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W. M. FOLBERTH, JR., ET AL

2,796,262

ARROW FLETCHING

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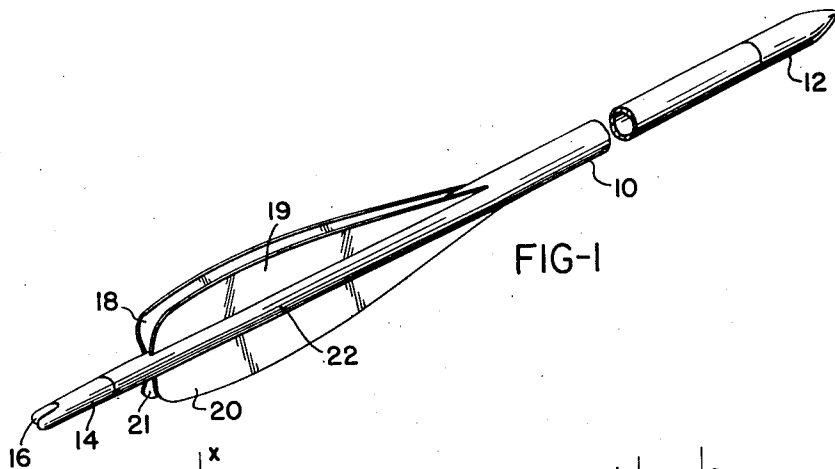


FIG-1

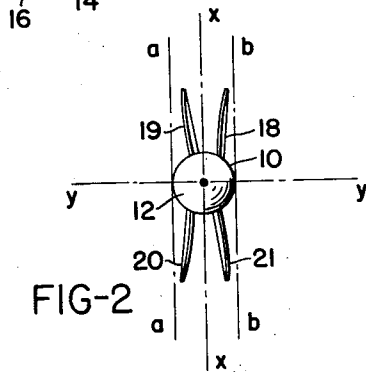


FIG-2

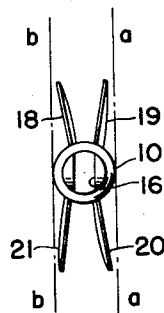


FIG-3

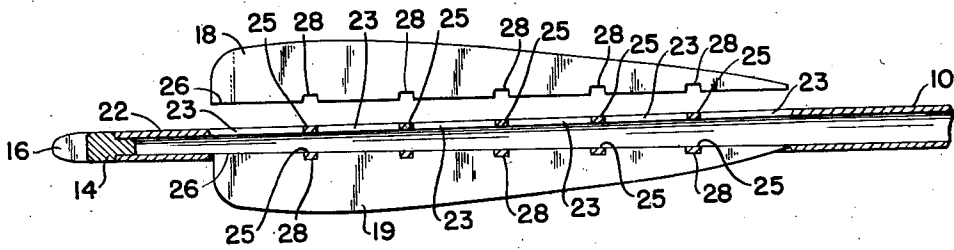


FIG-4

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ARROW FLETCHING

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3 Claims. (Cl. 273—106.5)

This invention relates to the making of arrows and in particular to the fletching of archery arrows. The invention is described herein with respect to the fletching of arrows having thin walled tubular shafts, but it is to be understood that it can be utilized in conjunction with arrows of other types of construction.

An arrow is ordinarily provided with three or four vanes secured to the rear end of the shaft and these are ordinarily arranged with slight helical or spiral angles with respect to the axis of the said shaft to cause the arrow to rotate about its longitudinal axis in flight. Heretofore, it has been customary to space the vanes equally about the shaft in order to provide a symmetrically balanced arrangement; that is, when three vanes are employed they are ordinarily about 120° apart, and when four vanes are employed they are ordinarily about 90° apart. Although such arrangements of the vanes of arrows have been used for many years they have caused difficulties and have impaired the accuracy of the flight of the arrows because the vanes inevitably strike the bow when the arrows are shot, and the contact between the vanes and the bow deflects the arrows from their intended courses. The difficulty is encountered with arrows of all types but it is particularly marked in modern arrows having vanes composed of Celluloid or other plastic material because such vanes are not distorted or deformed as easily as the feathers that were used in the past. Thus, the problem of inaccuracy in the flight of the arrow due to the striking of the vanes against the bow has become more acute as the use of Celluloid and like plastic vanes has increased.

According to the present invention the difficulties with prior types of arrows are avoided and arrows having a higher degree of accuracy in flight are provided by arranging the arrows with four vanes that are spaced in such fashion and are of such width that the edges of the vanes do not project beyond the planes of tangents to the shaft of the arrow lying parallel to the arrow nock and in which the vanes are arranged symmetrically about vertical and horizontal axes so that the arrow is properly balanced.

Referring to the drawings:

Figure 1 is a perspective view of a preferred form of arrow embodying my invention.

