

[54] **ARROW TIP HAVING REPLACEABLE CUTTING BLADES**

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[51] Int. Cl. **F41b 5/02**

[58] Field of Search **273/106.5 B**

[56] **References Cited**

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[57] **ABSTRACT**

An arrow tip adapted to receive a plurality of replaceable cutting fins or blades comprises an elongated body member to which the replaceable blades are secured by means of a nose piece and snap ring. The body member has an external surface defining longitudinally extending grooves into which the replaceable blades are fitted. The blades may be formed from a section of an injector-type razor blade and are readily installed on or removed from the body member by means of the nose piece and snap ring. The snap ring rotates in a circumaxial groove in the tip and extends through an opening in each blade. A discontinuity in the ring is selectively registerable with each blade.

10 Claims, 4 Drawing Figures

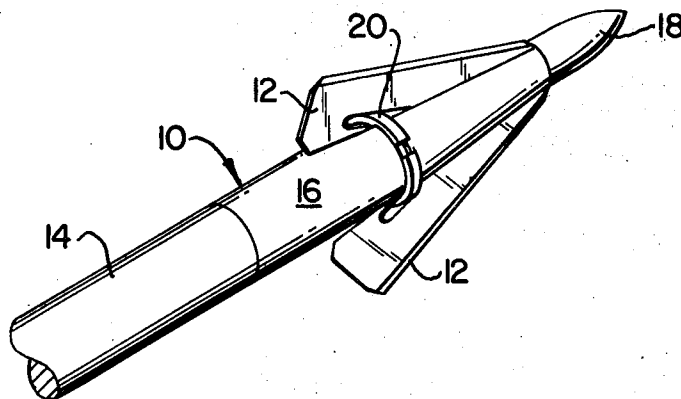


FIG. 1

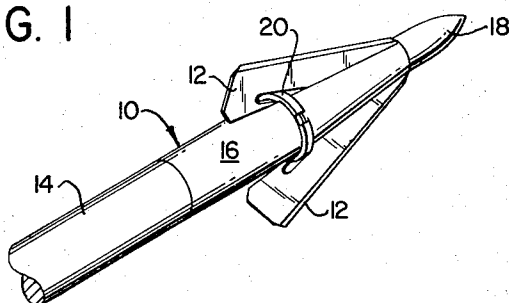


FIG. 2

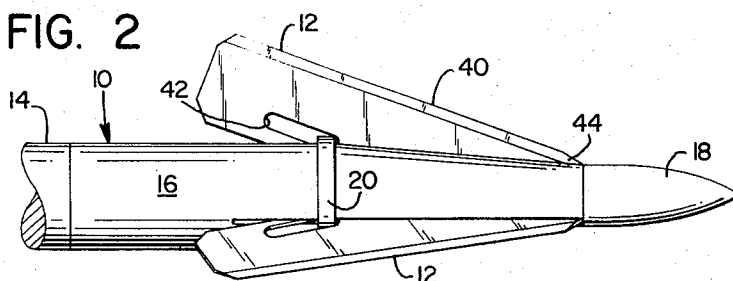


FIG. 3

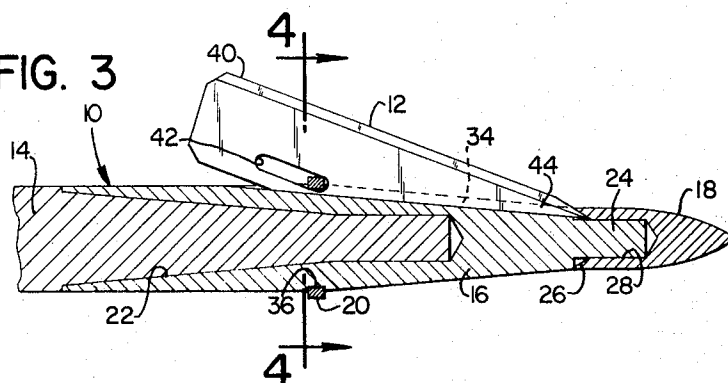
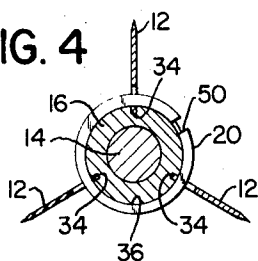


