Dec. 16, 1969 L. L. JONES 3,483,857

CROSSBOW

Filed March 1, 1965 2 Sheets-Sheet 1

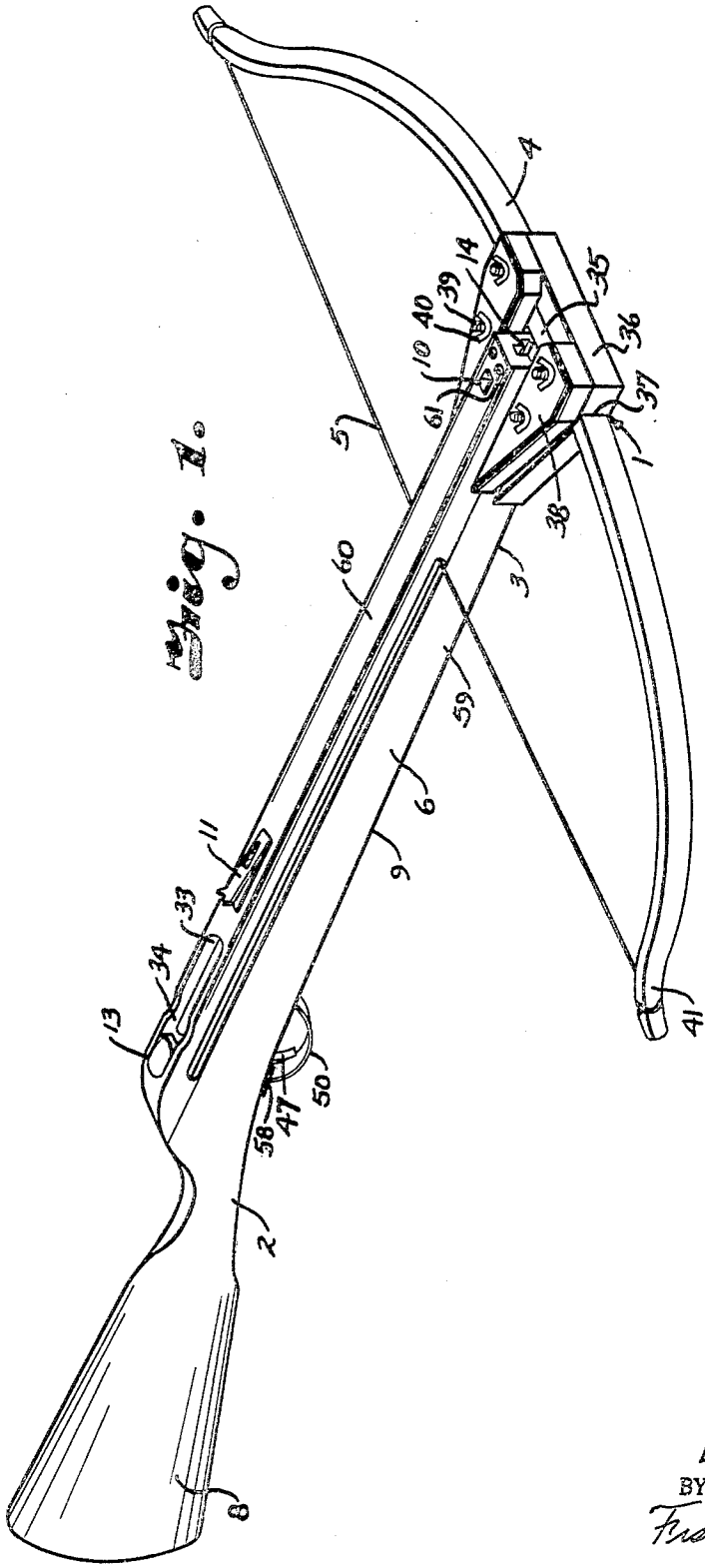


Fig. 1.

