

[54] FRANGIBLE IN FLIGHT ARROW HEAD COVER

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[22] Filed: Aug. 20, 1970

[21] Appl. No.: 65,609

[52] U.S. Cl. 273/106.5 R, 150/52 H, 273/106.5 B, 273/106.5 C

[51] Int. Cl. F41b 5/02

[58] Field of Search 273/106.5 R, 106.5 B, 106.5 C; 30/368, 151; 224/2 D; 150/52 R, 52 F, 52 H; 124/23

References Cited

UNITED STATES PATENTS

1,554,653	9/1925	Poole	273/106.5 R
2,212,345	8/1940	Krieger	273/106.5 R
2,611,354	9/1952	Harvey	124/23
2,620,190	12/1952	Bean	273/106.5 R
3,528,662	9/1970	Merchant et al.	273/106.5 R
3,110,336	11/1963	Sukala, Jr.	150/52 R

FOREIGN PATENTS OR APPLICATIONS

234,255 5/1925 Great Britain.....273/106.5 B

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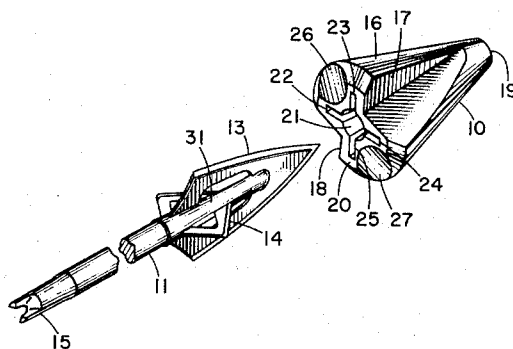
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ABSTRACT

[57]

A novel, in-flight cover to protect arrow points and archers during handling of arrows has been invented. The novel cover has an aerodynamic external shape and fractures upon impact with a target. It is constructed preferably of a frangible material and has a center opening to accommodate an arrow point and to frictionally secure itself thereto. The external surface is preferably conical in shape and may have vanes cut in the surface thereof to provide stability for arrow shafts in flight. Frangible cellular materials such as polystyrenes, polyurethanes and the like are useful construction materials. The novel covers of this invention may protect various types of points such as hunting points, field tips and the like. An insertion device for placing the cover on an arrow comprising a hard, rigid material having an internal opening having substantially the same shape as the external surface of the cover is also provided.