FIG. 4



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ARROW TIP HAVING REPLACEABLE CUTTING BLADES

BACKGROUND OF THE INVENTION

The present invention relates to the field of arrow-heads or arrow tips and, more particularly, is concerned with broadhead arrow tips in which the fins or cutting blades are replaceable.

Arrow tips of the type to which the present invention is directed are used for hunting game and generally include a plurality of knife-edged blades which increase penetration of the arrow and sever the veins and arteries of an animal to bring about a more rapid and more humane kill. It is important for maximum effect that the knife edges of the cutting blades be extremely sharp so that the arrow will penetrate more easily and insure a severing of veins and arteries. To obtain extreme sharpness, it is known in broadhead arrow tips to employ safety razor blades which are normally provided with a finely honed cutting edge. In some broadhead arrow tips, the blades are glued in place and the entire tip is discarded when the blades become dull. In others, such as disclosed in U.S. Pat. No. 2,880,000, the razor blades are replaceable.

Broadhead arrow tips which are adapted to receive replaceable blades, are advantageous for several reasons. Firstly, the blades can be replaced whenever they become dull and, therefore, a sharp head is easily maintained. Secondly, the replaceable blades can be removed when the arrow is in storage so that injuries from an otherwise sharp instrument can be avoided. Furthermore, the broadhead arrow tips with the replaceable cutting blades removed can be used for practice shooting without causing extensive damage to the target or dulling the head. Of course, removing the blades results in a change in the weight of the arrow which can cause slightly different flight characteristics and, therefore, from the bowman's standpoint, it is desirable to have a broadhead arrow tip construction which provides a minimum net change in weight when the cutting blades are removed for practice.

SUMMARY OF THE INVENTION

The present invention resides in an arrow tip adapted to receive a plurality of replaceable cutting blades and thus form a broadhead arrow tip. The arrow tip includes an elongated body having coaxial front and rear end portions and a plurality of longitudinal blade-receiving grooves extending along its periphery in circumferentially spaced relationship. The body also has an annular groove extending circumaxially about the body and intersecting each of the plurality of blade-receiving grooves. A blade locking member having an annular shape, such as such as example a snap ring, extends around the body in the annular groove to engage a plurality of the replaceable cutting blades mounted 34 the body. Blade retaining means is connected to the front end portion of the body and cooperates with each of the plurality of blade-receiving grooves to hold the replaceable cutting blades. The cutting blades have attachment apertures which register with the annular groove when mounted in the body portion and tips engaged by the retaining means. The blades are easily removed, replaced, or installed by moving the annular locking member.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a broadhead arrow tip embodying the present invention.

FIG. 2 is a side elevation view of the arrow tip shown in FIG. 1.

FIG. 3 is a longitudinal sectional view of the broadhead arrow tip shown in FIGS. 1 and 2.

FIG. 4 is a transverse sectional view of the broadhead arrow tip as seen along the sectioning line 4—4 of FIG. 3.

DESCRIPTION OF THE PREFERRED EMBODIMENT

FIGS. 1—4 show an arrow tip, generally designated 10, which is adapted to receive three replaceable cutting blades 12, 12 to form a broadhead arrow tip. The arrow tip 10 is shown mounted at the forward end of an arrow shaft shown in part for convenience.

