United States Patent

[11] 3,614,103

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[22] Filed **Nov. 24, 1969**
[45] Patented **Oct. 19, 1971**

[54] **ARROWHEAD**
10 Claims, 27 Drawing Figs.

[52] **U.S. Cl.** ..... **273/106.5 B**
[51] **Int. Cl.** **F41b 5/02**
[50] **Field of Search** ..... 273/106.5 R, 106.5 B

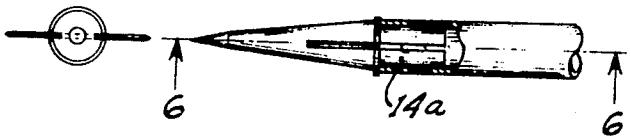
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Primary Examiner—Richard C. Pinkham
Assistant Examiner—Paul E. Shapiro
Attorney—Charles E. Markham

ABSTRACT: A broadhead for an arrow comprising an elongated conical body member having a forward pointed end and a cylindrical rear extension attached to the base of the conical member and adapted to be entered into a tubular arrow shaft or adapter. There is an axial slot extending forward from the rear end of the cylindrical rear extension, and into the elongated conical body through a portion of its length, into which is fitted a flat cutting blade. The forward end of the blade is spaced rearward from the forward end of the body to provide a relatively long leading spike, the blade having a forward edge abutting the forward end of the body slot, a rear shoulder at the point of juncture between the conical body member and the cylindrical rear extension, abutting the end of the hollow arrow shaft and a rearwardly extending tang entering the hollow arrow shaft. The front end of the blade and the front edge of the slot have a cooperating tang and reentry portion to prevent lateral displacement of the blade. In a second embodiment there is a second slot at right angles to the first slot, and of lesser extent, extending the conical member, the cylindrical rear extension and the first blade. A second blade, similar to the first blade is fitted in the second slot.



