first and second orientations; and

a roller assembly that rolls over a surface of the string latch when the trigger lever is actuated to adjust the orientation of the string latch.

18. The crossbow according to claim **17**, wherein the arm comprises two arms that extend away from the flight deck on opposite sides thereof.

19. The crossbow according to claim **17** further comprising a safety latch that interferes with actuation of the trigger lever when positioned in a safety position.

20. The crossbow according to claim **17** further comprising a safety latch that interferes with the transmission of the force imparted on the trigger lever to the string latch when in a safety position.

21. The crossbow according to claim **17** further comprising a set of cams about which the bowstring extends to minimize the force required to be imparted on the bowstring to fully retract the bowstring to the drawn position.

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