United States Patent [19]

Mathews

[11] **3,788,299**

[45] **Jan. 29, 1974**

[54] **AUTOMATICALLY RELEASABLE ARROW HOLDING DEVICE FOR A CROSSBOW**

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[73] Assignee: **Honeywell Inc.,** Minneapolis, Minn.

[22] Filed: **Feb. 16, 1973**

[21] Appl. No.: **333,141**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 167,190, July 29, 1971, abandoned.

[52] **U.S. Cl.** ..... **124/35 R,** 124/25, 124/41

[51] **Int. Cl.** **F41b 5/00**

[58] **Field of Search** ... 124/25, 35 R, 41, 51, 52, 53, 124/49

[56] **References Cited**

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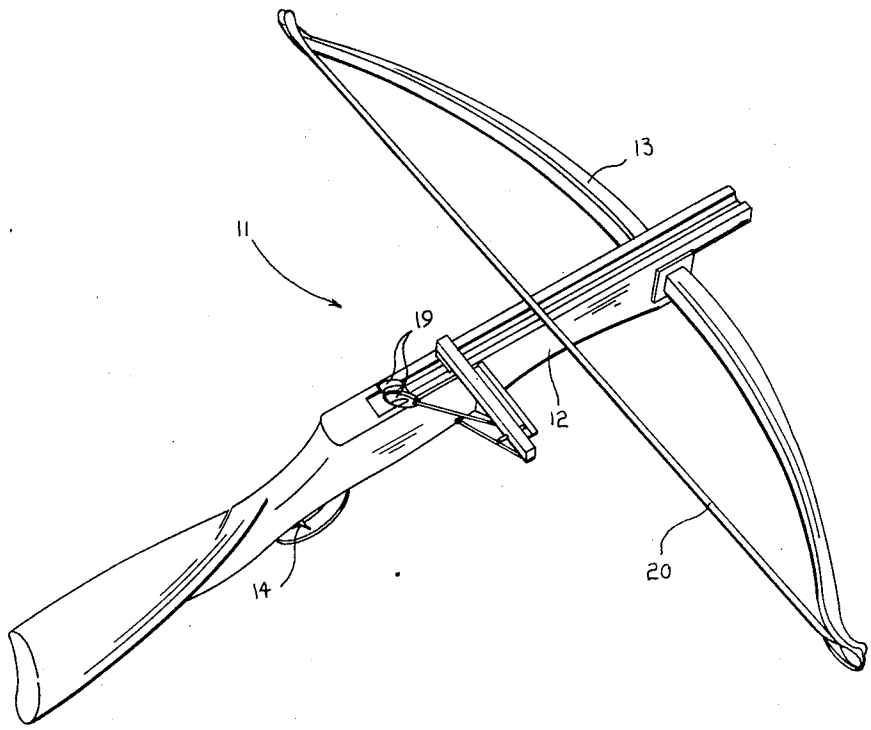
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Primary Examiner—Richard C. Pinkham
Assistant Examiner—William R. Browne
Attorney, Agent, or Firm—John G. Mills, III; Larry L. Coats

[57] **ABSTRACT**

A device for attachment to a crossbow for preventing an arrow from falling off the crossbow when the crossbow is tipped or turned upside down. The device has a pivotally mounted finger that can be pivoted into engagement with an arrow in place on the crossbow. The finger has a colloidal material at one end that engages the arrow and absorbs motions and shock but does not pass them on to the arrow. Beneath and at the opposite end of the finger a resilient member biases the opposite end of the finger out of engagement with the arrow. A member is attached to the finger and to the trigger to prevent the finger from moving out of engagement with the inplace arrow. When the trigger is actuated the bow-string is released, the member attached to the trigger is then released, and the resilient member is freed to act on the finger and bias it out of engagement with the inplace arrow.

