Sept. 8, 1970 M. L. TURNER 3,527,463

ARROW HAVING A FREELY SHIFTABLE ARROWHEAD

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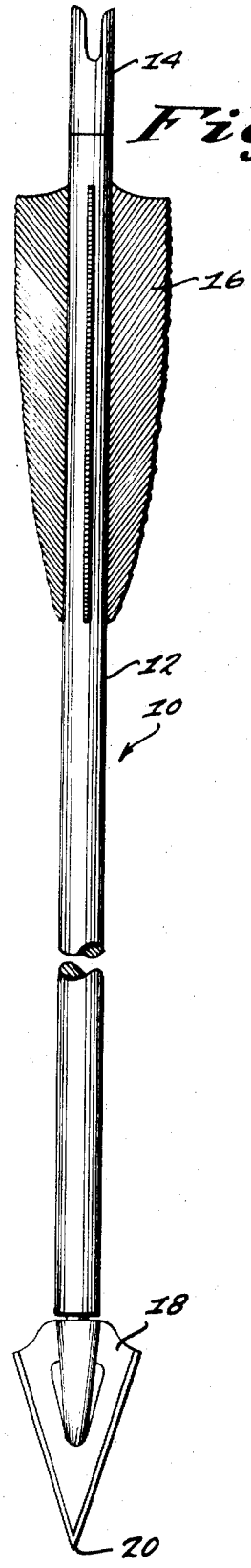


Fig. 1

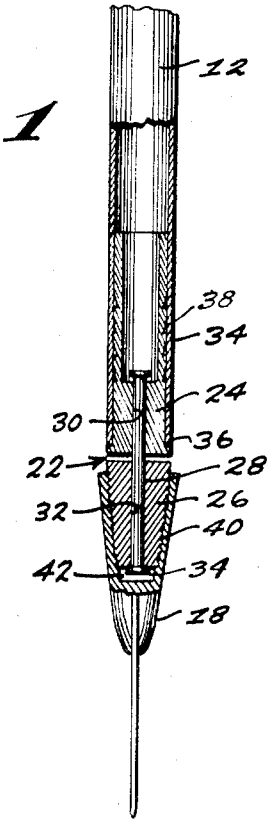


Fig. 2

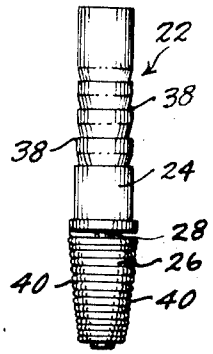


Fig. 3

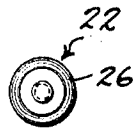


Fig. 4

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ARROW HAVING A FREELY SHIFTABLE ARROWHEAD

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ABSTRACT OF THE DISCLOSURE

An arrow used primarily for game hunting comprising an elongated shaft member having a generally flat arrowhead mounted at one end thereof by an attachment fixture which allows the arrowhead to shift freely with respect to the shaft member about the longitudinal axis of the arrow when the arrow is in flight. Preferably, the fletching secured to the arrow extends parallel to the longitudinal axis thereof.

BACKGROUND OF THE INVENTION

Arrows used in hunting game animals are fitted with special arrowheads designed to inflict the greatest possible damage to the animal when it is hit, and while these arrowheads may vary to some extent in size and shape depending on the particular game being hunted and the individual taste of the hunter, they are almost always formed with a generally flat, wedge-shaped configuration designed to sever a maximum number of the animal's blood vessels and thereby promote heavy bleeding which ultimately results in the death of the animal.

Because of their flat construction, arrowheads of this type act somewhat in the nature of an airfoil when the arrow is in flight, and the reactive forces induced by this airfoil phenomenon are applied against the arrowhead and transmitted to the arrow shaft member integrally fixed thereto with a tendency to cause the arrow to depart from its intended trajectory unless something is done to counteract this effect.

So far as I am aware, the only method heretofore employed to counteract this effect has been the standard practice of arranging the arrow fletching so that it has a slightly spiralled extent along the shaft member of the arrow whereby the air passing over the fletching imposes a turning moment on the arrow causing it to rotate about its longitudinal axis so as to neutralize the aforementioned reactive force action at the arrowhead and thereby follow a substantially true path of flight.

However, the necessity of imparting rotational movement to the arrow also results in several disadvantages, including increased wind resistance caused by the relatively large flat surfaces of the arrowhead and fletching being turned in the surrounding air, and additional noise which may forewarn the intended prey of the arrow's approach. Also, since the arrowhead is rotating when it strikes the animal, undesirable tearing of the animal's flesh results and the penetration of the arrow is reduced.

