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(54) **COUNTERWEIGHT FOR A HUNTING
ARROW**

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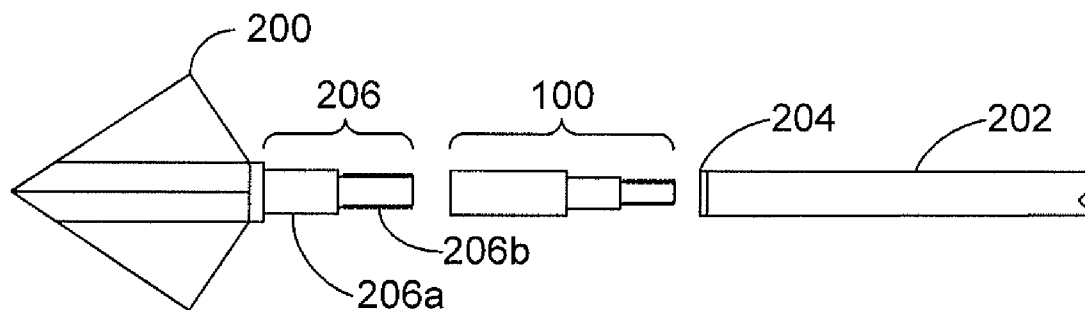
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(57) **ABSTRACT**

A counterweight for a hunting arrow that is mountable between a broadhead and the arrow shaft. The counterweight includes a body with a threaded opening that receives a threaded projection extending from a broadhead and a threaded stud that is threadably matable with a threaded opening in an insert disposed within the leading end of an arrow shaft.



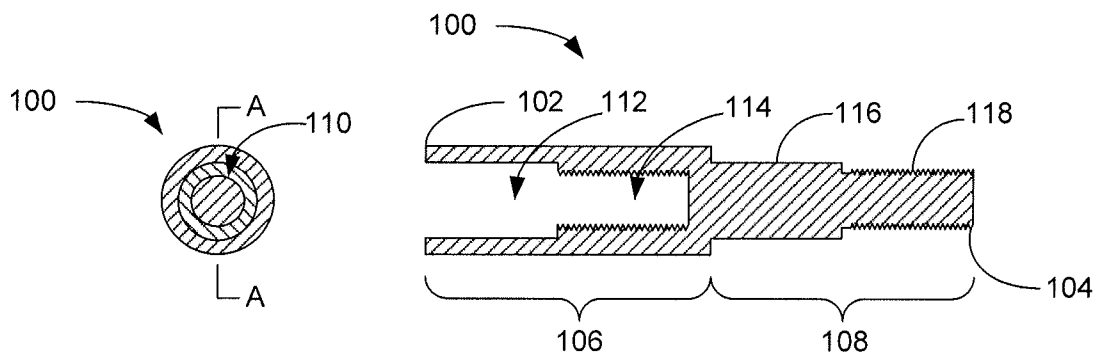


Fig. 1a

Fig. 1b

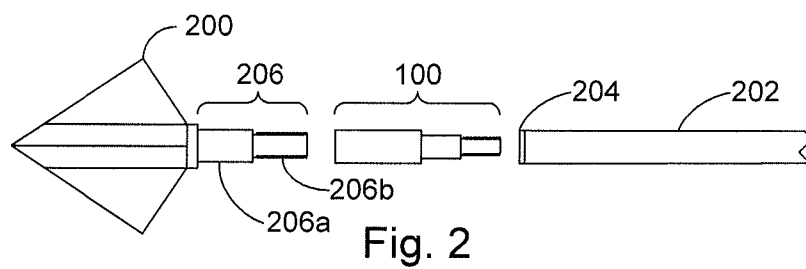


Fig. 2

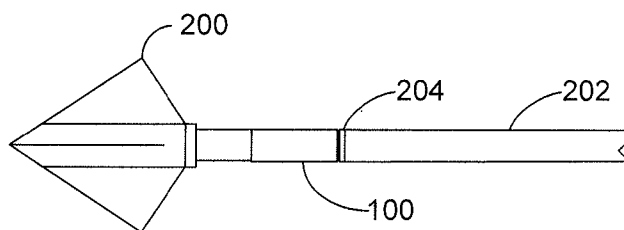


Fig. 3

COUNTERWEIGHT FOR A HUNTING ARROW

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] (Not Applicable)

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] (Not Applicable)

BACKGROUND OF THE INVENTION

[0003] The present invention relates to hunting arrows and, more specifically, to a counterweight that is usable with a hunting arrow to provide forward of center weighting for the arrow.