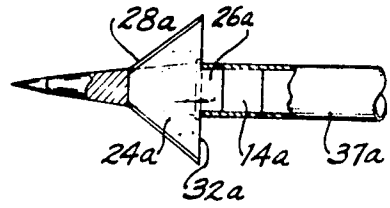


FIG. 1

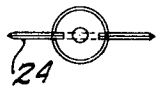


FIG. 2

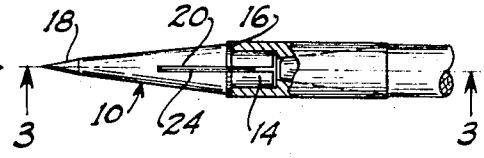


FIG. 3

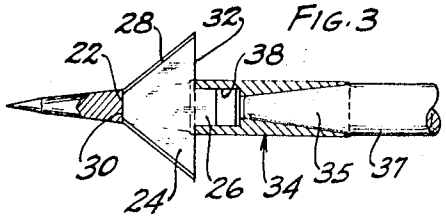


FIG. 4

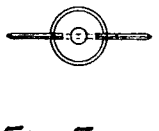


FIG. 5

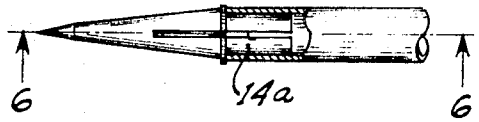


FIG. 6

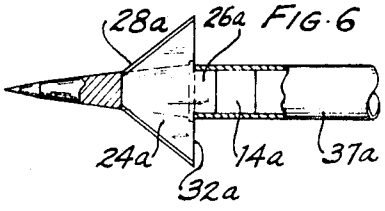


FIG. 7

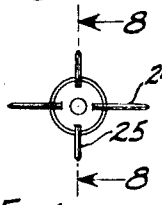


FIG. 8

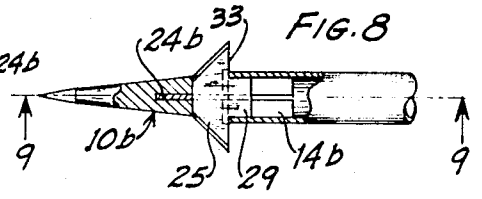


FIG. 9

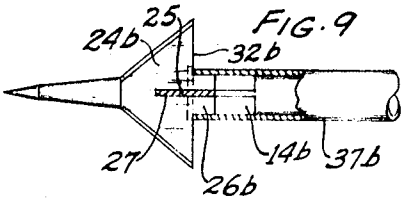


FIG. 10

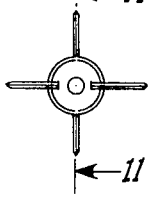


FIG. 11

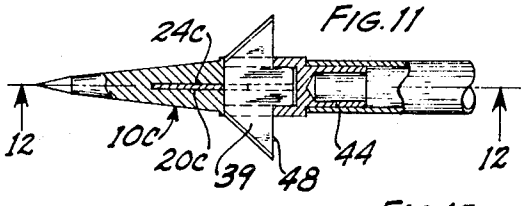


FIG. 12

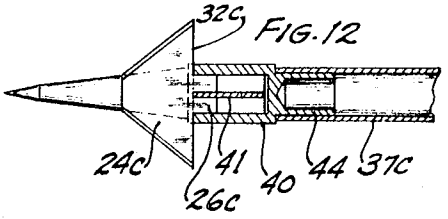


FIG. 13

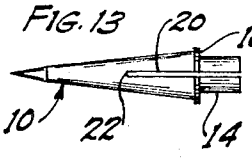


FIG. 14



FIG. 15

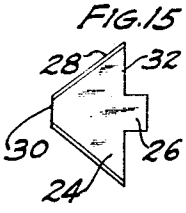


FIG. 16

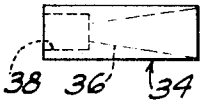


FIG. 17



FIG. 18

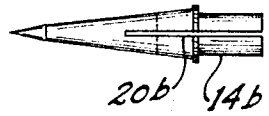


FIG. 19



FIG. 20

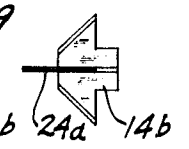


FIG. 21

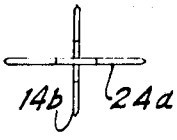


FIG. 26

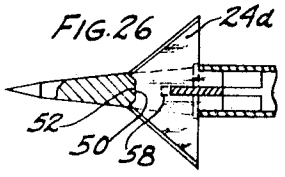


FIG. 27

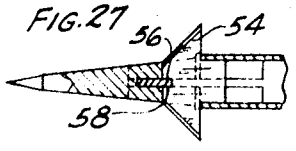


FIG. 22

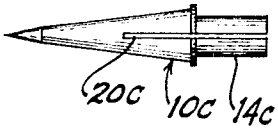


FIG. 23

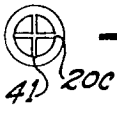


FIG. 24

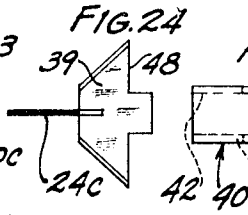
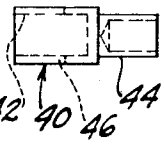


FIG. 25



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ARROWHEAD

This invention relates to archery equipment and particularly to broadheads for hunting arrows.

An object of the invention is to provide a generally new and improved broadhead for a hunting arrow which is particularly economical to manufacture and adaptable to convenient attachment to currently used tubular aluminum or fiber glass arrow shafts without the necessity of employing adapter ferrules.

A further object is to provide a hunting broadhead having an axial spike extending a substantial distance forward of the cutting blade thereby to minimize deflection of the arrow from its line of flight during penetration of an animal and to facilitate removal of the broadhead from a tree or log of the like which it may strike and become imbedded in.

A further object is to provide a hunting broadhead having a body member for attachment to an arrow shaft and one or more separable flat cutting blades which may be conveniently removed from the body member and replaced.

Further objects and advantages will appear when reading the following description in connection with the accompanying drawing.

