Jan. 5, 1965 R. L. SHURE 3,164,385

DIRECTIONALLY CONVERTIBLE ARROW TIP

Filed March 12, 1962

Fig 1

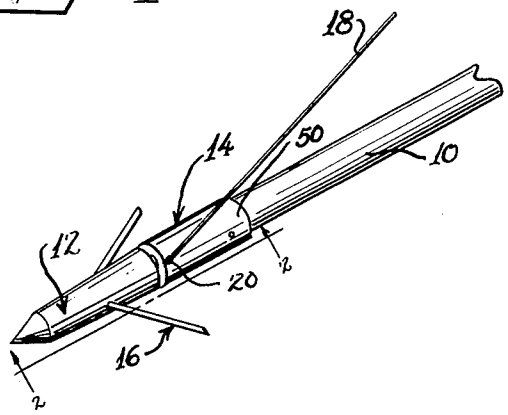


Fig 4

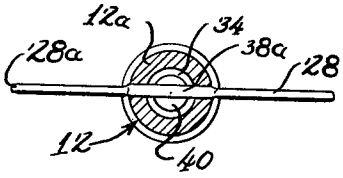
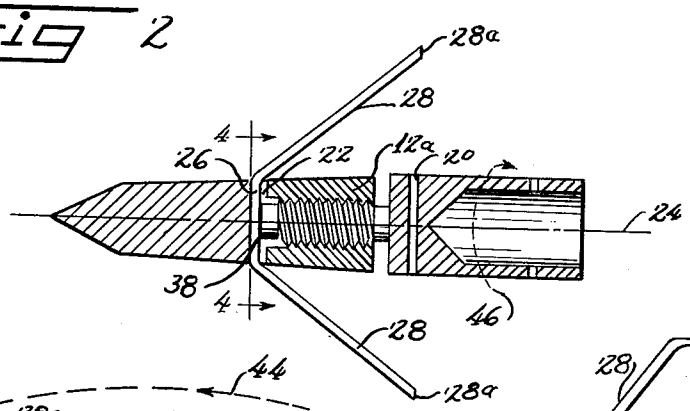


Fig 2



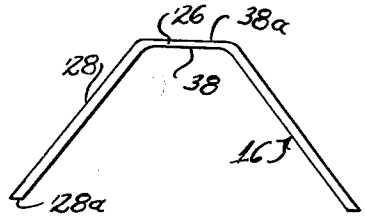


Fig 5

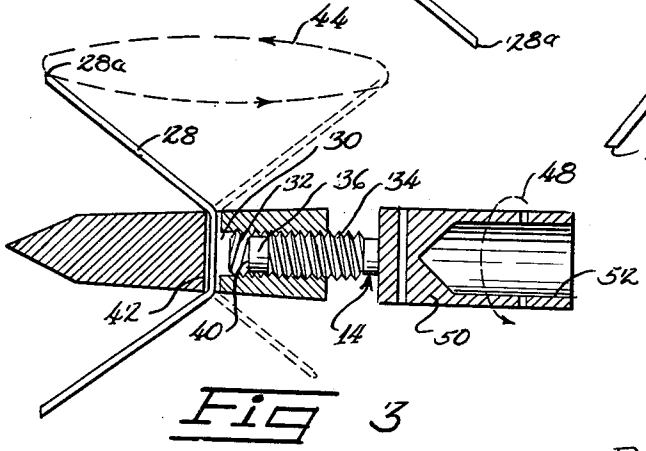


Fig 3

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DIRECTIONALLY CONVERTIBLE ARROW TIP

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This invention relates to spear and arrow missile constructions which include a pivotally mounted barb. More particularly it relates to an improved arrow tip construction wherein the barb is readily fixed in either a forward or backward direction as desired by an archer.

