Sept. 22, 1959 E. H. HOYT, JR 2,905,470

ARROW HEAD

Filed April 1, 1957

FIG. 2

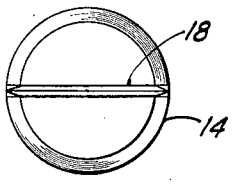


FIG. 6

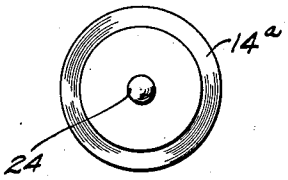


FIG. 3

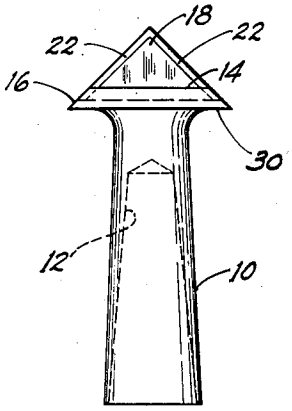


FIG. 4

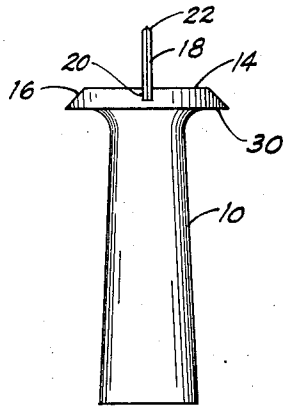


FIG. 7

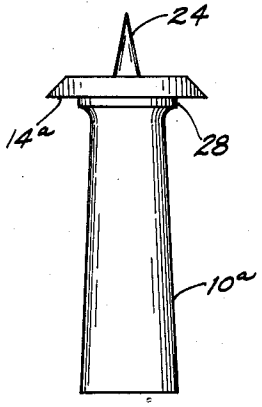


FIG. 5

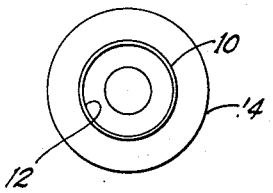


FIG. 1

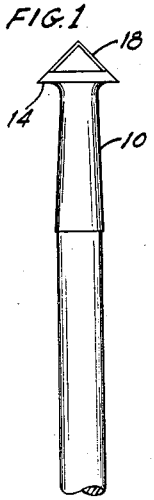
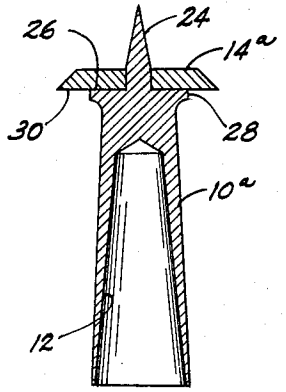


FIG. 8



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HIS AGENT

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ARROW HEAD

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Application April 1, 1957, Serial No. 649,947

9 Claims. (Cl. 273—106.5)

This invention relates to archery equipment and particularly to arrow heads adapted to small game hunting.

Experience in hunting small game animals with bow and arrows teaches that those instances in which the small game animal escapes after being wounded occur most frequently as the result of either complete penetration or insufficient penetration. When complete penetration occurs much of the kinetic energy of the arrow is wasted, particularly at close ranges, and without the encumberance of the arrow, the wounded small animal can escape much more readily. In cases of insufficient or no penetration at somewhat longer ranges, the arrow either ricochets off after striking and injuring the animal or it is quickly dislodged and the wounded animal is again free to escape.

Further experience has conclusively proved that the loss of injured small game can be greatly reduced by the provision of an arrow head which will function effectively to deter penetration and deliver substantially all of the energy of the arrow at the highest arrow velocities and, on the other hand, promote penetration at lower arrow velocities. The use of blunt end arrow heads to reduce penetration and increase impact is well known, but when the diameter of the blunt end of this type of arrow head is increased sufficiently so as to effectively prevent complete penetration of small game, such as rabbits, at close range with the usual forty to fifty pound pull hunting bow, it is rendered incapable of sufficient penetration to retain the arrow in the animal at somewhat longer ranges, which somewhat longer ranges are well within the limit of highly probable hits by the average bow hunter.