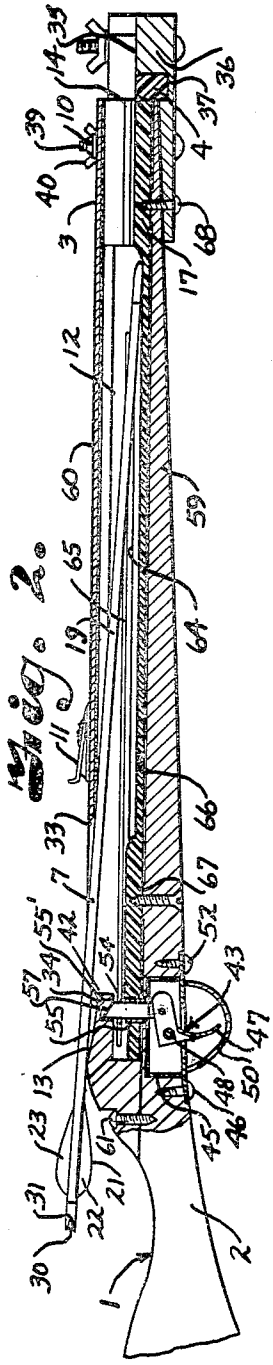


Fig. 2.

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Fig. 3.

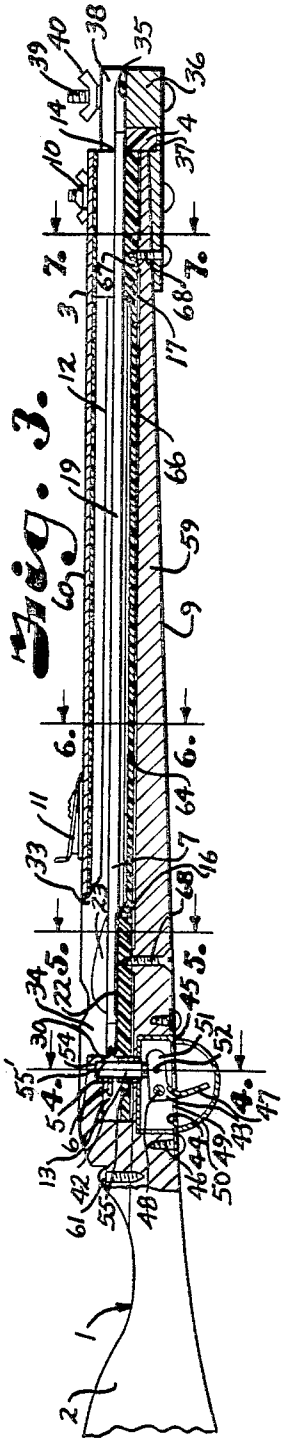


Fig. 7.

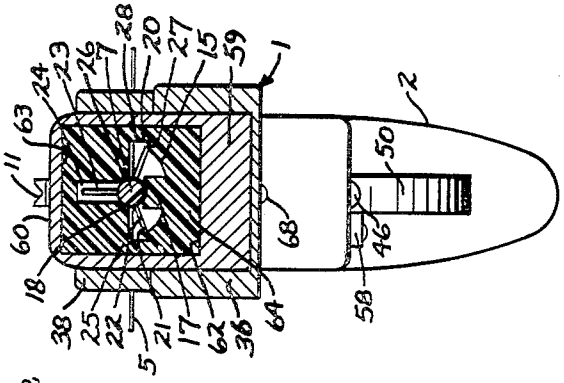


Fig. 6.

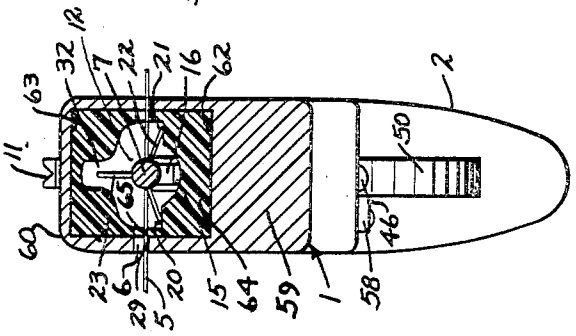


Fig. 5.

