United States Patent [19]

Jandura, Jr.

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[54] **PROCESS AND APPARATUS FOR THE REMOVAL OF ARROWS**

[76] Inventor: **John J. Jandura, Jr.**, Main Rd., Towaco, N.J. 07082

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[52] **U.S. Cl.** ..... **29/427;** 29/242; 29/270; 273/106.5 R

[51] **Int. Cl.** **B23p 19/02**

[58] **Field of Search** ..... 29/426, 427, 235, 240, 29/240.5, 242, 244, 267, 270, 275, 283, 200 H, 203 H, 203 HM; 273/106.5 R, 106.5 A, 106.5 B, 106.5 C, 106.5 D; 81/177 R, 177 A; 16/110 R

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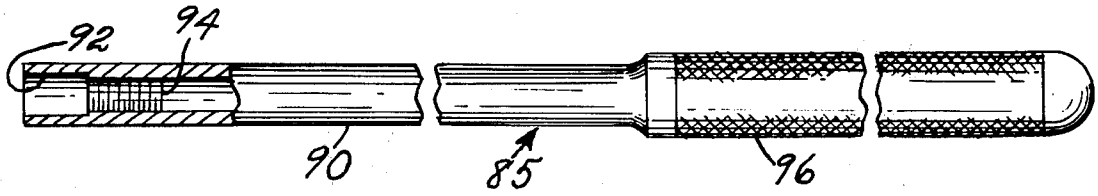
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Primary Examiner—C. W. Lanham
Assistant Examiner—James R. Duzan

[57] **ABSTRACT**

A tool and process for the recovery of hollow-shafted target arrows which are in a backstop or target member from which the force necessary to remove the arrowhead is likely, if applied to the shaft, to cause distortion of the shaft. The hollow shaft is removed from the arrowhead and the arrowhead is positively engaged by an extractor which will remain intact under the application of the necessary withdrawal force. The arrowhead is withdrawn, disengaged from the extractor, and reaffixed to the arrowshaft.