It is an object of the present invention to provide a generally new and improved small game arrow head having an enlarged flat forward surface for retarding penetration of small game at short ranges and having a piercing element projecting centrally from said flat surface for initiating penetration at longer ranges.

It is a further object to provide a small game arrow head having a short, cylindrical portion at the forward end of the shaft-receiving shank which is considerably larger in diameter than the shank and is tapered forwardly so as to provide thereon an acute, sharp, rear edge to deter extraction.

It is a further object to provide a sharp-pointed small game arrow head having a large flat surface rearward of the point which is of sufficient area and sufficiently close to the point to cause the arrow to rebound and completely disengage the arrow when the arrow strikes a tree limb.

A further object is to provide a small game arrow head which is particularly effective, of rugged construction, and simple and economical to manufacture.

These and other objects and advantages will appear from the following description and accompanying drawing.

In the drawing:

Fig. 1 is a side elevation of an arrow head constructed in accordance with the present invention, shown attached to a portion of an arrow shaft;

Fig. 2 is an enlarged top plan view of the arrow head shown in Fig. 1;

Fig. 3 is an enlarged elevational view of the arrow head shown in Fig. 1;

Fig. 4 is an elevational view of the arrow head shown rotated 90° from the position shown in Fig. 3;

Fig. 5 is a bottom plan view of the arrow head shown in Figs. 1 to 4; and

Figs. 6, 7, and 8, are, respectively, top plan, elevational and longitudinal cross-sectional views of a modified form of the arrow head shown in Figs. 1 to 5.

Referring to Figs. 1 to 5 showing the first form of the invention, the arrow head comprises a round, tapered, hollow shank portion **10** provided with a tapered bore **12** to receive the tapered end of an arrow shaft, a flat, circular head **14** with its edge beveled 45° as indicated at **16**, and a flat, triangular cutting blade **18** arranged on the diameter of the head **14**. The forward surface of the head **14** is provided with a narrow milled slot **20** extending thereacross on its diameter, which slot receives one side of the triangular blade. The shank **10** and blade **18** are preferably constructed of steel, and the blade **18** is rigidly fastened in the slot **20** by soldering or copper brazing. The forward facing exposed sides of triangular blade **18** are beveled, as at **22**, to provide a cutting edge. In this arrangement, the shank **10** and head **14** are formed as a one piece screw machine part.

In another contemplated form of construction, the entire arrow head is formed from a single piece of stock by first turning the shank and head portions and boring the shank, and then forming the blade by milling. In this method of construction, the material would preferably be a steel which can be heat treated to obtain a relatively hard blade. The shank **10**, head **14**, and blade **18** may, of course, be constructed of any suitable material, and the blade may be fastened in the head in any suitable manner.

While I prefer to use the conventional 5° tapered bore to receive the tapered end of an arrow shaft and correspondingly taper the shank **10** to reduce weight, a straight shank with a straight bore **12** may be used. Also, the exposed cutting edges of the blade **18** may have any suitable contour. For example, they may be concave or they may be convex so as to form, together with the lower inserted flat side, a semi-circle.

In the modified form shown in Figs. 6 to 8 inclusive, a round tapered point **24** is substituted for the blade **18**, which point is formed as an integral part of the shank **10*a***, as indicated in Fig. 8. Also, in this arrangement, the flat circular head **14*a*** is formed as a separate perforated stamping which is fitted over the base of the point and copper brazed at **26** to a head **28** formed on the shank portion **10*a***, as indicated, thereby permitting the use of smaller diameter stock from which to turn the shank. The entire arrow head shown in Figs. 6 to 8 may, of course, be formed on a screw machine from a single piece of stock.