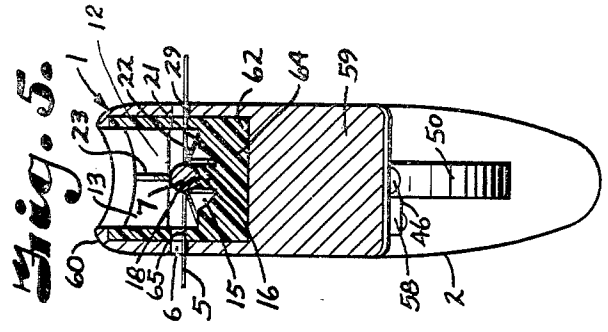
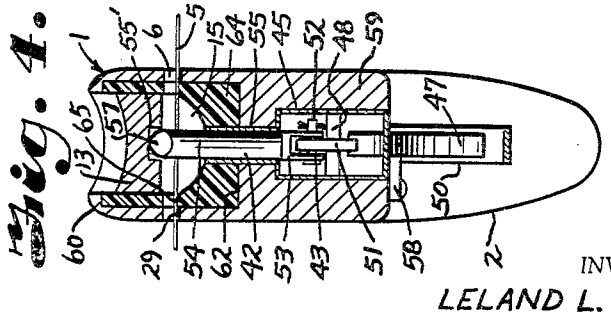


Fig. 4.



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3,483,857

CROSSBOW

Leland L. Jones, Independence, Mo., assignor of one-half to said Leland L. Jones and Bessie M. Jones, as tenants, and one-half to Ada E. Jones, Independence, Mo.

Filed Mar. 1, 1965, Ser. No. 435,952
Int. Cl. F41b 5/00
U.S. Cl. 124—25 4 Claims

ABSTRACT OF THE DISCLOSURE

A crossbow structure having a stock and elongate barrel with a bore having longitudinally spaced L-supporting portions and an enlarged intermediate portion that cooperates with a loading opening in the rear portion that communicates with and opens upwardly from the bore whereby arrows are loaded from the rear of the bore. The intermediate portions of the bow are clamped adjacent the muzzle end of the barrel below the bore and the barrel has longitudinally extending opposed slots in which the bow string moves, and when in cocked position, the string is engaged with a sear that moves transversely of the plane of the string and extends into a recess whereby the string may not be released until the sear is retracted. The sear is connected by a link to a trigger pivotally mounted on the stock with the trigger guard and safety lug positionable between the trigger and guard to prevent accidental retractive movement of the trigger. The barrel has separable portions and the bore may be formed by an insert of material substantially unaffected by climatic conditions.

The principal objects of the present invention are to provide a cross bow structure having a stock similar in appearance and shape to a conventional shoulder-fired weapon; to provide such a structure in which a bow is removably mounted on the muzzle end of the stock whereby the bow can be used separately from the stock; to provide such a structure with a bore for receiving conventional long arrows or like projectiles; to provide such a structure wherein the bow string is retained in cocked position by a trigger actuated detent and the stock has an open breech through which arrows are loaded into the rear portion of the barrel; to provide such a structure wherein the bore of the barrel is particularly adapted for receiving arrows with guide feathers or the like at the neck end wherein certain feathers and bore lands cooperate with the bow string to support the rear portion of the arrow as it is projected from the barrel; to provide such a structure wherein the barrel may have a bore forming insert of long-wearing, low-friction material; and to provide a cross bow structure that provides great accuracy of aim and that is particularly safe in the loading and preparation for firing and that is economical to manufacture with simple parts whereby they can be easily disconnected and stored.

Other objects and advantages of this invention will become apparent from the following description taken in connection with the accompanying drawings wherein are set forth by way of illustration and example certain embodiments of this invention.

FIG. 1 is a perspective view of a cross bow embodying the features of the present invention.

FIG. 2 is a partial side elevation with a portion broken away to show the longitudinal cross section through the barrel portion with an arrow being loaded therein.

FIG. 3 is a view similar to FIG. 2 with the arrow in position for firing.