4 Claims, 6 Drawing Figures



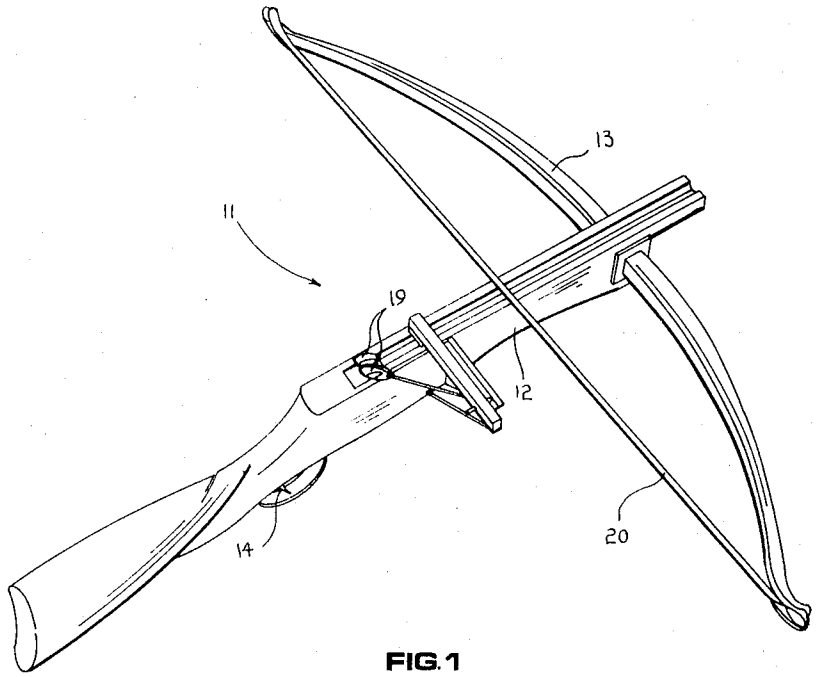


FIG. 1

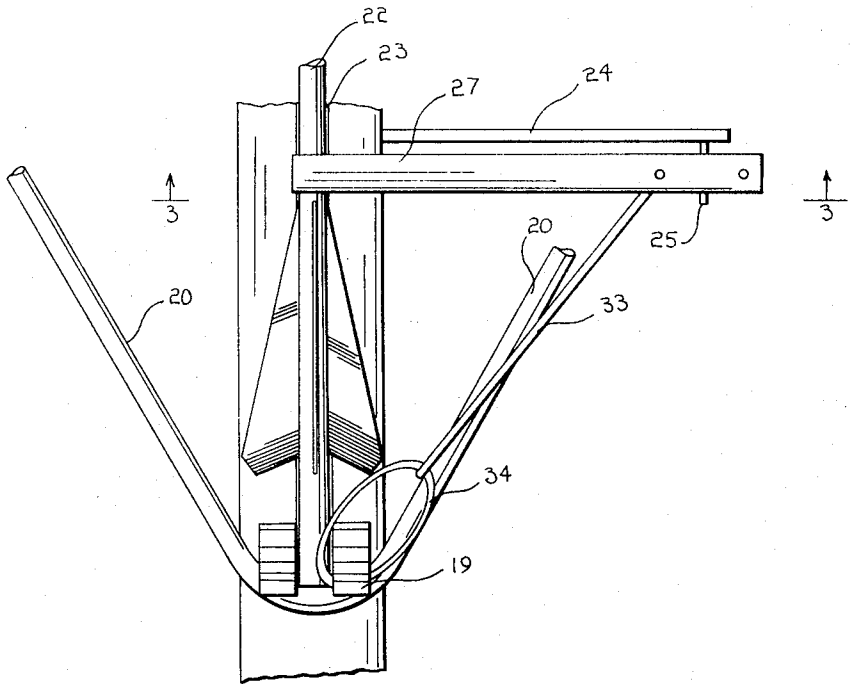


FIG. 2

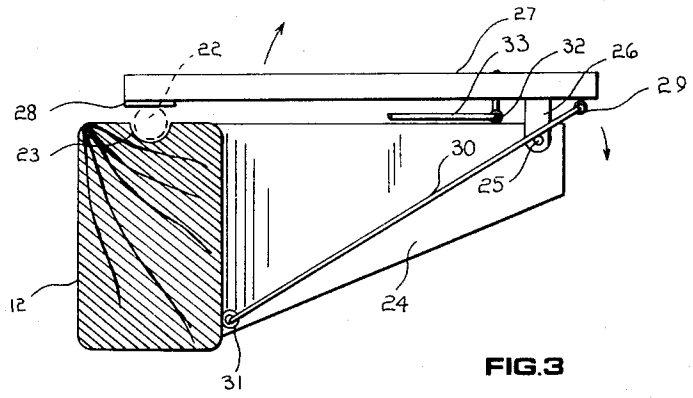

27
22
33
32
26
29
28
23
30
25
12
24
31

FIG.3

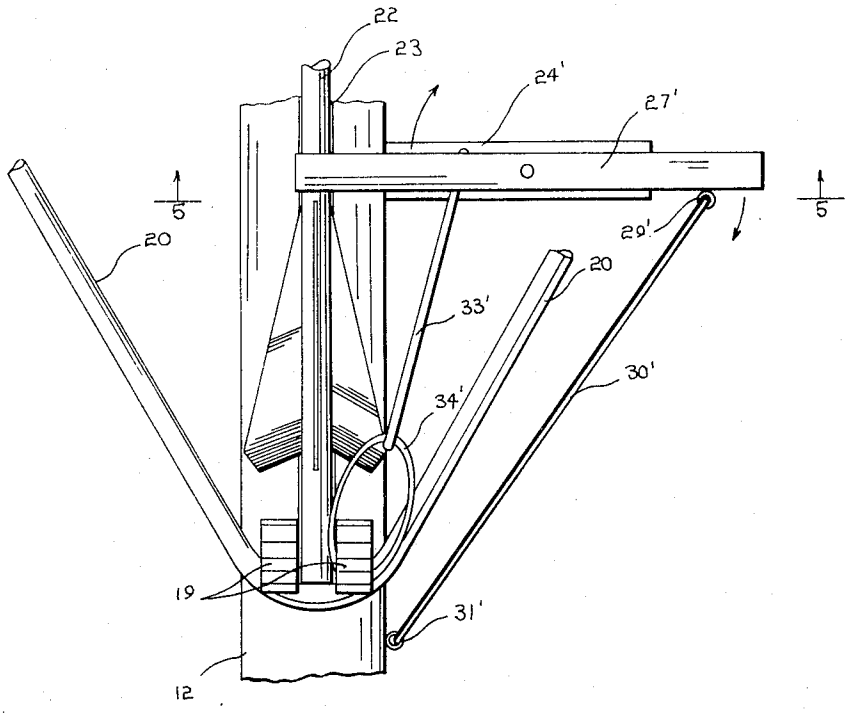

22
23
24'
27'
5
5
20
29'
20
33'
30'
34'
19
31'
12

FIG.4

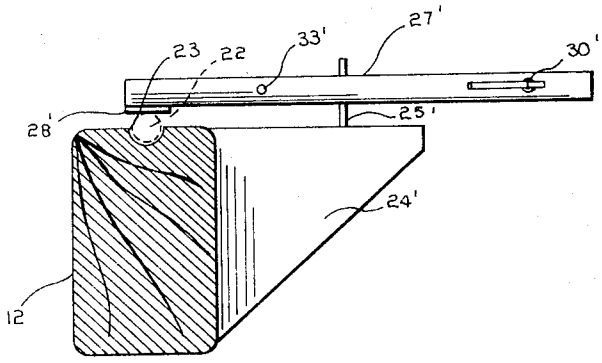


FIG.5

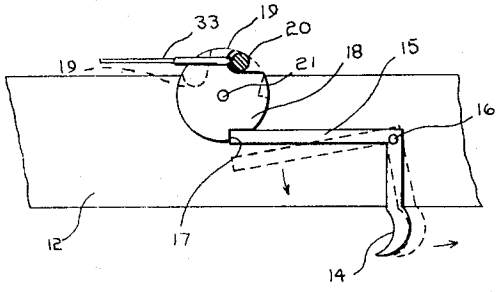


FIG.6

AUTOMATICALLY RELEASABLE ARROW HOLDING DEVICE FOR A CROSSBOW

This is a continuation-in-part of co-pending application Ser. No. 167,190 filed July 29, 1971, now abandoned entitled BOLT HOLDER FOR CROSSBOW.

This invention relates to crossbows and more particularly to bolt retainers for crossbow devices.

In the use of crossbows, it has been an age old problem to prevent the bolt or arrow projectile from sliding forward in the groove so that the bow string will not engage the same when discharged or will have a shattering impact because of the free motion prior to engagement.

One of the early attempts to prevent the mispositioning of the bolt when downwardly discharging the same was to have a horn, which extends over the latch or nut, to lightly press against the butt of the bolt. This prevents the bolt from falling off the crossbow when the latter is aimed downwardly, however, even the slightest pressure on the bolt when the bow string latch or nut is released will cause at least a slight deflection which, when amplified by the flight of the bolt, causes inaccuracy. Since crossbows are generally considered more accurate than firearms when the bolt is discharged from a resting, nonretained position, the inaccuracy caused by a retention means in downward discharging not only is undesirable but unacceptable.