In the drawing,

FIG. 1 is a front elevational view of one form of broadhead constructed in accordance with the present invention;

FIG. 2 is a partly sectionalized side elevational view of the broadhead in FIG. 1 shown attached to the end of a wood arrow shaft;

FIG. 3 is a longitudinal cross sectional view taken on line 3—3 of FIG. 2;

FIG. 4 is a front elevational view of a second form of broadhead constructed in accordance with the invention;

FIG. 5 is a partially sectionalized side elevational view of the broadhead in FIG. 4 shown attached to the end of a tubular arrow shaft;

FIG. 6 is a longitudinal cross sectional view taken on line 6—6 of FIG. 5;

FIG. 7 is an end elevational view of a third form of broadhead constructed in accordance with the present invention;

FIG. 8 is a longitudinal sectional view taken on line 8—8 of FIG. 7;

FIG. 9 is a longitudinal sectional view taken on line 9—9 of FIG. 8;

FIG. 10 is a front elevational view of a fourth form of broadhead constructed in accordance with the invention;

FIG. 11 is a longitudinal cross-sectional view taken on line 11—11 of FIG. 10;

FIG. 12 is a longitudinal cross-sectional view taken on line 12—12 of FIG. 10;

FIGS. 13 and 14 are side and end elevational views, respectively, of the body member of the broadhead shown in FIGS. 1 to 3;

FIG. 15 is side elevational view of the cutting blade of the broadhead shown in FIGS. 1 to 3;

FIGS. 16 and 17 are side and end elevational views, respectively, of the ferrule employed in mounting the broadhead shown in FIGS. 1 to 3 on the arrow shaft;

FIGS. 18 and 19 are side and end elevational views, respectively, of the body member of the broadhead shown in FIGS. 7 to 9;

FIGS. 20 and 21 are side and end elevational views, respectively, of the cutting blades of the broadhead shown in FIGS. 7 to 9;

FIGS. 22 and 23 are side and end elevational views, respectively, of the body member of the broadhead shown in FIGS. 10 to 12;

FIG. 24 is a side elevational view of the cutting blade of the broadhead shown in FIGS. 10 to 12;

FIG. 25 is a side and end elevational view of the ferrule employed in the broadhead shown in FIGS. 10 to 12; and

FIGS. 26 and 27 are longitudinal cross-sectional views showing methods of locking the fore ends of primary and secondary blades.

FORM SHOWN IN FIGS. 1 TO 3

Referring to the drawing in more detail, the form of the invention shown in FIGS. 1 to 3 comprises a round, elongated body member 10 having a forwardly converging tapered portion 12, a rear cylindrical portion 14 of reduced diameter forming a shoulder at 16. The forward tapered portion of the body is preferably provided with a short portion 18 at the forward end thereof having a somewhat faster taper thereby to provide a stronger pointed end. The body 10 has an axial slot 20 extending forward from the rear end thereof to a point approximately midway of the length thereof. The surface 22 defining the inner end of slot 20 is preferably perpendicular to the axis of the body member. Entered in the slot 20 is a flat cutting blade 24 having the general form of a truncated isosceles triangle with an integral tang 26 extending axially from its base, see FIG. 15.

The cutting blade 24 is entered into slot 20 with its sides 28 converging forward. The sides 28 are ground to provide cutting edges. The forward edge 30 of the blade is parallel with its base 32 and abuts the surface 22 defining the forward end of slot 20. The tang 26 of the blade has a width substantially equal to the diameter of the reduced diameter rear portion 26 of the body member 10.

The broadhead of FIGS. 1 to 3 further includes a cylindrical ferrule 34 adapted to receive the tapered end of a solid arrow shaft of wood or other material. The ferrule 34 has a tapered bore 36 extending inward from one end thereof adapted to receive the tapered end 35 of an arrow shaft 37 and a straight bore 38 extending inward from the other end thereof receiving the reduced diameter rear end portion 14 of the body member 10 in close-fit relationship. The tang 26 of the blade 24 coextends with the body portion 14 into the bore 38 of the ferrule. The relationship of the thickness of the blade 24 to width of slot 20 is such that the blade is firmly gripped in the body member 10 when the portion 14 thereof is entered into the ferrule bore 38 in close-fit relationship.