FIG. 4 is a transverse sectional view through the structure at the bow string release mechanism taken on line 4—4, FIG. 2.

FIG. 5 is the transverse sectional view through the structure taken on the line 5—5, FIG. 3.

FIG. 6 is a transverse sectional view through the barrel portion of the structure taken on the line 6—6, FIG. 3.

FIG. 7 is a transverse sectional view through the muzzle portion of the structure taken on the line 7—7, FIG. 3.

Referring more in detail to the drawings.

The reference numeral 1 generally designates a cross bow structure having a stock 2 with a muzzle end 3 and a bow 4 carried on said muzzle end. The bow 4 has a bow string 5 movable in a slot 6 of the barrel portion of the stock and adapted to be engaged with arrows or like projectiles 7 for propelling same to a target (not shown). In the structure illustrated the stock is generally in the form of a conventional rifle and has a butt end portion 8 adapted to be engaged with a person's shoulder and the barrel portion 9 supported whereby said person can sight along suitable front and rear sights 10 and 11 respectively on the barrel portion in aiming the device for flight of the arrow to the desired target when the arrow is released as hereafter described.

The barrel portion of the stock has a suitable longitudinal opening or bore 12 extending from a breech portion 13 to the muzzle end 14 for receiving, supporting and guiding of the arrow 7. The opening 12 preferably has an arcuate or trough shaped bottom 15 for substantially the length thereof with a longitudinal upstanding rib 16 in the rear or breech portion thereof and a longitudinal upstanding rib 17 in the muzzle end portion. Each of said ribs have a longitudinal channel or trough 18 extending the length thereof and presenting a concaved upper face for receiving the shaft 19 of an arrow positioned in the bore or opening 12 of the stock. The troughed shaped arcuate bottom 15 of the bore terminates at the sides thereof in longitudinally extending lands 20 that are slightly below the channel portion 18 of the ribs 16 and 17 whereby the lands 20 are engaged by outer extremities 21 of guide vanes or feathers 22 that extend laterally outwardly from the rear portion of the arrow supported in the channel 18 of the ribs 16 and 17 which arrangement is particularly adapted for arrows having three feathers or guides, the third feather or guide 23 being positioned substantially vertically. In the forward portion of the bore or opening 12 having the rib 17 the upper portion has a longitudinal slot 24 of suitable size for freely passing the feather or guide 23 as the arrow is projected from the bore. On opposite sides of the slot 24 there are portions 25 having inner arcuate longitudinally extending through portions 26 cooperating with the channel in the rib 17 to engage the forward portion of the shaft 19 of the arrow when the arrow is positioned in the bore with this arrangement providing a three land engagement or bore portion for the arrow to form the guiding engagement to the arrow as it is projected therefrom. The wall portions 25 have bottom surfaces 27 which preferably are substantially coplanar and in horizontal planes with the surfaces 28 that define the upper longitudinal surface of slot 6. The bottom surface 29 of the slot 6 is preferably arranged in a longitudinal plane that would form a uniform supporting engagement to the bow string 5 when said bow string is engaged in the rear recess 30 of the arrow nock 31. The portion of the opening or bore 12 extending from the rear of the forward rib 17 has an upper portion shaped as at 32 as illustrated

in FIG. 6 with a width slightly greater than the diameter of the arrow shaft to serve as a guide therefore during loading. This shape extends to the forward end 33 of the opening 34 at the breech portion 13 which opening is of suitable length whereby the arrow may be placed into the bore from above and through said loading opening 34 as illustrated in FIG. 2.

The bow 4 is preferably removably mounted and secured to the forward or muzzle end portion of the stock 2 at a position whereby the portion of the bow normally engaged with the head end portion of the arrow shaft presents a surface 35 that is slightly below the channel 18 in the rib 17. In the structure illustrated the muzzle end of the stock has bracket members 36 extending laterally and forwardly from each side of the lower portion of the muzzle end of the stock and has a transverse channel or groove 37 in which the central portion of the bow 4 is placed. Clamp members 38 are mounted on the member 36 in overlying relation to the bow portion 4 in the groove or channel 37 and are tightened there against to clamp the bow in place by means of suitable fastening devices such as bolts 39 and wingnuts 40 as illustrated in FIG. 1.