[0004] Hunting arrows are known that have broadheads mounted at the leading end of the arrow. Broadheads typically have threaded studs that are threadably mountable within a threaded opening in an insert that is secured in the leading end of the arrow. Broadheads are commercially available from many vendors in many forms and vary considerably in weight. The insert that is mounted at the leading end of the shaft generally has a bore configuration that is sized to receive the threaded stud of a broadhead. Typically, broadheads include a standard threaded stud so as to permit the mounting of the broadhead on any arrow shaft that includes a cooperative insert. More specifically, broadheads typically have threaded studs with 8-32 threads that are intended for threadable mating with inserts having similar threads disposed in the leading end of an arrow shaft. A nock is secured within a threaded opening within an insert at the trailing end of the arrow shaft.

[0005] A rear mounted deployable cutter device is disclosed in U.S. patent application Ser. No. 12/570,558 which is assigned to the same individuals as the present. It has been observed that the added weight of the rear mounted deployable cutter device can adversely affect the flight characteristics of a hunting arrow since it is desirable for a hunting arrow to maintain forward of center weighting for the assembled arrow.

[0006] It would therefore be desirable to have a means to readily create the desired forward of center weighting in a hunting arrow when a rear deployable cutter device is utilized or when the weight distribution of the arrow does not provide the desired forward of center weighting.

BRIEF SUMMARY OF THE INVENTION

[0007] In accordance with the present invention, a counterweight for a hunting arrow is disclosed that may be readily installed so as to provide forward of center weighting for a hunting arrow without modification of conventional broadheads or inserts mounted within arrow shafts. In one embodiment, the counterweight is generally cylindrical, and has a body that is fabricated of a material that provides the weight needed to obtain the desired forward of center weighting for an assembled hunting arrow. The counterweight has a leading end and a trailing end. The leading end of the counterweight has a threaded bore that is sized and configured to receive a threaded stud extending from a broadhead. The trailing end of the counterweight includes a threaded stud that is configured like the threaded stud on a broadhead so that the threaded stud on the counterweight may be threadably secured in an insert

disposed in the leading end of an arrow shaft. When it is desired to add weight to the leading end of a hunting arrow, such as when a rear deployable cutter device is mounted at the trailing end of the arrow shaft, the threaded stud of the broadhead is threaded into the bore at the leading end of the counterweight. The threaded stud at the trailing end of the counterweight is threaded into the insert at the leading end of the arrow shaft. The assembly of a hunting arrow with a counterweight disposed between the broadhead and the leading end of the arrow shaft allows the desired forward of center weighting to be readily achieved, such as when a rear deployable cutter device is mounted at the aft end of an arrow shaft.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0008] The invention will be more fully understood by reference to the Detailed Description of the Invention in conjunction with the Drawings of which:

[0009] FIG. 1a is an end view of the leading end of a counterweight in accordance with the present invention; and

[0010] FIG. 1b is a side cross-sectional view of the counterweight of FIG. 1a along plane A-A;

[0011] FIG. 2 is an side exploded plan view of a hunting arrow in accordance with the present invention that includes a broadhead, an arrow shaft and a counterweight mountable between the broadhead and the arrow shaft; and

[0012] FIG. 3 is a side plan view of the assembled hunting arrow of FIG. 2.

DETAILED DESCRIPTION OF THE INVENTION

[0013] U.S. patent application Ser. No. 12/570,558 is incorporated herein by reference.

[0014] A counterweight 100 in accordance with the present invention is illustrated in FIGS. 1a and 1b. Referring to FIGS. 1a and 1b, the counterweight 100 has a leading end 102, a trailing end 104, a first or forward portion 106 and a second or aft portion 108. In one embodiment, the body is fabricated as a unitary body. The first portion 106 and the second portion 108 in one embodiment are fabricated as a single piece. The first portion 106 extends from the leading end 102 and extends to the leading end of the second portion 108. The second portion 108 extends from the trailing end of the first portion to the trailing end 104 of the counterweight 100.

[0015] The leading end 102 of the counterweight includes an opening 110 having a smooth bore 112 extending inward from the leading end 102 and a threaded bore 114 extending toward the trailing end of the first portion 106 from the smooth bore 112. The smooth bore 112 has a diameter sized to receive a cylindrical shoulder on a stud extending from a broadhead. The stud on a conventional broadhead also includes a threaded portion that is threadable into the threaded bore 114 of the counterweight 100 to secure the broadhead within the counterweight, as is subsequently discussed in greater detail. The smooth bore 112 and the threaded bore 114 are coaxially disposed about a common longitudinal axis.

[0016] The second portion 108 of the counterweight 100 comprises a stud that includes a cylindrical section 116 and a threaded portion 118 that is sized and configured for threadable mating within a threaded opening in an insert that is mounted within the leading end of an arrow shaft. The size and configuration of the second portion 108 of the counterweight 100 generally corresponds to the size and configura-

tion of the stud extending from a conventional broadhead to permit the counterweight **100** to be threadably secured within an insert mounted in the leading end of an arrow shaft. The cylindrical section **116** and the threaded portion **118** are also disposed about the same longitudinal axis as the smooth bore **112** and the threaded bore **114**.