8 Claims, 8 Drawing Figures



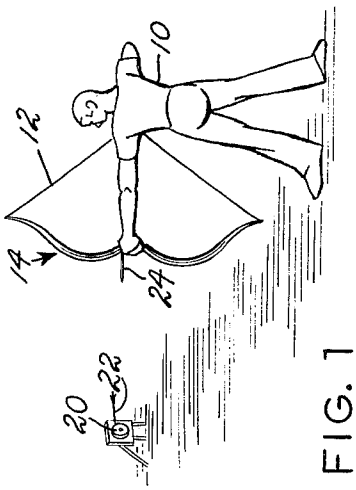


FIG. 1

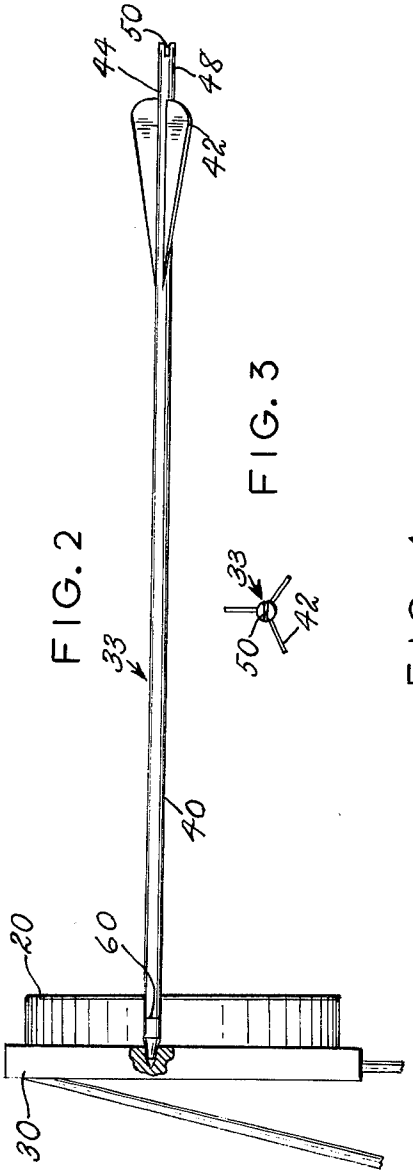


FIG. 2

FIG. 3

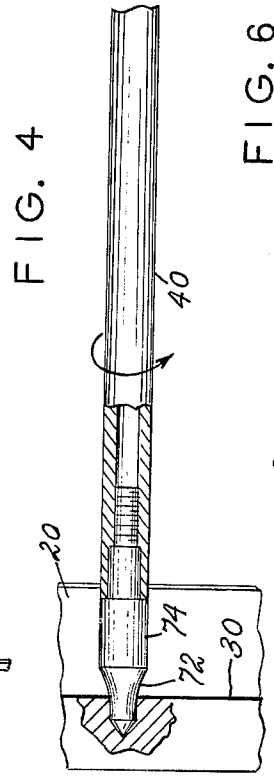


FIG. 4

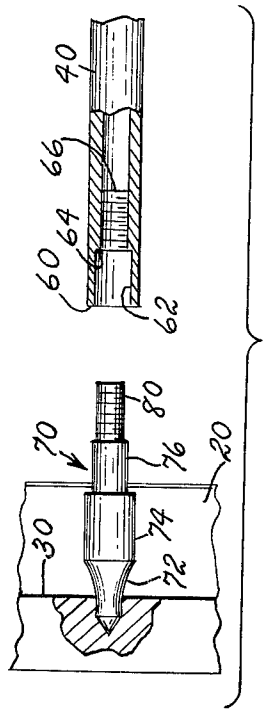


FIG. 5

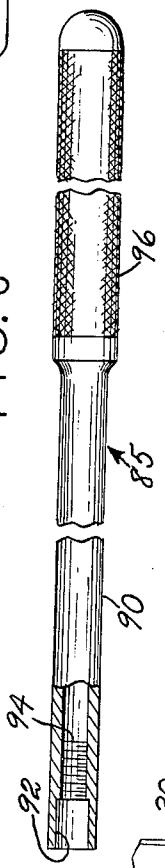


FIG. 6

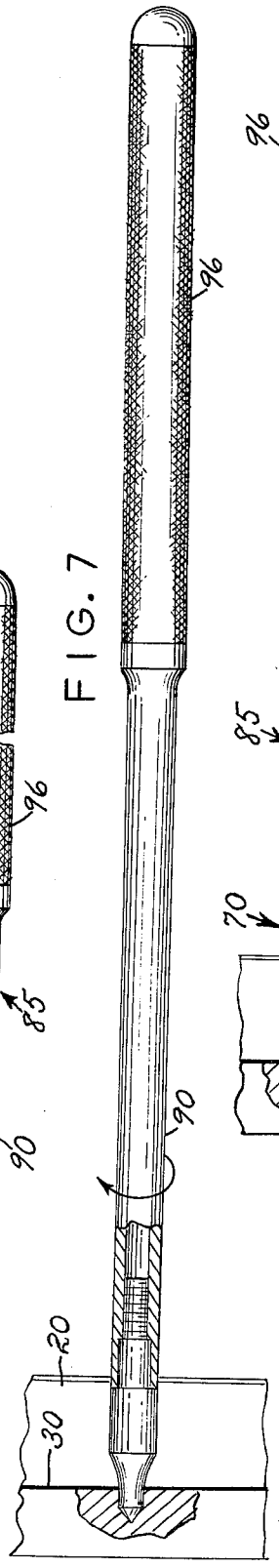


FIG. 7

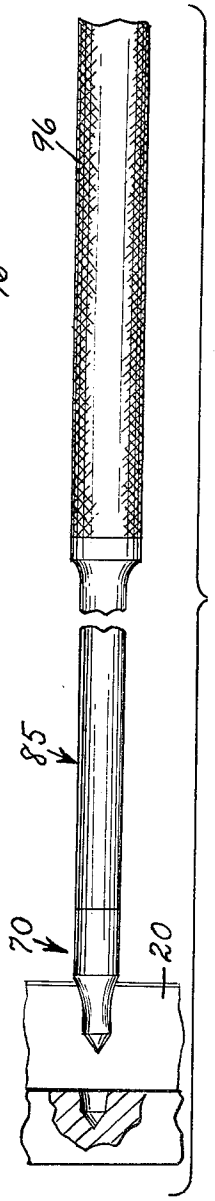


FIG. 8

PROCESS AND APPARATUS FOR THE REMOVAL OF ARROWS

This invention relates to archery. More particularly, this invention relates to archery techniques in which arrows having hollow shafts, e.g. hollow aluminum shafts, are employed.