20 Claims, 5 Drawing Figures



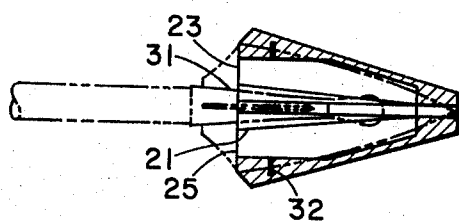


Fig. 3

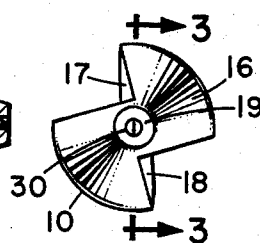


Fig. 2

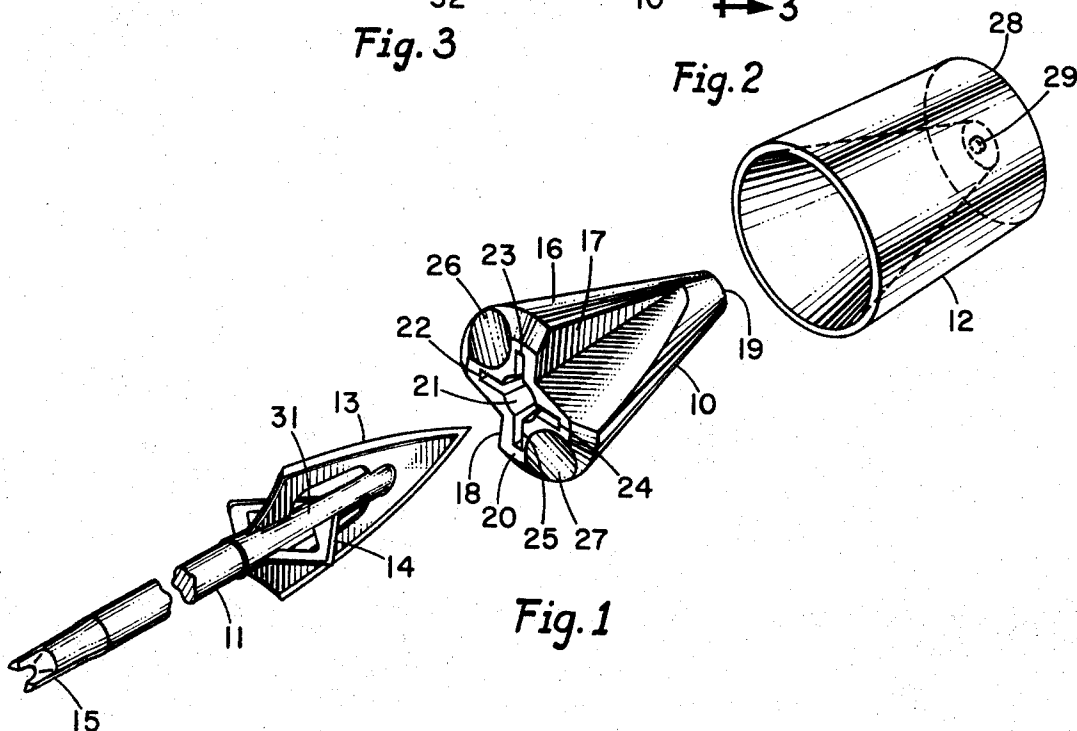


Fig. 1

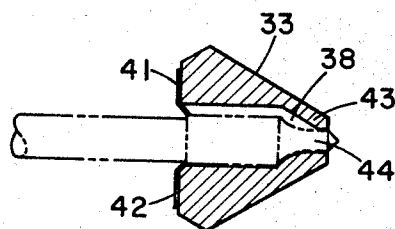


Fig. 5

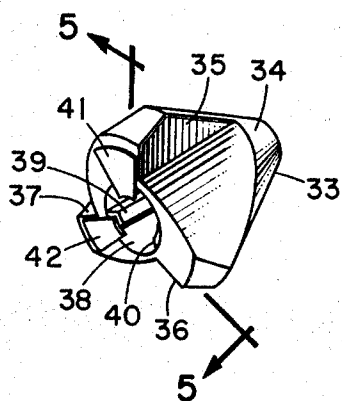


Fig. 4

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FRANGIBLE IN FLIGHT ARROW HEAD COVER

BACKGROUND OF INVENTION

The basic shape and design of arrows has remained substantially the same for the last one thousand years, viz., an arrowhead disposed at one end of a shaft with feathers provided at the aft end of the shaft for in-flight stabilization. U.S. Pat. No. 2,212,345 discloses an arrow in which the blades of the arrowhead are disposed at a slight angle to the longitudinal axis of the shaft to provide rotation and in-flight stability. However, the patent indicates that in the preferred construction of the invention feathers are retained at the aft end of the shaft. Thus, arrows which are in prevalent use today have the blades of the arrowhead disposed along the longitudinal axis of the shaft and are quite similar to arrows used hundreds of years ago.

The need for covers for the razor-like heads frequently used on modern hunting arrows is illustrated by U.S. Pat. No. 2,611,354. This patent discloses a cover for protecting an arrowhead during handling and use. It is designed to drop automatically as the arrow is drawn for shooting. Another method for protecting the sharp point of an arrow or dart is illustrated in U.S. Pat. No. 2,620,190, wherein a permanent cover is designed to slide rearward along the shaft of a dart as the cover makes contact with the target thereby permitting the point of the dart to project through and beyond the cover.

Other shapes for arrows are disclosed in U.S. Pat. No. 1,554,653 and No. 2,613,936. The arrow disclosed in the former patent is a toy arrow having a rubber tip which is not designed for accurate shooting inasmuch as there are no means disclosed for stabilizing the arrow in flight. The latter patent discloses coating a spiral-shaped tip with a plastic or soap-like material so that the arrow could be easily removed from targets.

Although the above patents disclose innovations regarding arrow shapes and protective covers for arrows, the modern arrow still substantially resembles arrows used hundreds of years ago and is generally used without the presence of a protective cover.