[0017] The outer diameter of the first portion **106** of the counterweight **100** generally corresponds to the outer diameter of the arrow shaft **202**.

[0018] The length of the counterweight **100** and the material for the counterweight are specified to provide the desired weight to achieve forward of center weighting for an assembled hunting arrow. More specifically, the overall length of the counterweight is typically at least 1¼ inches and, in one embodiment, is approximately 1½ inches. In general, the weighting of the assembled arrow including the broadhead, counterweight, arrow shaft and rear deployable cutter device is specified to provide front of center weighting so that the arrow will fly true. In one embodiment, a 70 grain counterweight provides suitable forward of center weighting for a hunting arrow that includes a rear mounted deployable cutter device disposed at the aft end of the arrow shaft. In general, the presently disclosed counterweight weighs between 20 and 150 grains to provide the desired front of center weighting, the weight being specified based on the weight distribution along the arrow shaft. It should be recognized that the weight of the counterweight **100** that is used will depend upon the weight of the broadhead, the weight of the arrow shaft, and the weight of a rear mounted deployable cutter device if such a device is used.

[0019] The counterweight **100** may be fabricated of steel, tungsten, titanium, brass, metal alloys, plastic or any other suitable material to obtain a desired size and weight characteristic. Moreover, the counterweight **100** may be fabricated of combinations of metals or combinations of plastic and metal to obtain the desired size and weight for a given application.

[0020] FIG. 2 is an exploded view illustrating the mounting of the counterweight **100** between a broadhead **200** and an arrow shaft **202**. The arrow shaft **202** includes a conventional insert **204** that is mounted within the leading end of the arrow shaft in a known manner. For example, inserts **204** may be Easton HP, CB, X10 arrow inserts manufactured by Easton Technical Products, Salt Lake City, Utah or any other suitable commercially available insert. The various inserts are intended for use with specific tubular arrow shafts. The broadhead **200** includes a threaded stud **206** having a cylindrical section **206a** and a threaded portion **206b**. The threaded portion **206b** of the threaded stud **206** is threadable into the threaded bore **114** of the counterweight **100** (FIG. 1b) to secure the broadhead **200** to the counterweight **100**. The second portion **108** of the counterweight **100**, as discussed in connection with FIG. 1b, is a threaded stud having a configuration that corresponds to the configuration of the threaded stud **206** of the broadhead **200** and is therefore threadably matable with the insert **204**.

[0021] FIG. 3 illustrates an assembled hunting arrow that includes a broadhead **200** that is threadably secured within the first portion **106** (FIG. 1b) of the counterweight **100**, with the second portion **108** (FIG. 1b) of the counterweight **100** threadably secured within the insert **204** mounted within the arrow shaft **202**.

[0022] While the above-described counterweight is illustrated as being configured to receive a threaded stud of a

broadhead and as including a threaded projection sized and configured for threadable mating with a threaded opening of an insert, one or both of the stud of the broadhead and the projection on the aft end of the counterweight may be non-threaded and secured within a corresponding non-threaded opening in the counterweight or the insert respectively via a press fit.

[0023] Moreover, while the counterweight is illustrated as being fabricated as a single piece, the forward and aft portions of the counterweight may be fabricated as separate pieces that are threadably mated, mated via a press fit by which a projection on one of the portions is insertable within an opening in the other one of the portions, or otherwise mated via any suitable technique. Moreover, a cavity may be provided in one or both of the portions to permit the optional insertion of a weighted insert within the cavity. In this manner a user may vary the weight of the counterweight by insertion of one or more weighted inserts within the cavity. While a solid weighted insert may be employed, it should be recognized that a powder, e.g. a tungsten powder, may be disposed within the cavity as an alternative to, or in addition to, a solid insert.

[0024] Alternatively, weight may be optionally added to the counterweight via one or more C shaped clips that are disposed around the counterweight. The C shaped clips are disposed in circumferential slots (not shown) in the counterweight so as to remain in place during arrow flight.

[0025] It will be appreciated by those of ordinary skill in the art that modifications to and variations of the above-described hunting arrow and counterweight for use with a hunting arrow may be made without departing from the inventive concepts disclosed herein. Accordingly, the invention should not be viewed as limited except by the scope and spirit of the appended claims.