Figure 2 is a front elevational view of the arrow of Figure 1 on an enlarged scale.

Figure 3 is a rear elevational view of the arrow of Figure 1 on an enlarged scale; and

Figure 4 is a longitudinal sectional view showing the manner in which the vanes are preferably secured to the arrow shaft.

As shown in the drawings, a preferred embodiment of a modern arrow comprises a thin walled tubular shaft 10, usually made of aluminum, a solid metal tip 12 secured to the front end of the shaft 10, a short solid portion 14 secured to the rear end of the shaft 10 in order to provide a stock for cutting a nock 16 therein, and vanes 18, 19, 20 and 21, preferably made of Celluloid or some

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other similar plastic material. The rear portion 22 of the arrow is preferably tapered as shown in the drawings.

In order to cause the arrow to rotate about its longitudinal axis when it is shot, the vanes preferably extend along a helix, the angle of which is very slight with respect to the said longitudinal axis of the shaft 10, ordinarily not more than one or two degrees.

In order to provide for a symmetrically balanced arrangement of the vanes and at the same time to dispose them so that the vanes can pass the bow without striking it, the vanes are preferably angularly arranged as shown particularly in Figures 2 and 3. Thus the vanes 18 and 19, and 20 and 21, respectively, are closely spaced having an acute angle between them; vanes 18 and 19 constituting the upper pair, and vanes 20 and 21 constituting the lower pair are symmetrical about the axis $x-x$ as shown in Figure 2. The spaces between vanes 19 and 20 and between vanes 18 and 21 respectively are correspondingly enlarged; these vanes being separated by obtuse angles and symmetrically disposed with respect to axis $y-y$. The longitudinal axis of nock 16 is normal to the longitudinal axis of shaft 10 and, in relationship to the angular arrangement of the vanes, parallel to axis $x-x$ shown in Figure 2 and also parallel to planes indicated by lines $a-a$ and $b-b$ in Figure 3.

Thus the spacing between opposite pairs of vanes is equal, with the angular spacing between the vanes of the respective upper and lower pairs preferably being of the order of 15° to 20°. With this arrangement, as shown particularly in Figures 2 and 3, vanes of reasonable width do not project laterally beyond the planes indicated by the lines $a-a$ and $b-b$ that are tangent to shaft 10 of the arrow. With the vanes so disposed, the arrow can be impelled in a substantially straight line by the bow string without having the vanes strike the bow as they pass it. This improves the accuracy of the flight of the arrow and eliminates a difficulty that archers have encountered for centuries.

While vanes of this type can be used with arrows of any ordinary construction, they are, as noted above, particularly useful in conjunction with hollow tubular arrows embodying plastic vanes. With arrows of this type the vanes are preferably secured to the arrows in the manner described and claimed in application Serial No. 434,154, filed June 3, 1954, by providing, as shown particularly in Figure 4, a series of slots 23 separated by intervening webs 25 to receive each vane. The inner edges 26 of the vanes are notched as at 28 to receive the webs 25 and the vanes are adhesively secured in place in the slots 23. As explained in the aforesaid application, the intervening webs 25 give the shaft of the arrow sufficient rigidity to withstand the compressive stresses applied by the force of the bow string accelerating the arrow or by the impact of the arrow when it strikes the target.

It is to be understood that the embodiment of the invention shown herein is given by way of example and that the scope of the invention is defined by the appended claims.

We claim:

1. In an archery arrow, a shaft provided at the nocked end with two opposed pairs of vanes, the respective vanes of each pair of vanes being symmetrically aligned about the longitudinal axis of the nock normal to the longitudinal axis of said shaft, and said opposed pairs of vanes being symmetrically aligned about the transverse axis of said shaft normal to said longitudinal nock axis, said pairs of vanes extending oppositely from said shaft wholly within a space defined by planes tangent to diametrically opposite sides of said shaft and parallel to said longitudinal axis of said nock, there being an acute angle between the vanes in each pair.

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2. The archery arrow set forth in claim 1, wherein said vanes are comprised of flat flexible sheet material.

3. In an archery arrow, a shaft having a portion tapered toward the nocked end thereof and including two diametrically opposed pairs of vanes comprising flat flexible sheet material secured to said tapered portion; the respective vanes of each pair of vanes being helically aligned about the longitudinal axis of said shaft and symmetrically aligned about the longitudinal axis of the nock normal to the longitudinal axis of said shaft, said opposed pairs of vanes being symmetrically aligned about the transverse axis of said shaft normal to the longitudinal axis of the nock of said shaft, and extending oppositely

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from said shaft wholly within a space defined by planes tangent to opposite ends of a major diameter of said shaft and parallel to the said longitudinal axis of the nock of said shaft.

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