Although this invention may be used in many applications its advantages are particularly evident when used in the sport of bow fishing in which, instead of using a rod and reel, the archer-fisherman shoots his fish with a bow and arrow, testing his skill against the darting movements of a fish, against the difficulties imposed by varying contours of a stream bed or lake bottom and against deceptive refractions of light rays as they pass through the surface of calm or active water. Usually the types of fish sought by such sportsmen are rather small and active varieties, for such fish provide the most difficult targets and the greatest tests of skill. The fish may range in size, however, from a few ounches to about fifty pounds.

In this type of fishing the chances of injuring the arrowheads are great because the stream bed or lake bottom may be rocky, or snags may partially screen the swimming fish. These and similar hazards can cause serious damage to arrow heads which contain several moving parts or comparatively delicate movements. Moreover, when the fisherman fires at his target the barbs in the arrow must be ready to pierce or embed themselves in the flesh of the fish; a movable type of barb must be in proper working order not only when it is first used but also after it has been used several times. It must not be easily broken or susceptible to malfunctioning after use on only a few occasions.

The arrowhead must also be operated easily. Once a fish is hit and lifted from the water, the arrow must be withdrawn, but when the weather is cold, for example, skillful manipulation of an arrowhead is difficult, and the ordinary problems of handling a still active fish covered with water and perhaps other slippery materials are still further enhanced. An archer's enjoyment is considerably diminished when he must cope with clips or collars, or a number of separate parts in the arrowhead to release his arrow from the fish.

Heretofore several different types of arrowheads have been used. In one type a pair of blade-like barbs are fastened loosely together upon a pivotal mounting within an arrow tip so that they will fold backward into a slot in the tip. The tip is slidably disposed over the forward end of an arrow shaft, the rearward portion of the tip forming a sleeve in which the shaft is slidably engaged. Both blades are free to pivot outwardly from their mounting when the forward end of the shaft is forced far into the sleeve between the trailing edges of the blades. The blades fly out when the shaft is forced quickly forward as the arrow is discharged or as it strikes its target. One particular drawback of this type of construction is that the pivotal mounting of the blades is easily damaged by forceful shocks received from the shaft, a drawback which impairs the functioning of the entire arrangement after even use on only a few occasions. Also the blades are easily bent so that they may not be readily pivoted or pressed back into the arrow tip.

In another type of arrowhead the barb member must either be removed from the assembly or compressed within it by using a slidable collar. Such constructions require types of engagements which are difficult to manipulate. In one, the removal of the barb requires a complete disengagement of an outwardly smooth and hard-to-grasp

forward section of the arrow tip. In another, an outwardly smooth, inwardly threaded collar must be forced over outstanding spring-biased vane portions of the barb to hold the vanes close to the rear of the tip member as it is being withdrawn from its target.

A third type of arrowhead construction includes a barb member which is pivotally arranged in an aperture in the forward portion of the tip. Such constructions provide for withdrawing the arrow from the target by allowing a pivotal reversal of the direction of the barb vanes after the arrowhead is thrust clear through the target. The arrow is then withdrawn by reversing the barb, that is, by reversing the direction which the vanes incline with respect to the arrowhead and shaft. One of the problems with this construction, however, is to provide a simple means to hold the barb member in target-engaging position initially and then to permit the barb to be reversed. The arrangements heretofore provided have all been difficult to set and/or difficult to reposition when it is desired to withdraw the tip from its target.

In one such arrangment a retrieving line has been tied to a vane portion of the barb, the other end of the line being held by the archer and the weight of the line being relied upon to hold the barb in a rearwardly directed position relative to the arrow shaft. In a related arrangement the retrieving line is not fastened to the barb but is fastened first to the shaft and then looped or tied around the vane of the barb before the arrow is discharged. A third arrangement includes a slot or groove on the outer surface of the arrow tip, the barb being formed from a resilient material so that the vane portion may be snapped into the slot and freed by springing or prying it out of such slot. Still another arrangement includes a barb having a portion which is wedged into the aperture; and the barb is reversed or eliminated either by forcefully twisting it against the friction provided by the wall of the aperture, or by pulling the barb out of the arrowhead entirely.