After much research and study into the above mentioned problems, the present invention has been developed to allow retention of the bolt of a crossbow even when the same is disposed in a downward discharging position and yet will release the bolt without deflection thereof. The retainer of the present invention also can be used regardless of the attitude at which the bow is discharged.

In view of the above, it is an object of the present invention to provide a retainer for the bolt of a crossbow which automatically releases such bolt immediately prior to discharge.

Another object of the present invention is to provide a colloid type substance for retention of the bolt to prevent damaging contact from resulting between the bolt and retention means.

Another object of the present invention is to provide an automatically releasable bolt retainer for crossbows utilizing an elastic colloidal type substance between the contactive surfaces.

Another object of the present invention is to provide, in a bolt for a crossbow, a colloidal substance as the contactive retention surface against such bolt.

Other objects and advantages of the present invention will become apparent from a study of the following description and the accompanying drawings which are merely illustrative of the present invention.

IN THE DRAWINGS

FIG. 1 is a top perspective view of a typical crossbow showing the parts of one form of the present invention;

FIG. 2 is a top plan view of a portion of the crossbow with the device of the present invention mounted thereon;

FIG. 3 is a section taken through lines 3—3 of FIG. 3;

FIG. 4 is a view similar to FIG. 2 showing a modification of the present invention;

FIG. 5 is a section taken through lines 5—5 of FIG. 4; and

FIG. 6 is a cutaway view of the trigger and bow string nut mechanism.

With further reference to the drawings, the crossbow indicated generally at **11** is composed of a basic stock **12** and bow **13.** Trigger **14** is provided which is fixedly secured to trip lever **15.** This lever is pivotably connected to pin **16** and is adapted to engage notch **17** of bow string nut **18.** A pair of nut fingers **19** are adapted to engage bow string **20** which extends from the tips of bow **13** in the normal manner.

From FIG. **6,** it is obvious that when the trigger **14** is pulled in the direction of the arrow, trip lever **15** will move downwardly in the direction of its arrow thus becoming disengaged from notch **17** allowing nut **18** to rotate about pivot **21** to release bow string **20** when the same has been bent on the crossbow.

To retain a bolt **22** in groove **23** of the crossbow **11,** and yet release the same simultaneously with the discharge of the bow string **20** from the nut **18,** a means such as that disclosed in the FIGS. and hereinafter described is provided.

In the embodiment of FIGS. **1, 2** and **3,** an outwardly extending, transversely disposed, bracket **24** is secured to stock **12.** A pivot pin **25** is fixedly secured to bracket **24** and pivot arm **26** mounted thereon is adapted to arcuately pivot thereabout. Lever arm **27** is fixedly secured to pivot arm **26** and extends to a point over groove **23.**

Attached to the lower portion of arm **27,** adjacent groove **23,** is a colloidal substance of gelatinous consistency. Since this type of substance is generally considered as being close to a perfect elasticity body, and certainly more so than noncolloidal substances, its function as the contactive member for the bolt is considered a necessary and unique feature of the present invention.

To the opposite end of lever arm **27** from colloid **28** is a connecting eyelet **29.** A spring or elastomer member **30** is secured to this eyelet and the other end of such member is secured, by means such as eyelet **31,** to stock **12.** Thus it can be seen that arm **27** is biased such that colloid **28** will tend to move away from groove **28** unless restrained (see arrows of bias direction in FIG. **3**).

To restrain lever arm **27** from the biasing forces of elastomer member **30** and to hold the colloid **28** in light pressure contact with bolt **22,** a low friction block, either in the form of a small pulley or an eyelet shaped fairlead **32** is secured to bracket **24** immediately below arm **27** an nonelastic, flexible lead or member **33** secured at one end to the lever arm is threaded through the fairlead and into looping engagement with at least one of the nut fingers **19.** From the above, it can be seen that when bow string nut **18** rotates to discharge bow string **20,** lead **33** will be released an instant earlier. As soon as the holding pressure on lever arm **27** is relaxed, it will, due to the biasing of elastometer member **30,** move upwardly in the direction of the arrow in FIG. **3** thus breaking the surface contact between the colloid **28** and the bolt **22.** The bolt is thus freed from any obstruction or contactive pressure except for lying freely in groove **23** and is thereby ready for driving contact with discharging bow string **20.**

A modification of the disclosure of the present invention is shown in FIGS. **4** and **5** wherein pivot pin **25'** is disposed generally vertically instead of horizontally and the spring or elastomer biasing member **30'** extends

rearwardly rather than downwardly. From the arrows of FIG. 4, it can be seen that when lead 33' is released, arm 27 will swing about pivot pin 25'. The bolt is thus cleared of obstructions and ready for propulsion by the bow string 20 for a true and accurate flight.