What is claimed is:

1. A counterweight for a hunting arrow comprising:
 - a body having a longitudinal axis, the body having a forward end, a rearward end, a forward portion terminating at the forward end and an aft portion terminating at the rearward end, the forward portion sized and configured for receiving a stud extending from a broadhead, and the aft portion including a projection terminating at the rearward end, the projection sized and configured for secure mating with an insert disposed within a leading end of an arrow shaft.
2. The counterweight of claim 1 wherein the stud extending from the broadhead is a threaded stud, the projection comprises a threaded projection, and
 - the forward portion includes a bore opening to the forward end of the body, the bore being coaxially disposed about the longitudinal axis and including an inner threaded portion sized and configured to receive the threaded stud extending from the broadhead.
3. The counterweight of claim 1 wherein the forward portion includes a trailing end and the bore includes a generally cylindrical inner surface opening to the forward end of the first portion and the inner threaded portion, wherein the generally cylindrical inner surface and the inner threaded portion are disposed about the longitudinal axis and, wherein the aft portion includes a generally cylindrical section extending generally from the trailing end of the first portion to the threaded projection and wherein the generally cylindrical section and threaded projection are disposed about the longitudinal axis.

4. The counterweight of claim 3 wherein the forward portion comprises generally cylindrical section having an outer diameter and the generally cylindrical section of the aft portion has an outer diameter that is less than the outer diameter of the generally cylindrical section of the forward portion.

5. The counterweight of claim 3 wherein the generally cylindrical section of the aft portion and the threaded projection each have an outer diameter and the outer diameter of the threaded projection is less than the outer diameter of the generally cylindrical section of the aft portion.

6. The counterweight of claim 1 wherein the body is fabricated as a single piece.

7. The counterweight of claim 1 wherein the body weighs between 20 and 150 grains.

8. The counterweight of claim 1 wherein the overall length of the body is at least 1¼ inches.

9. The counterweight of claim 1 wherein the body is fabricated of steel, titanium, tungsten, brass, a metal alloy, a plastic or a combination of a metal and plastic.

10. The counterweight of claim 1 wherein the forward portion and the aft portion are separate pieces and the forward portion is mated to the aft portion to form the body.

11. The counterweight of claim 10 wherein either or both of the forward and aft portions include a cavity configured to optionally receive weighted material therein.

12. The counterweight of claim 11 further including a weighted insert disposed with the cavity.

13. A hunting arrow comprising:

a broadhead having a stud extending from an aft end of the broadhead;

an arrow shaft having a leading end;

an insert having a leading end, the insert mounted at least partially within the leading end of the arrow shaft, the insert including a bore opening to the leading end of the insert; and

a counterweight comprising a body, the body having a forward portion, an aft portion, and a longitudinal axis, the forward portion including a bore sized and configured for secure mating with the stud extending from the aft end of the broadhead, wherein the stud of the broadhead is securely disposed within the bore of the forward portion, the aft portion including a stud that is sized and configured for secure mating within the bore of the insert, the stud of the aft portion being securely disposed within the bore of the insert to secure the body between the broadhead and the arrow shaft.

14. The hunting arrow of claim 13 wherein a) the stud of the broadhead includes a threaded projection, b) the bore in the insert includes a threaded opening, and c) the bore in the

forward portion includes a threaded portion sized and configured to receive the threaded projection of the stud of the broadhead and wherein the stud of the aft portion includes a threaded projection sized and configured for threadable mating within the threaded opening of the insert.

15. The hunting arrow of claim 13 wherein the body is fabricated as a single piece.

16. The hunting arrow of claim 13 wherein the counterweight weighs between 20 and 150 grains.

17. The hunting arrow of claim 13 wherein the overall length of the counterweight is at least 1¼ inches.

18. The hunting arrow of claim 13 wherein the forward portion and the arrow shaft have first and second outer diameters respectively and wherein the first outer diameter of the forward portion is generally equal to the second outer diameter of the arrow shaft.

19. The hunting arrow of claim 13 wherein forward portion and the arrow shaft have first and second outer diameters respectively and wherein the first outer diameter of the forward portion is generally equal to the second outer diameter of the arrow shaft.

20. The hunting arrow of claim 13 wherein the arrow shaft has a trailing end and the hunting arrow further includes a rear mounted deployable cutter device mounted at the trailing end of the arrow shaft.

21. The hunting arrow of claim 20 wherein the body is fabricated as a single piece.

22. The hunting arrow of claim 20 wherein the counterweight weighs between 20 and 150 grains.

23. The hunting arrow of claim 20 wherein the overall length of the counterweight is at least 1¼ inches.

24. A method for assembling a hunting arrow that includes a) a broadhead having a stud with a threaded projection and b) an arrow shaft having an insert mounted at least partially within a leading end of the arrow shaft, the insert including a threaded opening, the method comprising the steps of:

threadably securing the threaded projection of the broadhead within a threaded opening within a forward portion of counterweight having a body that includes the forward portion and an aft portion, the aft portion having a stud that includes a threaded projection; and

securing the threaded projection of the aft portion of the body within the threaded opening of the insert to secure the body between the broadhead and the arrow shaft and provide added weight therebetween.

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