The bow string 5 extends through the slot 6 and it is connected to the ends 41 of the bow 4 as in conventional practice. The length of the string and initial tensioning on the bow may be adjusted whereby a desired pull on the bow is necessary to draw the string 5 rearwardly in the slot 6 to cocked position. In order to fire an arrow from the cross bow, the bow string 5 must be drawn back and engaged with a sear 42 before the arrow is inserted into the bow. A trigger mechanism 43 is operatively connected with the sear 42 for actuating same in releasing the bow string from said sear.

In the structure illustrated the lower portion of the stock at the breech end of the barrel portion is recessed as at 44 to receive the trigger mechanism housing 45 which is secured therein by suitable fastening devices such as screws 46. Suitably mounted in the housing 45 is a trigger 47 mounted on a pin 48 with a finger portion extending downwardly through an opening 49 to be accessible below the stock. The trigger mechanism includes a trigger guard 50 in the form of an arcuate member or band extending downward in and around the trigger in spaced relation thereto as illustrated in FIG. 2. The trigger has a lever member 51 extending forwardly of the pivot pin 48 and is pivotally connected as at 52 to a link 53 which in turn is connected to the sear 42. The sear 42 is in the form of an elongate plunger 54 mounted in a bushing 55 that extends upwardly from the housing 45 across the rear of breech portion of the slot 6 and into a recess 55' in the stock portion above the rear portion of the slot. The sear 42 is rearwardly of the rear of the opening 34 and forwardly of the rear of the slot 6 whereby said bow string may be moved behind the sear when in cocked position. A spring 56 is mounted on the trigger to bias the sear upwardly to a position for receiving the bow string 5 as illustrated in FIG. 2. The forward portion at the upper end of the sear is bevelled as at 57 to facilitate camming said sear downwardly below the recess 55' so the string will move thereover and the upper end of the sear is rounded to facilitate the string being released from the sear when the sear is moved downwardly below the slot 6 by a rearward pull on the lower portion of the trigger. A suitable safety device 58 is engageable with the trigger device to prevent accidental firing. In the structure illustrated a lug is pivotally mounted on the stock and swingable to a position engaging between the trigger member 51 and the guard 50 to prevent rearward movement of the trigger member 51 until said lug is swung to a released position. Also the sear extends across the slot 6 so the bow string cannot move thereover until the trigger is pulled.

In this structure illustrated the barrel portion 9 of the stock is preferably made in two pieces to facilitate, manufacture and particularly the shaping of the interior of the bore. While all of the stock and the portions defining the bore may be made of wood or other suitable material it is preferred that the bore defining portions be made of a long-wearing, low-friction material such as a suitable synthetic resin. For example: high impact polyethylene, polyproprene or other suitable plastic that will hold its shape and not be affected by variation in climatic conditions. In the structure illustrated the barrel portion 9 has a lower part 59 that is integral with the rear of the stock and an upper or cover portion 60. They are secured together by suitable fastening devices 61 such as screws or the like. The interior of the portions 59 and 60 are provided with longitudinally extending mating grooves or channels 62 and 63 generally rectangularly in cross section member 64 that has interior bore defining portions and surfaces defining the bore 12. The member 64 also has longitudinal slots 65 on each side that register with the slot 6. It is preferred that the bottom portion 66 of the lower channel 62 be provided with slightly raised portions 67 adjacent the forward and rearward ends thereof and that the barrel member 64 rest thereon and be secured thereto by suitable fastening devices such as screws 68. This spaced support gives stability and eliminates possibility of irregularities in the stock portion from altering the alignment of the bore 12.