Although pins 25 and 25*a* are described as being generally horizontal or generally vertical, it is understood that these pins could be disposed at an angle to control the direction of movement of the colloid away from the bolt. This is particularly true in FIG. 5 where it may be deemed desirable to have the colloid 28*a* moved forwardly and upwardly from its rest or static position.

In actual use of the crossbow of the present invention, a bolt 22 is placed in the groove 23 of stock 12 and bow string 20 is pulled back into retaining engagement with fingers 19 of nut 18. The nut is held in retaining position by lever 15 being in engagement with notch 17. Lever arm 27 is moved against the biasing of spring or elastometer member 30 by pulling the nonelastic, flexible lead 33 rearwardly and placing the loop 34 in the end thereof over one of the fingers 19. In the case of the embodiment of FIG. 3, the lead would pass through free running fairlead 32 for proper directional retention of the lever arm. In the case of the embodiment of FIG. 5, the nonelastic, flexible lead can be threaded directly rearwardly and looped over one of the fingers 19.

From the above description, it is obvious that by correctly adjusting the length of lead 33, light retaining pressure can be exerted by the colloid 28 of arm 27 against bolt 22. Once, however, trigger 14 is pulled rearwardly to disengage trip lever 15 from notch 17 of nut 18, the nut will rotate about pivot 21 and release lead 19 instantaneously prior to releasing or discharging bow string 20. Thus just as the bow string begins to move to engagement with bolt 22, lever arm 27 will begin to pivot away from the bolt by the action of biasing member 30 causing such lever to pivot about pin 25. This relative movement between the bolt and its retaining lever arm will be dampened to the point that colloid 28 will absorb any motions and leave the bolt undisturbed in its groove. This shock absorbing elasticity of the colloid is a critical factor both in the FIG. 3 and FIG. 5 embodiments disclosed.

It is, of course, understood that utilizing the basic principles of the present invention, other means for removing the retaining pressures from the bolt can be accomplished such as the hollow rod and tuning fork mechanisms shown and described in the earlier copending application Ser. No. 167,190, supra.

From the above discussion, it should be obvious that the present invention has the advantage of providing a relatively simple, yet efficient means for retaining the bolt or projectile of a crossbow in proper discharging position in its groove without effecting the flight path and thus accuracy of the bolt. Another advantage of the present invention is that a relatively simple yet efficient means is used to remove retaintive pressures from the bolt just as it is engaged by the discharging bow string.

The terms "upper", "lower" and so forth have been used herein merely for convenience to describe the bolt holder for crossbows and its parts as oriented in the drawings. It is to be understood, however, that these terms are in no way limiting to the invention since the crossbow may obviously be disposed in many different positions when it is used.

The present invention, of course, may be carried out in other specific ways than those herein set forth without departing from the spirit and essential characteristics of the invention. The present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive, and all changes coming with the meaning and equivalency range are intended to be embraced herein.

What is claimed is:

1. An arrow holder for a crossbow comprising: means for holding a drawn bowstring, means mounted adjacent the rear end portion of a crossbow for moving into engagement and for holding an arrow in a groove on a crossbow, and for moving out of engagement with an inplace arrow in response to the release of the means for holding a drawn bowstring, said means mounted adjacent the rear end portion of a crossbow having a pivoted member with a gelatinous material thereon for engaging an arrow and preventing motions and shock from reaching an inplace arrow.

2. The arrow holder of claim **1**, wherein the means mounted adjacent the rearend portion of a crossbow includes a means for biasing the pivoted member with the colloidal material away from an inplace arrow prior to the discharge of an arrow by a bowstring.

3. The arrow holder of claim **2**, wherein said means adjacent the rear end portion of a crossbow includes means for retaining said colloidal material in contact with an arrow while a bowstring of a crossbow is in a cocked position.

4. The arrow holder of claim **3**, wherein the retaining means is releasably connected to said means for holding a drawn bowstring.

* * * * *

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,788,299 Dated January 29, 1974

Inventor(s) FREDERIC M. MATHEWS

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Page 1, column 1, line 3, delete "Assignee Honeywell, Inc., Minneapolis, Minn.".

Signed and sealed this 3rd day of September 1974.

(SEAL)
Attest:

McCOY M. GIBSON, JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents

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