All of these disadvantages are effectively eliminated by the present invention which provides a unique arrow that follows an extremely accurate flight path without the need of having any rotational movement imposed on the arrow.

SUMMARY OF THE INVENTION

According to the present invention, the elongated shaft member of an arrow is provided at one of its ends with an attachment fixture by which the arrowhead is mounted

on the shaft member so as to be freely shiftable with respect thereto about the longitudinal axis of the arrow. By virtue of this free mounting of the arrowhead on the shaft member, the aforementioned reactive forces acting on the arrowhead simply cause it to shift about its own axis in much the same manner as a weather vane. As a result, the necessity of imposing a rotational movement on the arrow to neutralize these forces is eliminated and, since the shifting movement of the arrowhead is caused by the passing air, such movement does not generate any substantial wind resistance which would adversely affect the speed of the arrow or its path of flight. Additionally, this mounting of the arrowhead permits replacement of the spirally extending arrow fletching with straight, longitudinally extending fletching of the type heretofore associated primarily with target arrows which have small conical heads that do not present the ballistic problems caused by the flat hunting-type arrowheads.

Thus, the arrow of the present invention follows a true path of flight while traveling at greater speeds and with less noise than hunting arrows heretofore known. Moreover, the absence of a rapidly rotating arrowhead permits a deeper penetration of the arrow when it strikes the target animal and also results in a neater wound.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an elevation view illustrating an arrow having a hunting-type arrowhead mounted thereon in accordance with the present invention;

FIG. 2 is an enlarged fragmentary view of the arrow shown in FIG. 1, partly broken away to illustrate the mounting arrangement for the arrowhead;

FIG. 3 is an elevation view of the attachment fixture for mounting the arrowhead on the shaft member of the arrow; and

FIG. 4 is an end view of the attachment fixture illustrated in FIG. 3.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now in detail to the drawings, FIG. 1 illustrates an arrow **10** composed of a conventional elongated shaft member **12** made of a suitable material such as fiber glass or aluminum and fitted at one of its ends with a nock **14** and fletching **16**, the other end of shaft member **12** being fitted with a typical arrowhead **18** used for hunting game animals. The arrowhead **18** is generally flat (see FIG. 2), and has a wedge-shaped or flared configuration extending from a sharp point **20** to a maximum width that substantially exceeds the thickness of the shaft member **12**, the side edges of the arrowhead **18** being sharpened so as to sever a large number of blood vessels when the arrow **10** strikes its target.

In contrast to the conventional prior art practice of uniting the shaft member and arrowhead together as an integral unit, the arrowhead **18** of the present invention is mounted at one end of the shaft member **12** by an attachment fixture **22** which permits the arrowhead **18** to shift freely with respect to the shaft member **12** about the longitudinal axis of the arrow **10**. As best seen in FIGS. 2 and 3, the attachment fixture **22** comprises a first component **24** secured to the shaft member **12** at one end thereof, a second component **26** secured to the arrowhead **18**, and a pin element **28** extending through centrally located bores **30** and **32** formed, respectively, in first component **24** and second component **26**. The bores **30** and **32** extend along the longitudinal axis of the arrow **10** and have a diameter which is slightly greater than the diameter of pin element **28** so as to permit free relative shifting of the components **24** and **26** with respect to each other about the pin element **28** and the longitudinal

axis of the arrow, and the pin element **28** is provided with enlarged end parts **34** having a diameter larger than the diameter of bores **30** and **32** to maintain components **24** and **26** in longitudinal adjacency. It will be noted that pin element **28** has sufficient length to allow a slight spacing between first component **24** and second component **26** to allow relative shifting of the latter free of any frictional contact with first component **24**.

The first component **24** of attachment fixture **22** is cylindrically shaped so that it can be inserted in the hollow end of shaft member **12** until the end face of the shaft member **12** abuts the shoulder **36** of the first component **24** as seen in FIG. 2. Normally, the first component **24** is permanently secured in place with a suitable adhesive, and it is provided with circumferentially extending edges **38** to facilitate holding the first component **24** securely in place. The second component **26**, which is left free to shift about the extending portion of pin element **28** when first component **24** is secured in place, is formed as a frustum with circumferentially extending ribs **40** that engage the hollow portion **42** of arrowhead **18** with a press-fit to hold it in place. While arrowhead **18** may be permanently secured to second component **26** with an adhesive, the press-fit mounting is generally preferable because it allows the arrowhead **18** to be removed and replaced with comparatively little trouble.