It is therefore one object of this invention to provide an improved arrow tip having an adjustable barb which may be readily directed forwardly or rearwardly along the arrow as desired by the archer.

It is another object of this invention to provide an improved arrow tip having a pivotally disposed barb readily maintainable in fixed relationship to the remainder of the arrow tip by a barb locking member.

It is another object of this invention to provide an improved arrow tip having means disposed in an indirect shock receiving position for fixing a locking member against a directionally adjustable barb member.

It is still another object of this invention to provide an improved arrow tip in which all components are easily accessible and readily manipulated under adverse conditions such as cold temperatures and slippery environmental circumstances found in bow fishing.

Other objects and advantages will be seen from an examination of the following detailed description and the accompanying drawings.

In one embodiment of this invention the arrow tip comprises a point member and a barb member. The barb member includes a first portion disposed in a pivotal engagement with the point member and a vane portion movable about said pivotal engagement, the vane portion being always positioned in an outwardly substantially oblique direction relative to the point member. A locking member is movably disposed on the point member. Means are disposed on the point member for fixing and maintaining the locking member upon the barb member first portion to secure the first portion and the vane portion in a fixed position relative to the point member.

For a more complete understanding of this invention

reference should be made to the accompanying drawings in which:

FIGURE 1 is a perspective view of an arrow tip and shaft assembly;

FIG. 2 is a sectional view along line 2—2 of the arrow tip shown in FIG. 1, the parts of the arrow tip being disposed in a first position;

FIG. 3 is a sectional view of the arrow tip shown in FIG. 1, also along line 2—2, but showing the parts in full lines in a second position;

FIG. 4 is a cross-sectional view taken along line 4—4 of FIG. 2; and

FIG. 5 is an elevational view of the barb shown in FIGS. 1, 2, 3 and 4.

Referring now to the drawings, which illustrate one embodiment of this invention, and more particularly to FIG. 1, an arrow shaft 10 is provided with a point member 12 mounted upon a locking member 14 at one end of the shaft. A barb 16 is disposed through the point member in front of the locking member, and to the rear of the barb a cord 18 for retrieving the arrow is attached to the locking member. A slot 20 or any other readily apparent means may be provided if desired for facilitating the attachment of cord 18.

In the point member 12, which is ordinarily formed of a hardened metal to resist injury and maintain a sharp point, a transverse aperture 22 is positioned to intercept a longitudinal axis, illustrated by line 24, drawn through the point member. The barb member extends through aperture 22 so that a first portion 26 of the barb member is positioned generally within the aperture and vane portions 28 are positioned generally outside of the aperture, the vane portions also extending obliquely from the point member and its longitudinal axis. The transverse aperture has a large enough diameter so that the first portion of the barb member may be rotated freely. However, the oblique position of the vanes precludes any substantial transverse movement of the first portion 26 of the barb member with respect to the longitudinal axis, thus preventing accidental separation of the barb member 16 from the point member 12.

In the embodiment of this invention which is illustrated in the drawings a second aperture 30 is formed in the trailing section 12*a* of the point member which extends rearwardly from transverse aperture 22. The section is drilled and tapped along the longitudinal axis 24 from the rear of the point member clear through to transverse aperture 22 in order to locate the second aperture in a direction intercepting the transverse aperture. This second aperture 30, easily seen in FIG. 3, is provided with internally disposed threads 32 adapted to engage and to direct the course of an externally threaded portion 34 of the locking member positioned in the second aperture. Communication of the second aperture with the first aperture 22 is unobstructed in order that the locking member portion 34 may be inserted from the rear of the point member through the second aperture and directed into the first aperture.