The provision of the centrally protruding point **24** or the blade **18** permits the use of a much larger diameter, flat, shocking surface to absorb the arrow's energy at short ranges, while insuring a penetration at longer ranges which would not be achieved in their absence. A further particular advantage gained by making the diameter of the flat head elements **14** and **14*a*** considerably larger than the shank, and by beveling their forward edges so as to provide a pronounced shoulder, is that the arrow is rendered much more difficult to dislodge and is therefore more likely to be retained until the animal can be recovered. To this end the under surface of the head

is also flat so as to provide an abrupt shoulder **30** which functions in the manner of a barb.

In the drawing the blade **18** and the point **24** are shown projecting from the flat head surface a distance of one-half the diameter of the head. To extend the perpendicular height of these elements beyond this would possibly increase the effectiveness of the arrow head somewhat with respect to initiating penetration, and would probably further reduce the tendency of the arrow to ricochet, but, on the other hand, a point would soon be reached wherein the arrow head would be much more likely to be rendered useless if it inadvertently encountered a stone or similarly hard material, and, moreover, a point would soon be reached wherein the arrow would stick in a tree limb out of reach if the quarry happened to be a squirrel. To reduce the perpendicular height of the point or blade below one-half the diameter of the flat head surface would rapidly reduce the effectiveness of the arrow head from the standpoint of penetration. I have found that by providing a point or blade which projects perpendicularly from the head a distance of one-half to three-quarters of the diameter of the head, I can construct a rugged arrow head which has the desired penetration, freedom from ricochet, and rebound from wood.

The relationship of the diameter of the head to the shank may be varied to suit conditions. Everything else being equal, the hunter using a very heavy draw bow would need a larger diameter head than a hunter using a light draw bow to insure that the full energy of his arrow is absorbed. In any event, the diameter of the head will be larger than the arrow shaft and the shank of the arrow head.

While the modification shown in Figs. 6 to 8 is somewhat more economical to manufacture, the modification shown in Figs. 1 to 5 is particularly effective in attaining penetration at lower arrow velocities on the thicker and tougher-skinned small game animals. This is so because the blade **18** provides a continuous slit extending substantially the diameter of the head **14**, which in yielding material such as animal tissue permits the easy entry of the enlarged, beveled edge head. To carry this principle further a pair of thin blades such as **18** could, of course, be used and arranged on perpendicular diameters of the head **14**, but this increases the cost of the arrow head considerably and at this time it does not appear that the advantage gained over a single blade justifies the increased cost.

The foregoing description and drawing is intended to be illustrative and not limiting, the scope of the invention being set forth in the appended claims.

I claim:

1. A hunting arrow head for small game animals comprising a tapered shank portion tapering from a larger diameter near its rear end to a smaller diameter at its forward end, a longitudinal tapered bore in said shank opening at its rear end for receiving the tapered end of an arrow shaft, a flat circular head portion at the forward end of said shank portion of larger diameter than the largest diameter of said tapered shank portion, thereby to form a relatively wide shoulder at the forward end of said shank, the side of said flat, circular head portion being beveled so as to form an acute, sharp, rear edge thereon, and a flat cutting blade arranged on the diameter of said flat circular head portion and extending perpendicularly from the forward face thereof.

2. A hunting arrow head for small game animals comprising a hollow shank portion open at its rear end to receive the end of an arrow shaft, a flat, circular head portion at the forward end of said shank portion of larger diameter than said shank portion, whereby a shoulder is formed at the forward end of said shank portion, and the side of said flat, circular head portion being beveled so as to form on the head portion an acute sharp rear edge, and a sharp-pointed piercing element projecting perpendicularly from the forward face of said flat, circular

head portion an amount not greater than three-quarters of the diameter of said head portion.