Normally in archery events arrows are shot at targets from which the arrows may be withdrawn with relatively little effort.

Occasionally, however, arrows may miss the principal target and become embedded in a wooden backstop or support, such as a sheet of plywood, side of a building, or a tree. In many instances removal of arrows which are relatively firmly embedded in such a substrate presents a particular problem since the force which must be applied to the hollow shaft to pull the arrow free may be sufficient to bend or deform it.

Accordingly, it is an object of the present invention to provide for the recovery of hollow-shafted arrows which have their heads firmly embedded in a target or other substrate from which the force necessary for removal is likely, if applied to the walls of the hollow shaft, to cause deformation thereof.

Another object of the invention is an apparatus for positively engaging and removing arrowheads from a substrate in which they are firmly embedded.

In accordance with the present invention, an archery process comprises discharging from a bow an arrow having a shaft and a head threaded thereto, said head being of a diameter not greater than said shaft, embedding said head in a substrate from which the force necessary for removal of said arrow may be sufficient to cause deformation of said shaft if applied thereto, unthreading said shaft from said embedded arrowhead, threadably engaging said arrowhead with an extractor having an outer diameter not greater than said shaft, extracting said arrowhead from said substrate and recovering said arrowhead, and rethreading said recovered arrowhead to said shaft.

Further in accordance with the present invention is an arrowhead extractor for use with arrowheads which have been embedded in an arrowhead retaining substrate and from which an associated hollow arrowshaft has been unthreaded, said extractor comprising a handle member, a tubular shank member projecting therefrom and having a diameter not greater than said arrowshaft and thread means at the distal end of said tubular shank member for mating engagement with said arrowhead, said handle member being characterized by a circumferentially ridged surface to improve frictional hand engagement therewith.

The object advantages and characteristics of the instant invention will become more apparent from the following detailed description taken in conjunction with the accompanying drawings.

In the drawings:

FIG. 1 illustrates pictorially an archer on an archery range;

FIG. 2 is a longitudinal section of an arrow embedded in a wooden backstop for an archery target;

FIG. 3 is a view of the arrow of FIG. 2 taken from the butt end;

FIG. 4 illustrates the disengagement of the arrowshaft of the arrow of FIG. 2 from the head thereof while the head thereof remains embedded in the target backstop;

FIG. 5 illustrates the completely disassembled arrowshaft and arrowhead of FIG. 4;

FIG. 6 illustrates in fragmented vertical section an extractor for use with the arrowhead of FIG. 5;

FIG. 7 illustrates the engagement of the extractor of FIG. 6 with the arrowhead; and

FIG. 8 illustrates the extraction of the arrowhead from the backstop while positively engaged with the extractor.

In the drawings, an archer **10** is depicted pulling the bow string **12** on a bow **14** aimed at a target **20** already having therein a first arrow **22.** The archer is preparing to discharge a second arrow **24** toward the target **20,** which is mounted on a backstop **30** consisting of a rectangular sheet of fir plywood.

As better illustrated in FIG. **2,** occasionally a target arrow **33** will miss the target **20** which is composed of straw or other matted material, and become firmly embedded in the wooden backstop **30** therefor, or in another wooden object in the vicinity of the target, e.g., a tree, building wall, or the like.

The target arrow **33** consists of a hollow, thin-walled aluminum shaft **40** which is fletched with plastic guide vanes **42** at the butt end **44.** The butt end **44** of the shaft **40** is closed by a molded plastic closure fitment **48** affixed thereto. The closure fitment **48** carries a nock **50** for accepting the bowstring **12.**

At the forward end **60** of the arrowshaft **40,** there is a cylindrical recess **62,** extending rearwardly to an internally projecting shoulder **64.** Immediately behind the shoulder **64,** the hollow shaft **40** carries a female thread **66** on the interior surface of the shaft wall.

The target arrowhead **70** consists of a solid body having four sections, each of approximately the same length. The first, or forward section **72,** tapers outwardly from its forward point to the full, maximum diameter of the arrowhead. The second section **74** is cylindrical and of the same diameter as the outside diameter of the shaft **40.** The third section **76** is also cylindrical but is of slightly reduced diameter, having substantially the same diameter as the recess **62** in the forward end of the arrowshaft. The fourth section **80** is a threaded, rearwardly extending projection of yet further reduced diameter, protruding from a shoulder **82** at the rear end of the third section, and is threaded to mate with the thread **66** on the interior of the shaft.