In using a cross bow constructed as described the parts are assembled by removing the clamp members 38 and placing the bow 4 in the channel 37 with the bow and portions extending substantially uniformly laterally outwardly therefrom. The clamp members 38 are then replaced and the nuts 40 tightened to secure the clamped bow in place. The bow string 5 is then inserted through the slot 6 whereby it extends transversely of the bore 12 and said bow string is secured to the end portions of the bow with a suitable length to provide the desired initial tension therein and pull for the bow. The butt end of the stock may be placed against an obstruction or the like for application of substantial force to the bow string in moving same rearwardly through the slot 6 the safety member 58 is disengaged from the trigger member 51. The string is pulled rearwardly to the breech end of the bore and slot 6 and the sear partially moved downwardly so the string will cam up over the bevel 57 of the sear 42 and be positioned behind said sear. The trigger spring then causes the sear to move up whereby the sear is across the slot 6 with the sear upper end in the recess 55' so the bow string is retained in said cocked position. The safety lug is then moved into trigger locking position. The head of an arrow 7 is then inserted through the breech opening 34 and moved forwardly in the bore 12 as illustrated in FIG. 2 whereby the head passes through the forward end of the bore and is engaged by the channel on through lands 18 and 26 or the rib 17 and the wall portions 25 respectively. The opening 34 is of such size that this loading movement of the arrow is permitted and when the arrow is moved in the bore 12 the guide feathers will freely move through the opening to permit the rear portion of the shaft to drop down onto the surface 18 of the rib portion 16. This positions the nock 31 just forwardly of the sear and the recess 30 extending transversely of the bore is positioned in a plane defined by the bow string so that when the bow string is released it will immediately move into the nick or recess 30. In this position the outer portions of the guide feathers lightly rest on the surfaces 20 to give stability to the arrow, however the support for the arrow is in the engagement of the shaft as it rests on the surfaces 18 of the ribs 16 and 17. The structure is then ready for firing upon release of the safety. The stock is moved up and the butt end placed against the shoulder whereby the person can sight through the sights 10 and 11 to the target, it being preferred that the rear sight be of an adjustable type for accurate sighting. When properly aimed the safety lug is disengaged from the trigger and said trigger 47 is pulled rearwardly drawing said sear 42 downwardly releasing the bow string which moves into

engagement with the recess 30 in the nock of the arrow. The bow string then in its propelling movement forwardly supports the rear of the arrow so that in the movement of the arrow forwardly through the bore the guide feathers provides stability but the bow string is the main support that cooperates with the lands at the muzzle end of the bore for the guiding of the arrow as it is propelled from the bore. As the guide feathers move outwardly through the muzzle portion of the bore the lateral and vertical portions are such as illustrated in FIG. 7, so there is no interference in the launching of the arrow.

The structure permits the use of long conventional arrows that are more easily found after firing than are short darts. Also, it permits the use of structure wherein the bow and arrow can be used separately from the stock if desired. It is believed that this structure is economical, efficient cross bow that provides great accuracy and yet provides safety in that the arrow is not in a position to be engaged by an moved by the bow string during loading steps as could occur if the arrow were loaded from the muzzle end. The bow string must be retained by the sear during the loading of the arrow and accidental release of the bow string prior to complete loading of the arrow would be ineffective in propelling said arrow.

It is to be understood that while I have illustrated and described one form of my invention, it is not to be limited to the specific form or arrangement of parts herein described and shown insofar as such limitations are included in the claims.

What I claim and desire to secure by Letters Patent is:

1. A cross bow structure and feathered arrow, in combination:

(a) an arrow having an elongate shaft with a butt end with guiding feathers on the shaft adjacent said butt end,

(b) a cross bow stock having a barrel, said barrel having a longitudinal bore with longitudinal slots formed at each side of the barrel and communicating with the bore, said slots extending rearwardly from adjacent the barrel muzzle end and terminating in a breech portion, said stock having a sear guideway extending in a line transversely of the breech portion of the slots adjacent the rear of the bore, said sear guideway having bore portions above and below said slots,

(c) a bow secured to said barrel at the muzzle end thereof,

(d) a bow string connected to each end of the bow and traveling in said slot,

(e) a sear slidably mounted in said sear guideway and extending across the breech portion of the slot into the bore portion thereabove to engage and retain the bow string when said bow is in bow cocking position,