The front end of the locking member includes an anvil 36 for engaging a cooperatively arranged first engagement surface 38 on the first portion of the barb member, the anvil being provided with a second engagement surface 40 generally conformed to the contour of the first engagement surface of the barb member. In the illustrated embodiment both of these surfaces are substantially flat so that, when fitted against each other, even a high degree of rotational force applied to the vane portions of the barb will not effect a separation of the surfaces. However, these surfaces are not limited in shape to the flat faces illustrated; in fact, they may be concave or convex, or even include complementary types of keyed or frictional arrangements, so long as the engagement between them is resistant to rotational force which may be applied to the barb member.

Also, in the illustrated embodiment, the first portion of the barb is formed with an engagement surface 38*a* on that side of the first portion which is opposite to surface 38, since it is advantageous to form surface 38 simply by stamping or rolling the first portion into a flat shape. The advantage of surface 38*a* will be apparent hereinafter.

Substantially the entire length of the first portion of the barb member may be positioned adjacent the forward side 42 of the wall of aperture 22. When so disposed, a surface is provided by the wall directly opposite anvil 36 against which the barb may be held by the locking member, especially when first and second engagement surfaces 38 and 40 are flat and the barb first portion is formed of a material, such as hardened and tempered wire, flexible enough to be pressed against the forward wall. However, the first portion 26 of the barb member may be spaced apart from most of the forward side 42 at all times, even when the first and second engagement surfaces are disposed against each other in firm locking engagement, if a locking arrangement requiring more space than complementary flat surfaces is desired.

The first portion 26 of the barb member being loosely arranged in aperture 22 and the vane portions being disposed in outwardly oblique directions, the outer ends 28*a* of the vane portions lie in circular paths such as 44 which are spaced apart from the transverse aperture. Outer ends 28*a* may be moved along such paths to any point in those paths by applying a rotational force or cranking motion to the barb. When the desired point in paths 44 is reached the vane end portions may be halted and secured by affixing the second engagement surface of the locking member upon the first portion of the barb member. Usually, of course, when the barb member is secured in a fixed position relative to the point member, the vane portions extend obliquely in either the forwardmost or rearwardmost directions along the arrow tip.

When it is desired to secure the barb vanes in a direction toward the rear the barb is first turned to its desired position, the first engagement surface 38 thereby being positioned to face the second engagement surface 40 of the locking member. The locking member is then rotated in the direction indicated by arrow 46 in FIG. 2, the effect of such rotation being to move anvil 36 through the second aperture 30 and tighten the second engagement surface of the locking member against the first engagement surface of the barb member. As illustrated, the tightening of the locking member not only results in a firm engagement of the first and second engagement surfaces but also drives the anvil against the first portion of the barb member to press the first portion against the forward side 42 of transverse aperture 22, thus disposing the first portion of the barb between two frictional engagements. In such disposition of the locking member, point member and barb member, the position of the barb is fixed with respect to both of the other members.

Correspondingly, when it is desired to change the direction in which the barb member is disposed, for example, from a rearward direction to a forward direction as illustrated in FIGS. 2 and 3, the locking member is rotated in the direction of arrow 48. The interaction of the external threads 34 on the locking member and the internal threads 32 of the point member directs the locking member away from the barb member first portion, thus disengaging second engagement surface 40 from the first engagement surface 38 on the first portion of the barb. Without the frictional engagement provided by the locking member and the opposition of the wall side 42 of the transverse aperture, the looseness of the barb in the transverse aperture permits the barb to be rotated to any desirable position.

At this point, if it should be desired to fix the barb in a newly chosen position, the locking member may be rotated in the direction of arrow 46 to reposition the second engagement surface against the barb member first portion.

The barb member first portion is formed, in its preferred embodiment, to present at least one exceptional engage-

ment surface 38 to the second engagement surface 40 of the locking member. Thus, the first engagement surface 38 is a flat face which is complementary to the flat face of the second engagement surface 40. However, when the barb is rotated to the point where surface 38 faces the front side 42 of the transverse aperture, it may be desirable to have the area of the barb first portion which is opposite surface 38 formed, as is surface 38*a*, to cooperate with the second engagement surface 40 on the locking member. Instead of grinding surface 38 flat, then, it has been found advantageous to press the barb first portion and to obtain two exceptional engagement surfaces, 38 and 38*a*.