The arrow tip 10 comprises an elongated body member 16, a nose piece 18 and a resilient snap ring 20. The body member 16 is cylindrical and the intermediate portion of the body tapers inwardly toward the front portion 24 which is also cylindrical. The rear portion of the body member 16 defines an axially extending mounting bore 22 which permits the member to be mounted at the forward end of the arrow shaft 14. The cylindrical front portion 24 projects coaxially from the forward end of the member 16 and serves as a support for the nose piece 18.

The nose piece 18 has the external shape of a pointed projectile and mates at its rear extremity with the tapered external surface of the body member 16. The rear portion of the nose piece is formed as an internally chamfered skirt section 26 which contains a central, mounting bore 28 reamed to a size permitting the nose piece to be press fitted onto the projecting body portion 24.

As seen most clearly in FIGS. 3 and 4, a plurality of longitudinally extending grooves 34 are formed in the external surface of the body member 16 to receive the replaceable blades 12. The grooves 34 are equally circumferentially spaced and extend from the forward end of the body member 16 adjacent the rear end of the nose piece 18 along the tapered external surface of the member toward the rear portion of the member. The grooves have a width which accommodates the cutting blades 12 and support the blades so that they project radially from the member 16. It is contemplated that broadhead arrow tips having two or more replaceable blades can be formed according to the present invention by providing a number of longitudinal grooves corresponding to the number of blades.

At a position between the front and rear end portions of the body member 16, an annular groove 36 extends circumaxially about the body member and intersects each of the longitudinally extending grooves 34. The width of the annular groove 36 is approximately equal to the width of the snap ring 20 so that the ring 20 can be accommodated within the groove and resiliently engages the body member 16 in the groove to prevent it from shifting in the axial direction along the member.

In accordance with the present invention, the replaceable cutting blades 12 are secured to the body member 16 by means of the nose piece 18 and the snap ring 20. The blades 12 may be formed from safety razor blades by sectioning the blades along a diagonal so that

the cutting edges of the blades, when mounted in the longitudinal grooves 34, are at an angle to the axis of the body member and taper away from the outer surface of the body member at the front end portion. The blades are sectioned so that an attachment aperture 42 registers with the circumaxial slot 36 and permits the snap ring 20 to be laced through each of the blades at the forward end of the aperture to lock the blades to the body member 16. In addition, the pointed forward ends or tips 44 of the blade sections are cut at an angle which permits the tips 44 to project forwardly through the grooves 34 into the rearward facing opening of the skirt section 26 of the nose piece 18 when the attachment apertures 42 are engaged by the snap ring 20. The skirt section 26 therefore, captures each of the blades 12 at their tips 44 and prevents the blades from being dislodged from the grooves 34 at the forward end of the arrow tip 10.

It will also be noted that the longitudinally extending grooves 34 are recessed into the body member 16 at a depth slightly greater than the circumaxial groove 36. As a consequence, the blades 12 rest in the member 16 at a slightly greater depth than the snap ring 20 and the snap ring 20 remains engaged with the annular groove 36. With the snap ring 20 laced through the blades 12 at the forward end of the attachment apertures 42 and also engaged with the annular groove to prevent it from shifting axially along the body member 16, the blades 12 are prevented from shifting in the longitudinal direction and, the blade tips 44 can not be disengaged from the skirt section 26 of nose piece 18. The blades 12, therefore, are firmly locked in the body member 16 by the snap ring 20.

Removal of the cutting blades 12 from the arrow tip 10 is readily accomplished by means of the snap ring 20. As seen most clearly in FIG. 4, the snap ring 20 has a discontinuity or missing segment forming a gap 50 which, in the preferred embodiment of the invention, is slightly larger than the width of a cutting blade 12. The ring 20 is rotated in the annular groove 36 of the body member 16 until the gap 50 registers with one of the longitudinal grooves 34. The cutting blade 12 in that one groove is then shafted slightly rearwardly to disengage the tip 44 and is lifted out of the groove 34 and away from the body member 16. The process is repeated for each of the other blades until all of the blades are removed. Since the snap ring 20 and nose piece 18 remain attached to the body member 16, the net change in weight of the arrow tip 10 associated with the removal of all blades 12 is limited to the combined weight of the blades themselves and the principal weight of the broadhead tip found in the body member 16, the nose piece 18 and the snap ring 20 remains attached to the arrow shaft. With the blades removed, the arrow tip maintains its streamlined configuration and the nose piece 18 provides a point which is adequate for penetrating practice targets.