Also, when the body member 10 is pressed inward into ferrule bore 38 as far as it will go to the base 32 of blade 24 abuts the end of ferrule 34 and the forward edge 30 of the blade abuts the surface 22 at the end of slot 20 so that the blade is held firmly against any axial movement. The abutment of the base 32 of the blade against diametrically opposite portions of the end of ferrule 34 and the entrance of tang 26 into the ferrule bore 38 holds the blade firmly against rotation. The body portion 14 has a close fit in the ferrule bore 38 and may either be detachably fixed therein by a low-temperature melting point ferrule cement or, if desired, more or less permanently fixed therein by a higher temperature melting point solder. It will be understood that the ferrule bore 38 and the reduced diameter rear end portion 14 of the body may be screw threaded, if desired, to provide a detachable connection. Also, the tapered bore 36 in the ferrule may be a straight bore adapted to receive the straight end portion of an arrow shaft. The length of blade 24 between its forward edge 30 and its base 32 is preferably just slightly greater than the distance from the shoulder 16 on the body member to the end of slot 20 thereby to insure that the blade is held firmly between the end of slot 20 and the end of ferrule 34 against any axial movement or looseness.

FORM SHOWN IN FIGS. 4 to 6

The broadhead shown in FIGS. 4 to 6 is similar in construction to the one shown in FIGS. 1 to 3, except that the ferrule 34 is dispensed with and the reduced-diameter portion 14*a* is adapted to be entered directly into the end of a tubular arrow shaft 37*a* instead of into a ferrule. In this simplest and most economical form of the invention the diameter of body member portion 14*a* is made such as to have a close fit in the follow arrow shaft and is preferably made slightly longer than the equivalent portion 14 of FIGS. 1 to 3. The range of internal diameters of commercially available high-grade aluminum arrow shafts is standardized and closely maintained so that it is

practical to produce and distribute arrowheads with portions 14*a* having a similar range of diameters.

In this arrangement the base 31*a* of blade 24*a* bears against the end of the hollow arrow shaft 37*a* and the tang portion 26*a* of the blade enters the hollow shaft with the portion 14*a*. Also, in this arrangement with body portion 14*a* is preferably detachably fixed in the hollow arrow shaft with a conventional, low-temperature melting point ferrule cement.

FORM SHOWN IN FIGS. 7 to 9

In the form of the invention shown in FIGS. 7 to 9, the broadhead is also adapted to be directly entered into a hollow arrow shaft and comprises two flat cutting blades, a primary blade 24*b* and a secondary blade 25 arranged perpendicular to each other in the body member 10*b*. The blade 25 is somewhat smaller both in width and length than blade 24*b* and coextends axially with the rear portion of blade 24*b*. In this form of the invention the reduced-diameter rear portion 14*b* of the body member is provided with axial slots 20*b* and 21 lying in perpendicular planes. The slot 21 receiving the smaller, shorter blade 25 is shorter than the slot 20*b*. Also in this arrangement the blade 20*b* has a slot 27 extending forward from the rear end thereof which receives the smaller blade 25. Both blades 20*b* and 25 have rearwardly extending tangs 26*b* and 29 having a width equal to the diameter of body portion 14*b* and enter the tubular arrow shaft. Also the bases 31*b* and 33, respectively, of blades 20*b* and 25 abut the end of the hollow arrow shaft and their forward parallel edges abut the forward ends of body member slots 20*b* and 21. The reduced-diameter portion 14*b* in this arrangement is also preferably detachably fixed in the tubular arrow shaft by a low-temperature melting point ferrule cement.

FORM SHOWN IN FIGS 10 to 12

In the form of the invention shown in FIGS. 10 to 12 the broadhead comprises two flat cutting blades, a primary blade 24*c* and a secondary blade 39 arranged perpendicular to each other, the blade 24*c* being entered into a relatively long axial slot 20*c* in body member 10*c* and the blade 39 being entered into a shorter axial slot 41 perpendicular to slot 20*c* and extending the length of the reduced-diameter rear body portion 14*c*. Further, in this arrangement, a cylindrical ferrule member 40 is provided having a bore 42 entering at one end which receives the body portion 14*c* in tight-fitting relationship. The other end of ferrule member 40 is reduced in diameter at 44 and is adapted to be entered into a hollow arrow shaft 37*c*. The ferrule 40 also has axial slot 46 entering from the front end thereof which receives the main portion of the blade 39 and the tang 26*c* of blade 24*c*also has an axial slot which receives the forward portion of blade 39. The cutting edges of the blades 24*c* and 39 are in tandem in this arrangement.