OBJECTS OF THE INVENTION

It is an object of this invention to provide a useful protective cover which substantially protects an arrowhead from damage and protects an archer from accidental injury from said arrowhead.

Another objective of this invention is to provide a protective cover for arrows which is frictionally secured thereto and remains with said arrow in flight.

A further objective of this invention is to provide a protective cover which contributes in-flight stabilization to an arrow.

Further objects of the invention include the providing of a cover which assists in aiming of an arrow; a cover which fractures upon impact of the arrow with a target and a cover which assists an archer in finding an arrow which has missed its target.

DESCRIPTION OF THE INVENTION

The above objects and others are realized by the instant invention of a fracturable, in-flight, protective cover for arrow points, said cover comprising a frangible material having an external surface of aerodynamic shape and having a center, internal opening which accommodates an arrow point.

Further description of the invention may be facilitated by reference to the attached drawing.

FIG. 1 is a perspective view of a cover for a hunting arrow, an insertion device for inserting said cover on an arrow and a hunting arrow;

FIG. 2 is a front elevational view of a novel protective cover having stabilizing vanes therein;

FIG. 3 is a sectional view along plane 3—3 of the novel cover illustrated in FIG. 2;

FIG. 4 is a perspective view of a protective cover for substantially blunt points such as field arrows and target arrows; and

FIG. 5 is a sectional view along lines 5—5 of the cover illustrated in FIG. 4.

In FIG. 1 there is illustrated a protective cover 10 oriented for placement upon a hunting arrow 11 by means of an insertion device 12. The hunting arrow 11 has a broad head blade 13 and a razor-like cross-blade 14 which has been inserted in a slot in the arrow and is secured therein merely by friction between the blade and the slot opening. These razor-like insert blades 14 are frequently lost during hunting. The hunting arrow is further illustrated with a double V-shaped notch 15 inasmuch as feathers have been omitted from the aft end of the illustrated arrow. Whenever feathers are used on the aft end of an arrow only a single narrow notch may be placed in the nock of the arrow inasmuch as it is necessary to hold the arrow in a particular orientation because of the placement of the feathers. However, by eliminating feathers, wide double V-shaped or multiple notches may be placed in the nock of the arrow thereby facilitating rapid notching and drawing of such an arrow.

The cover 10 illustrated in FIG. 1 has a substantially conical surface 16 in which a portion of the surface has been removed to provide a pair of vanes 17 and 18. These vanes cause an arrow having such a cover thereon to rotate in flight and thereby be stabilized. A conical shape is preferred for such protective covers, however, pyramidal shapes or other shapes may be utilized so long as the fore end of the cover 19 has a substantially smaller cross-section than the aft end of said cover 20.

The cover 10 is illustrated with a center, internal opening or cavity 21 to accommodate the extended surface of the arrow shaft. The internal opening generally has tapering walls so that the opening at the rear face has a greater diameter than the forward terminus of said opening at or near the forward surface 19. Four lateral slots 22, 23, 24, and 25 to accommodate the broadhead arrow 13 and the razor-like insert 14 open at the rear surface 20 of the cover. These slots generally extend substantially the length of said cover. In another embodiment of the cover the slot openings 22, 23, 24, and 25 may be omitted and the cover placed on the arrow with sufficient force to cause the broadhead arrow 13 and razor-like insert 14 to cut their own cavities in the cover and to seat themselves therein without premature fracturing of said cover. In either embodiment it is preferred to have the center opening or cavity 21 pass along the central axis completely through the cover as illustrated herein in FIGS. 2, 3, and 5. The longitudinal center opening 21 facilitates fracturing of the cover upon impact of the cover and arrow with a target, especially when the longitudinal opening extends to the front surface 19 of the cover.

The cover 10 of FIG. 1 is illustrated with a pair of cup-shaped indentations 26 and 27 located on the aft surface of the conical cover to facilitate drawing of an arrow having such a cover thereon without interference by the archer's hand holding the bow.

The insert device 12 of FIG. 1 can have substantially any external shape with an internal opening which has preferably substantially the same shape as the external surface of said cover 10. The insertion device 12 is constructed of a substantially rigid material which is not easily pierced. It is used to place a cover 10 on an arrow so that the cover can be properly aligned with the arrow shaft. Also, the use of an insertion device 12 materially assists in preventing excess force from being applied to the cover 10 during its insertion on an arrow 11.