When the target arrowhead **70** is assembled to the shaft **40,** the first two sections **72** and **74** of the head project outwardly, and the rear two sections **76** and **80** are received in and engaged with the interior of the forward end of the shaft **40.**

As is apparent from the drawings, the shaft **40** is fabricated of thin-walled aluminum, which is relatively soft and quite subject to deformation. Thus, when the arrowhead is firmly embedded in a substrate such that it is necessary to exert substantial force upon the arrowshaft in an effort to withdraw the head, the shaft is quite vulnerable to deformation. Thus, it is preferred not to exert even a longitudinal force on the order of more than about three pounds on an arrowshaft for fear of distortion thereof.

The extractor **85,** best illustrated in FIGS. **6–7,** has a forwardly projecting tubular shank **90** of the same outside diameter as the outside diameter of the arrowshaft **40,** thereby facilitating engagement of the extractor with the arrowhead **70** in those instances in which the arrowhead is completely buried in a substrate.

The distal end of the tubular shank **90** contains a machined recess **92** which is complementary to the third section **76** of the arrowhead **70.** An adjacent hollow section in the tubular shank **90** is threaded with a female thread **94** to accept and engage with the thread on the arrowhead **70.**

At its back end, the extractor **85** carries a hand grip section **96** of enlarged diameter at least one and one-half times the diameter of the tubular shank **90.** The handgrip is provided with a scored surface to facilitate grasping thereof.

As illustrated in FIG. **4–8,** once an arrowhead **70** has become embedded in a backstop **30** from which removal is difficult, the shaft **40** is removed from the embedded arrowhead **70** by unscrewing and removing the shaft. The extractor **85** is then screwed onto the rear half of the arrowhead **70** until full positive engagement of the thread **94** and threaded section **80** is achieved, and the extractor also fully envelopes the third section **76** of the arrowhead, butting against the back shoulder of the second section **74** thereof.

The extractor is constructed with considerably greater strength and integrity than the soft aluminum arrowshaft. Thus, considerable withdrawal and twisting force may be applied to remove the solid arrowhead from the substrate, as illustrated in FIG. **8.**

Following removal of the arrowhead from the substrate, the arrowhead **70** is unscrewed from the extractor **85** and is reinstalled on the arrowshaft **40** to reconstitute a complete arrow as illustrated in FIG. **2.**

What is claimed is:

1. An archery process which comprises discharging from a bow an arrow having a shaft and a head threaded thereto, embedding said head in a substrate from which the force which must be applied to said shaft to effect removal of said arrow may be sufficient to cause deformation of said shaft if applied thereto, unthreading said shaft from said embedded arrowhead, threadably engaging said arrowhead with a mating threaded end of a greater strength extractor tool having an outer diameter not greater than said shaft, extracting said arrowhead from said substrate by use of said extractor tool, recovering said arrowhead by unthreading said recovery arrowhead from said extractor tool threaded end, and rethreading said recovered arrowhead to said shaft.

2. An archery process as set forth in claim **1** in which said arrowhead is embedded in a wood substrate.

3. An archery process as set forth in claim **1** wherein recovery of the arrowhead necessitates applying a withdrawl force of at least three pounds in order to extract said arrowhead from said substrate.

4. An archery process as set forth in claim **1** wherein recovery of the arrowhead necessitates applying withdrawl and generally axial twisting forces.

5. An arrowhead extractor for use with archery arrows having relatively deformable and breakable arrowshafts and arrowheads which are embedded in an arrowhead-retaining substrate and from which an associated arrowshaft of an embedded arrowhead has been unthreaded and removed from thread means on a neck portion of said arrowhead, said extractor comprising a handle member, an elongated shank member projecting therefrom and having a diameter at least at a distal end thereof not greater than said arrowshaft, said extractor shank member being of substantially greater strength than that of said arrowshaft to facilitate the extraction, and thread means at the distal end of said extractor's elongated shank member for mating engagement with complementary thread means of said arrowhead.

6. An arrowhead extractor as set forth in claim **5** in which said extractor handle member is of greater diameter than its said elongated shank member.

7. An arrowhead extractor as set forth in claim **6** in which said extractor handle member is circumferentially ridged.

8. An arrowhead extractor as set forth in claim **5** in which said elongated shank member is of tubular form and is of the same outside diameter throughout its length as said arrowshaft.

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