The base 31*c* of cutting blade 24*c* abuts the forward end of ferrule 40 and its forward edge abuts the forward end of body slot 24*c*. The base 48 of blade 39 abuts the end of slot 46 in the ferrule 40 and the forward edge of blade 39 abuts the forward end of slot 41 in the body portion 14*c*. It will be understood that the length and width of the blades 24*c* and 39 may be made equal or unequal, as desired, in this arrangement and that the rear end portion of the ferrule 40 may, if desired, be provided with a straight or tapered bore adapted to receive a solid arrow shaft similar to ferrule 34 shown in FIGS. 2 and 3.

It will be apparent from the foregoing that I have provided a broadhead arrow having separable blades which is particularly simple and economical to construct and assemble, in which the inherent tendency of a flat blade to deflect an arrow from its line of flight during penetration is minimized and in which the considerable difficulty of dislodging a flat blade inadvertently imbedded in a tree or log is precluded by the provision of a long leading spike extending forward of the cutting blade.

In its simplest form, disclosed in FIGS. 4 to 6, the broadhead consists of only two parts which may be produced quite economically, a simple automatic screw machine part with an axial saw slot (the body member), and a simple flat stamping with ground edges (the blade). Further advantages of the conveniently separable blade and body members are that this arrangement permits the archer to conveniently replace a dull blade or remove it to more conveniently sharpen it or to substitute a narrower or wider cutting blade suited to the instant purpose.

While it has been found that the means for holding the blades firmly in position during usage, as shown in FIGS. 1 to 12, is adequate when prescribed dimensions are maintained in manufacturing, further means for locking the fore ends of both primary and secondary blades is shown in FIGS. 26 and 27. Such means may be found desirable or essential to permit greater tolerances in manufacturing. In FIG. 26 the fore end of a primary blade 24*d* is formed with a reentry 50 in the forward edge thereof which receives a projecting face 52 formed by chamfering the end of body slot 58, as shown. In FIG. 27 a secondary blade 54 is formed with a reentry 56 in the forward edge thereof which receives a small portion of the primary blade 24*d* at the forward end of the slot 60 therein.

Each of the forms of the invention disclosed comprise an elongated forward pointed body member with one or more separable cutting blades inserted in an axial slot in the body extending forward from the rear end thereof and spaced rearwardly from the pointed forward end of the body. Also in each of the forms disclosed the cutting blade or blades are firmly held in the slots by insertion of the rear end portion of the body into a bore in close-fitting relationship, are retained against axial movement by abutment of their forward edges against the end of the slot and by abutment of their bases against the end of a hollow arrow shaft or adapter ferrule into which the rear body portion is inserted. Further, in each of the forms disclosed, the cutting blades are each formed with a rearwardly extending tang which enters the bore into which the rear end portion of the body is inserted thereby to lock the blade securely against rotation or lateral movement in the slot.

It will be understood that other modifications within the spirit of the invention will occur to others when viewing the foregoing disclosure, for example other configurations of the cutting blades than triangular may be employed. The purpose of the foregoing description is intended to be illustrative and not limiting, the scope of the invention being set forth in the appended claims.

I claim:

1. An arrow broadhead comprising an elongated body member having a tapered portion converging to a pointed forward end and a cylindrical rear end portion adapted to be entered into the bore of an adapter ferrule or tubular arrow shaft into close fitting relationship, a slot extending transversely through said body and axially forward from its rear end, a flat cutting blade fitted into said slot and extending laterally from opposite sides of said body member, said blade having a forward end surface abutting the surface defining the forward end of said slot, a rear end surface perpendicular to the axis of said body adapted to abut the end of the ferrule or tubular arrow shaft, and a central narrow tang portion extending axially rearward from said rear end surface, said tang portion being substantially equal in width to the diameter of said cylindrical rear end portion of said body member and extending axially therein.