With the arrowhead **18** mounted on shaft member **12** in this manner, it is apparent that any reactive forces acting at the flat surface areas of arrowhead **18** when the arrow **10** is in flight will simply cause the arrowhead **18** and second component **26** to shift about the pin element **28** and, therefore, these forces will not adversely affect the trajectory of the arrow. Similarly, small twigs or the like which lie in the path of the arrow's flight will, in many cases, result only in the arrowhead **18** being shifted about pin element **28** rather than causing the arrow to alter its course.

Finally, since the present invention eliminates the necessity of imposing rotation on the arrow **10**, the fletching **16**, which has heretofore been arranged for spiral extent along the shaft member **12** in arrows having hunting-type arrowheads, may now extend longitudinally along the shaft member **12** as seen in FIG. 1 thereby increasing the speed of the arrow because the wind resistance formerly generated by the rotation of the shaft member and the fletching is no longer present. It will be noted, however, that the arrowhead mounting of the present invention may also be used with spiral fletching, if desired, and the aforementioned advantages derived from a freely shiftable arrowhead will still be realized.

The present invention has been described in detail above for purposes of illustration only and is not intended to be limited by this description or otherwise except as defined in the appended claims. For example, in cases where the shaft member **12** is made without a hollow end portion, the first component **24** of the attachment fixture **22** could be formed to fit around the end of shaft member **12** rather than for insertion therein. Likewise, the pin element **28** could be fixed to either the first component **24** or second component **26** without departing from the scope of the present invention.

What is claimed is:

1. In an arrow including an elongated shaft member having a generally flat arrowhead located at one end thereof, the improvement comprising means mounting said arrowhead at said one end of the shaft member to permit free shifting of the arrowhead with respect to said shaft member about the longitudinal axis of said arrow upon movement of said arrow in flight.

2. In an arrow of the character described, the improvement defined in claim **1** and further characterized in that said mounting means comprises an attachment fixture including a first component secured to said shaft member at said one end thereof, a second component secured to said arrowhead, and means interconnecting said first and second components to permit free relative shifting thereof about the longitudinal axis of said arrow.

3. In an arrow of the character described, the improvement defined in claim **2** and further characterized in that said shaft member is hollow at said one end thereof and said attachment fixture first component is received and permanently secured therein, and in that said arrowhead includes a hollow portion receiving said attachment fixture second component with a press-fit.

4. In an arrow of the character described, the improvement defined in claim **2** and further characterized in that said first and second attachment fixture components each include a centrally located bore extending along said longitudinal axis of said arrow, and in that said attachment fixture interconnecting means comprises a pin element extending freely through said bores in said first and second components and having enlarged end parts to maintain said first and second components in longitudinal adjacency.

5. In an arrow of the character described, the improvement defined in claim **1** and further characterized in that the other end of said shaft member includes fletching extending therealong in a direction parallel to said longitudinal axis of the arrow, and in that said arrowhead has a flared configuration with a maximum width that substantially exceeds the thickness of said shaft member.

6. An attachment fixture for rotatably mounting a generally flat arrowhead on the shaft member of an arrow, said attachment fixture comprising a first component adapted to be secured to said shaft member at said one end thereof, a second component adapted to be secured to said arrowhead, and means interconnecting said first and second components to permit free relative shifting thereof about the longitudinal axis of said arrow when said attachment fixture is secured in place and the arrow is moving in flight.

7. An attachment fixture as defined in claim **6** and further characterized in that said first component has a cylindrical shape and is formed with circumferentially extending edges to facilitate permanently securing said first component within a hollow end of said shaft member, and in that said second component is formed as a frustum with circumferentially extending ribs to facilitate securing said second component within a hollow portion of said arrowhead with a press-fit.

8. An attachment fixture as defined in claim **7** and further characterized in that said first and second components each include a longitudinally extending bore, and in that said interconnecting means comprises a pin element extending freely through the bores in said first and second components and having enlarged end parts to maintain said first and second components in longitudinal adjacency.

References Cited

UNITED STATES PATENTS

2,796,691	6/1957	Norris.	
2,816,765	12/1957	Stockfleth.	
2,833,266	5/1958	Mares	43—6 XR

OTHER REFERENCES

Archery Magazine, January 1964, p. 5, "Fleetwood" Archery Co. Ad.

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43—6