Threads 32 are the means illustrated by the preferred embodiment of this invention for fixing the second engagement surface of the locking member upon the barb member first portion 26. Other possible forms of such means are cooperating lugs or slidable frictional engagements which fix the locking member in position, and it is intended that the invention not be limited to the particular form of means shown in the preferred embodiment.

Threads 34 which cooperate with threads 32 may be formed on any suitable member receivable by the point member 12. An adapter 50 may be provided and an arrangement therein for affixing it to shaft 10 of the arrow, such an arrangement being provided in the preferred embodiment by a drilled sleeve portion 52 of the adapter. Such an adapter is not necessary, however, as long as the forward end of shaft 10 is provided with a locking member arranged to cooperate with threads 32.

A particular advantage of such an arrangement is that, in order to loosen or tighten the locking member readily, all that the operator need do is hold the point member and barb member between the thumb and first finger of his left hand and twist the shaft of the arrow with his right hand. Thus, the second engagement surface 40 may be engaged upon or disengaged from the barb member first portion with a minimum of effort, even under the most adverse weather and environmental conditions.

Another advantage of this invention is the disposition of the threads 32 in a protected location with respect to the reception of shock by the rest of the parts. When the barb member is positioned in the rearwardmost position, as shown in FIG. 2, the anvil 40 is directly in contact with the barb member first portion, which, in turn, is directly in contact with the front side of wall 42 in the transverse aperture 22. If the arrow happens to strike a rock or a snag, the shock travels along the point member into the locking member, which is disposed principally against the first engagement surface 38, and rearwardly therefrom back to the arrow shaft 10. Any shock traveling from the point member in the direction of threads 32 is therefore first taken up by the locking member, and the threads 32 are not subjected to sudden or direct stresses.

It will be immediately apparent that various modifications may be made without departing from the principles indicated herein, but such modifications as fall within the true spirit and scope of the invention are to be understood as being included in the appended claims.

I claim:

1. An arrow tip comprising a point member provided with an aperture having a longitudinal axis angularly disposed to a longitudinal axis in said point member, a barb member having a first portion disposed through said point member in said aperture and vane portions on opposite sides of said point member longitudinal axis extending from and angularly disposed to said first portion, each of said vane portions being always positioned in an outwardly oblique direction relative to said point member longitudinal axis and rotatable in substantially conical paths about linear extensions of said aperture longitudinal axis, said first portion being provided with a first engagement surface disposed within said aperture intermediate said vane portions, a locking member movably disposed in said point member, said locking member being provided with a second engagement surface cooperatively arranged to engage said first engagement surface, the first portion of the barb member being disposed in substantially simultaneous engagement relationship within said aperture between said locking member and a wall of said aperture opposite said locking member, and means disposed within said point member for fixing and maintaining said second engagement surface upon said first engagement surface in said aperture and securing said barb member first portion and vane portions in a fixed position relative to said point member.

2. An arrow tip comprising a point member having a sharp point at its forward end, said point member being provided with a first aperture disposed intermediate said forward end and a trailing end thereof and having a longitudinal axis normal to a longitudinal axis in said point member, said point member also being provided with a second aperture in communication with said first aperture and said trailing end, a barb member having a first portion disposed in a pivotal engagement in said first aperture and a vane portion movable about said pivotal engagement, said first portion being provided with a first engagement surface, said vane portion being always positioned in an outwardly substantially oblique direction relative to said point member longitudinal axis and rotatably disposed in a substantially conical path about a linear extension of said aperture longitudinal axis, a locking member extending into said trailing end and movably disposed in said second aperture, said locking member being provided with a second engagement surface disposed forwardly in said second aperture and cooperatively arranged to engage said first engagement surface in said first aperture, the first portion of the barb member being disposed in substantially simultaneous engagement relationship within said first aperture between said locking member second engagement surface and a wall of said first aperture opposite said locking member second engagement surface, and means disposed on said point member within said second aperture to engage said locking member rearwardly from said second engagement surface for fixing and maintaining said second engagement surface upon said first engagement surface within said first aperture and securing said barb member first portion and said vane portion in a fixed position relative to said point member.