2. A broadhead as set forth in claim 1 in which one of said abutting surfaces is provided with a projection and the other with an accommodating reentry thereby to preclude lateral movement of the forward end of said blade.

3. A broadhead as set forth in claim 1 in which the forward end of said body slot and blade are spaced rearward sufficiently from the forward end of said body member to provide a relatively long leading spike.

4. A broadhead as set forth in claim 1 in which said body comprises a relatively short cylindrical rear end portion of reduced diameter terminating in a shoulder at its forward end and a relatively long portion tapered to a forward point, and in which the length of said body slot and that of said blade between its said forward and rear end surfaces are such that said shoulder and said rear end surface of said blade substantially coincide.

5. A broadhead as set forth in claim 1 in which said flat cutting blade has the form of a truncated isosceles triangle with the sides thereof converging forward and forming cutting edges, with the base thereof perpendicular to the axis of said body, with a narrow tang portion extending axially from its base and having its apex truncated on a plane parallel to its base to form a forward surface substantially equal in width to the surface defining the forward end of said slot which it abuts.

6. A broadhead as set forth in claim 1 which further includes an adapter ferrule having a bore extending inward from one thereof receiving said cylindrical rear end portion of said body member in close-fit relationship with said rear end surface of said cutting blade abutting said one end of said ferrule and said ferrule having an opposite end portion formed for interfitting engagement with an arrow shaft.

7. An arrow broadhead as set forth in claim 6 in which said bore in said ferrule and said cylindrical rear end portion of said body are screw threaded and in screw-threaded engagement.

8. An arrow broadhead comprising an elongated body member having a tapered portion converging to a forward pointed end and a cylindrical rear end portion adapted to be entered into the bore of an adapter ferrule or tubular arrow shaft in close-fitting relationship, a first slot extending transversely through said body and axially forward from its rear end a substantial portion of the length thereof, a second shorter slot extending transversely through said body perpendicular to said first slot and extending axially forward from the rear end thereof to a forward end spaced rearward from the forward end of said first slot, a first flat cutting blade fitted into said first slot, a second shorter flat cutting blade fitted into said second perpendicular slot, each of said blades having a forward end surface abutting the surface defining the forward end of its respective slot and each of said blades having a rear end surface perpendicular to the body axis which surfaces are axially coincidental and adapted to abut the end of a ferrule or tubular arrow shaft into which the rear end of said body is inserted, each of said blades further including a narrow tang portion extending axially rearward from the rear end surface thereof which tang portions are substantially equal in width to the diameter of said cylindrical rear end portion of said body member and extend axially therein, and said first blade having an axial slot extending forward sufficiently from the rear end thereof to receive said second shorter blade.

9. A broadhead as set forth in claim 8 in which said axial slot in said first blade is slightly shorter than required to receive said second shorter blade and in which a short slot in the forward end of said second shorter blade receives a short portion of said first blade thereby to provide interlocking portions which preclude relative lateral displacement of the blades.

10. An arrow broadhead comprising an elongated body member having a tapered portion converging to a forward pointed end and a cylindrical rear end portion, a first slot extending transversely through said body and axially forward from its rear end a substantial portion of its length, a second shorter slot extending transversely through said body perpendicular to said first slot and coextending axially with said cylindrical rear end portion, a first flat cutting blade fitted into said first slot, a second flat cutting blade fitted into said perpendicular slot, said cutting blades both having portions thereof extending laterally from said body member, each of said blades having a forward end surface abutting the surface defining the forward end of its respective slot and each of said blades having a rear end surface perpendicular to the body axis, each of said blades further including a narrow tang portion extending axially rearward from said rear end surface thereof which tang portions are substantially equal to the diameter of said cylindrical rear end body portion and extend axially therein, a ferrule having a bore at one end thereof receiving said cylindrical end portion of said body in close fit relationship with said rear end surface of said first cutting blade abutting said one end thereof, an axial slot in said tang portion of said first blade receiving the fore end portion of said second blade, an axially extending slot in the walls of said one end of said ferrule receiving said laterally extending portions of said second blade, and said ferrule having an opposite end portion adapted to interfitting engagement with an arrow shaft.