(f) trigger means and linkage operatively connected to said sear for linear retracting movement of said sear from the breech portion of the slots and into the bore portion of the guideway below the slots to release the bow string,

(g) said barrel having an elongate loading opening communicating with the breech portion of the bore and opening upwardly therefrom, said opening being of substantially less length than the arrow and said bore having an enlarged intermediate portion cooperating with said loading opening whereby said arrow is moved through said loading opening into the bore to a position with the arrow butt forwardly of and adjacent the sear,

(h) elongate longitudinally spaced members in the barrel having arrow engaging portions supporting and positioning an arrow above the bottom of said enlarged intermediate portion in the bore in alignment with the path of movement of the bow string traveling in the slots whereby release of the bow string by the sear permits the string to engage the arrow butt and the bow and string to propel the arrow from the bore of said barrel.

2. A cross bow structure and feathered arrow, in combination:

(a) an arrow having an elongate shaft with a butt end with guiding feathers on the shaft adjacent said butt end,

(b) a cross bow stock having a barrel, said barrel having a longitudinal bore with longitudinal slots formed on each side of the barrel and communicating with the bore, said slots extending rearwardly from adjacent the barrel muzzle end and terminating in a breech portion, said stock having a sear guideway transversely of the breech portions of the slots adjacent the rear of the bore,

(c) a bow secured to said barrel at the muzzle end thereof,

(d) a clamp means at the muzzle end of the barrel and having a bow receiving channel therein with said bow being mounted in said channel and secured by said clamp means, said bow being below the bore of the barrel portion with end portions of the bow extending laterally outwardly from the barrel,

(e) a bow string connected to each end of the bow and traveling in said slot,

(f) a sear slidably mounted in said sear guideway and extending across the breech portion of the slots to engage and retain the bow string when said string is in bow cocking position,

(g) trigger means pivotally mounted on the stock and having a downwardly extending finger portion and a forwardly extending arm,

(h) link means connecting the trigger arm and sear whereby rearward movement of the finger portion of the trigger effects retractive downward movement of the sear retracting said sear from said breech portion of the slots and releasing the bow string,

(i) a trigger guard mounted on the stock and having an arcuate portion extending downwardly around and spaced from the finger portion of the trigger for the rearward portion of the guard adjacent said finger portion,

(j) a safety lug pivoted on the stock and movable to extend between and engage the trigger finger portion and rearward portion of the guard to prevent rearward movement of the trigger,

(k) said barrel having an elongate loading opening communicating with the breech portion of the bore and opening upwardly therefrom, said opening being of substantially less length than the arrow and said bore having an enlarged intermediate portion cooperating with said loading opening whereby said arrow is moved through said loading opening into the bore to a position with the arrow butt forwardly of and adjacent the sear,

elongated longitudinally spaced members in the barrel having arrow engaging portions supporting and positioning an arrow in the bore in alignment with the path of movement of the bow string traveling in the slots whereby release of the bow string by the sear permits the string to engage the arrow butt and propel the arrow from the bore of said barrel,

(l) said elongate longitudinally spaced arrow engaging and supporting portions being adjacent to the muzzle end and rear end of the bore for supporting said arrow and the enlarged intermediate portion of the bore is between said arrow engaging portions and free of contact with the arrow.

3. A cross bow structure and arrow as set forth in claim 2 wherein the barrel portion has longitudinally extending separable portions with mating longitudinal channels therein and a bore defining insert is secured in

said channels, said insert being of synthetic resins substantially unaffected by climatic conditions.

4. A cross bow and arrow structure as set forth in claim 2 wherein the bore in the barrel is shaped to receive the arrow having guiding feathers adjacent the butt end thereof with certain of the guiding feathers extending laterally outwardly of the arrow supporting means, and said barrel has longitudinally extending feather guides laterally outwardly of said arrow support means for engaging said certain feathers and stabilizing the arrow as it is propelled from the bore.

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