Installation of the cutting blades 12 is also a simple operation. With the gap 50 of the snap ring 20 registering with a groove 34, a blade 12 is installed in the groove 34 with the blade tip projecting into the skirt section 26 of nose piece 18. The snap ring 20 is then rotated through the attachment aperture 42 until the gap 50 registers with the next groove. As each blade is installed, it is individually locked in place and remains so positioned without any cooperation from blades in the other longitudinal grooves 34. When all of the

blades 12 are installed, the snap ring 20 is rotated to place the gap 50 between two of the grooves 34 as seen in FIG. 4 and the assembled broadhead is ready for use.

It will thus be seen that the arrow tip 10 is readily adapted to the installation and removal of replaceable cutting blades and that the blades once installed are securely anchored to the arrow tip to form a well balanced, light weight construction.

I claim:

1. An arrow tip adapted to receive a plurality of replaceable cutting blades comprising: an elongated body having coaxial front and rear end portions and a plurality of blade-receiving grooves extending along the periphery of the body from the front end portion toward the rear end portion, the body also having another groove extending circumaxially around the body; blade locking means having an annular shape and extending around the body in the circumaxial groove, the locking means having a discontinuity and being rotatable in the circumaxial groove between positions about the body to register the discontinuity individually with each blade and lock or unlock a blade in a selected blade-receiving groove at each position; and blade retaining means connected to the front end portion of the body and cooperating with each of the plurality of blade-receiving grooves in the body for holding replaceable blades at the front end portion of the body.

2. An arrow tip as defined in claim 1 wherein said blade retaining means comprises a nose piece connected to and projecting axially from the forward end portion of the elongated body.

3. An arrow tip as defined in claim 2 wherein the nose piece has a trailing skirt portion defining an opening registering with the plurality of the blade-receiving grooves at the front end portion of the body.

4. An arrow tip as defined in claim 1 wherein the rear end portion of the body defines a mounting bore extending axially within the rear end portion.

5. An arrow tip as defined in claim 1 wherein the blade locking means comprises a resilient snap ring mating with the circumaxial groove.

6. An arrow tip as defined in claim 1 wherein the circumaxial groove of the elongated body intersects each of the blade-receiving grooves.

7. A broadhead arrow tip comprising: an elongated body member having a longitudinal body axis and a plurality of grooves extending longitudinally along the outer surface of the body member, the outer surface also including a circumaxial groove intersecting the longitudinal grooves; a plurality of cutting blades positioned respectively in the plurality of longitudinal grooves and projecting radially from the body member, each blade having a projecting cutting edge extending at an angle to the longitudinal axis of the body member from a blade tip adjacent one axial end of the body member, and an attachment aperture registering with the circumaxial groove; a resilient, split ring rotatably mounted on the body member in the circumaxial groove and extending through each one of the attachment apertures in the cutting blades for rotatable movement to align the split in the ring with a selected blade for individual disengagement of the selected blade and the ring; and a fastening secured to said one axial end of the body member and engaging the blade tips of the cutting blades.

8. A broadhead arrow tip as defined in claim 7 wherein the fastening has a projectile shape and ex-

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tends coaxially of the body member from said one axial end.

9. A broadhead arrow tip as defined in claim 8 wherein the body member has an axially extending mounting bore at the axial end opposite the fastening.

10. A broadhead arrow tip as defined in claim 7

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wherein the longitudinal grooves of the body member have a greater depth below the surface of the body member than the circumaxial groove at the intersections of the grooves.

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