3. The device of claim 2 in which said locking member is provided with thread means disposed in said second aperture and said point member trailing end is provided with complementary thread engaging means rearwardly from said first aperture.

4. An arrow tip comprising a point member having a sharp point at its forward end, said point member being provided with a substantially cylindrically shaped aperture intermediate said forward end and a trailing end portion and angularly disposed to a longitudinal axis in said point member, a barb member having a pivotal portion freely disposed in and slidably engaging the walls of said cylindrical aperture, said barb member also having a vane portion integrally connected to said pivotal portion and extending outwardly from said cylindrical aperture, said vane portion being always disposed in spaced relationship from said longitudinal axis, a locking member disposed upon said trailing end portion of said point member, the pivotal portion of the barb member being disposed in substantially simultaneous engagement relationship between said locking member and a wall of said cylindrical aperture opposite said locking member, and means disposed intermediate said locking member and said trailing end portion for fixing and maintaining said locking member against said barb member pivotal portion to secure said barb member in a fixed position relative to said point member as said vane portion extends outwardly from said point member in any oblique direction.

5. An arrow tip comprising a point member having a sharp point at its forward end, said point member being provided with a substantially cylindrically shaped aperture intermediate said forward end and a trailing end portion and having a longitudinal axis substantially normal to a longitudinal axis in said point member, a barb member having a pivotal portion freely disposed in and slidably engaging the walls of said cylindrical aperture, said barb member also having a vane portion integrally connected to said pivotal portion and extending outwardly from said cylindrical aperture, said vane portion always being disposed in spaced relationship from said point member longitudinal axis and always rotatably mounted in a conical path about a linear extension of the said cylindrical aperture longitudinal axis, a locking member disposed upon said trailing end portion of said point member, the pivotal portion of the barb member being disposed in substantially simultaneous engagement relationship between said locking member and a wall of said cylindrical aperture opposite said locking member, and means disposed intermediate said locking member and said trailing end portion for fixing and maintaining said locking member against said barb member pivotal portion to secure said barb member in a fixed position relative to said point member as said vane portion extends outwardly from said point member in any oblique direction.

6. An arrow tip comprising a point member having a sharp point at its forward end, said point member being provided with a substantially cylindrically shaped aperture intermediate said forward end and a trailing end portion and having a longitudinal axis substantially normal to a longitudinal axis in said point member, a barb member having an elongate pivotal portion extending through and freely disposed in said cylindrical aperture, said elongate pivotal portion slidably engaging the walls of said cylindrical aperture, said barb member also having a vane portion integrally connected to said pivotal portion and extending outwardly from said cylindrical aperture, said vane portion always being disposed in spaced relationship from said point member longitudinal axis and always rotatably mounted in a conical path about a linear extension of the said cylindrical aperture longitudinal axis, a locking member disposed upon said trailing end portion of said point member, said pivotal portion of said barb member having a flat face extending substantially over the length of at least one side thereof and said locking member having a flat face juxtaposed to at least part of said barb member pivotal portion flat face, the pivotal portion of the barb member being disposed in substantially simultaneous engagement relationship between said locking member flat face and a wall of said cylindrical aperture opposite said locking member flat face, and means disposed intermediate said locking member and said trailing end portion for fixing and maintaining said locking member flat face securely against said barb member pivotal portion flat face to secure said barb member in a fixed position relative to said point member, as said vane portion extends outwardly from said point member.

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