3. A hunting arrow head for small game animals comprising a hollow shank portion open at its rear end for receiving the end of an arrow shaft, a flat circular head portion at the forward end of said shank portion and of larger diameter than said shank portion for retarding penetration of an arrow at close range, the side of said flat, circular head portion being beveled so as to form an acute, sharp, rear edge, and a flat cutting blade arranged on the diameter of said flat forward surface and extending perpendicularly forward therefrom for providing a slit for the entry of said enlarged head portion.

4. A hunting arrow head for small game animals comprising a hollow shank portion open at its rear end for receiving the end of an arrow shaft, a flat circular head portion at the forward end of said shank portion and of larger diameter than said shank portion, the side of said head portion being beveled so as to form an acute, sharp, rear edge thereon, and said head portion having a diametral slot milled in the forward surface thereof, and a flat, triangular cutting blade having one side thereof inserted into said slot and fixed therein and projecting perpendicularly from said forward surface to an apex.

5. A hunting arrow head for small game animals comprising a hollow shank portion open at its rear end for receiving the end of an arrow shaft, a flat circular head at the forward end of said shank portion of larger diameter than said shank portion, whereby a shoulder is formed at the forward end of said shank portion, a flat cutting blade of equilateral triangular shape fixed to said head and having one side thereof extending diametrically across the forward face of said head and projecting perpendicularly forward therefrom, and the side of said flat circular head being beveled at a 45° angle thereby to form on the head portion an acute sharp rear edge.

6. A hunting arrow head for small game animals comprising a hollow shank portion open at its rear end to receive the end of an arrow shaft, a flat, circular head portion at the forward end of said shank portion of larger diameter than said shank portion to reduce penetration at high arrow velocities and thereby to form a shoulder at the forward end of said shank portion, and the side of said flat, circular head portion being beveled so as to form on the head portion an acute, sharp, rear edge to deter extraction of the arrow, and a sharp-pointed piercing element projecting perpendicularly from the forward face of said flat, circular head portion for initiating penetration of the arrow head at low arrow velocities.

7. A hunting arrow head for small game animals comprising a round, elongated, hollow shank portion, said shank portion being open at its rear end to receive the end of an arrow shaft and being closed and having a flat, transverse surface at its forward end, a round, tapered piercing element projecting forwardly from said flat, forward shank surface for initiating penetration of the arrow head at low arrow velocities, said tapered piercing element having a base diameter adjacent said flat, forward shank surface and being tapered forwardly therefrom to a point, and a centrally perforated disc element of greater diameter than said shank portion fitted over the base of said piercing element and lying against said flat, forward shank surface for reducing penetration of the arrow head at high arrow velocities and to provide a shoulder at the forward end of said shank portion, and said disc element being rigidly attached to said shank portion and having the side thereof beveled so as to form thereon an acute, sharp rear edge, to deter extraction of the arrow.

8. A hunting arrow head for small game animals formed as a unitary screw machine product and comprising a hollow shank portion open at its rear end to receive the end of an arrow shaft, a flat, circular head portion of greater diameter than said shank portion formed at the forward end of said shank portion to reduce penetration

of the arrow head at high arrow velocities and to provide a shoulder at the forward end of said shank portion, the side of said flat, circular head portion being beveled so as to form an acute, sharp rear edge thereon, to deter extraction of the arrow, and a round, tapered piercing element projecting forwardly from said circular head for initiating penetration at low arrow velocities, said piercing element having a base adjacent the forward surface of said circular head which is smaller in diameter than the diameter of said circular head and being tapered forwardly therefrom to a point.

9. A hunting arrow head for small game animals comprising a hollow shank portion open at its rear end for receiving the end of an arrow shaft, a flat circular head portion at the forward end of said shank portion and of

larger diameter than said shank portion for retarding penetration at close range, the forward edge of said head portion being beveled, and a flat cutting blade extending substantially across said flat circular head portion on the diameter thereof and projecting perpendicularly from the forward face thereof, thereby to provide a slit upon impact to facilitate the entry of said enlarged head portion.

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