The insertion device 12 helps to align the cover 10 as it is placed on the arrow. The device 12 preferably has a solid bottom 28 which substantially eliminates possibility of injury to the hand during insertion of the cover on an arrow. Furthermore, by having a slight projection or protrusion 29 on the interior bottom surface to align with the hole in the fore surface 19 of said cover 10, the proper placement of the cover can be further facilitated and the broadhead arrow point 13 can be prevented from extending farther than desired into said cover 10. Alternatively, the insertion device 12 may have a thick

bottom with a central hole therein so that the cover having an opening in its front surface may be visually aligned with an arrow.

Although the cover 10 illustrated in FIG. 1 is provided with vanes it is useful without vanes whenever an arrow having aft-placed feathers is utilized. Thus, a cover having a conical or pyramidal or other appropriate shaped surface having aerodynamic characteristics may be utilized without having vanes formed in the surface of said cover. Also, the vanes on a cover may project from the surface rather than be recessed therein. Recessed vanes, however, are generally preferred because of the frangible nature of the cover.

In FIGS. 2 and 3 a front end and sectional view of a cover for a broad head arrow are illustrated. In FIG. 2, a front, elevational view of a cover similar to that shown in FIG. 1 is illustrated showing the conical surface 16 and vane surfaces 17 and 18. The vane surfaces may be formed in the conical surface to substantially any desired angle although for most purposes an angle of about $\frac{1}{2}^\circ$ to about 10° off a plane passing through the longitudinal center axis of the shaft is sufficient to provide stabilization. A vane angle of about 2° to about 5° is preferred for most purposes. As illustrated in FIG. 2, the most forward portion or edge of the vane is substantially aligned with the center axis with the vane surface trailing rearward at an angle to the center axis so that the rear edge of the vane is offset from the center longitudinal axis of the shaft.

FIG. 2 further illustrates the opening 30 in the front surface 19 of the cover 10. The front surface 19 has a diameter as small as possible consistent with providing a surface for said opening 30. The cover is illustrated with an arrow in place and the broadhead point of the arrow may be seen in the front opening 30.

FIG. 3 is a sectional view along section 3—3 of FIG. 2, illustrating an internal construction of a cover. Phantom lines indicate the placement of the arrow in said cover. The sectional view is along a pair of opposed slots so that the slot openings are illustrated as well as the internal center opening. The opposed slot openings 23 and 25 are illustrated in FIG. 3 as having slightly less length and height dimensions than the broad head arrow. By means of this construction the arrow does seat itself in a very small portion of the cone near the tip and at a very small portion of the wall of the cover at the aft portion of the cover. The internal opening 21 conforms substantially to the shape of the forward portion of the arrow 31. Also, an internal opening 21 is substantially conical in shape to accommodate the forward portion of the shaft 31.

As the arrow makes contact with the target and presses forward in said cover the blades of the arrow tend to cut through the external surface of the cover at substantially the same time the shaft portion 31 moves forward in internal opening 21 thereby placing an outward force on the cover and causing the cover to burst upon impact. The bursting effect may further be enhanced by providing weakened sections or fracture lines in the walls of said cone.

In FIG. 3 a small tab or waifer 32 is illustrated as part of the internal construction of the cover. The tab or waifer 32 is preferably located in a slot such as slot 25 so that the broadhead arrow as it is placed in said cover will cut the thin tab or waifer. The tab may be constructed of a thin paper, plastic, or other material. This tab or waifer 32 upon being cut tends to hold the cover in place by its flap-like action. The cover may be utilized without the use of such tabs or wafers, however, the cover remains more securely on the arrow if said tabs or wafers are utilized particularly during handling. Although a single tab or waifer is effective, it is generally preferred to use at least a pair of tabs or wafers each disposed in slots opposite one another.

In FIGS. 4 and 5 a protective cover for blunt tips such as field arrows is disclosed. In FIG. 4 the cover 33 has a conical surface 34 with vanes 35, 36, and 37 disposed in the external portion thereof. As illustrated in FIG. 5, it is preferred to have the internal opening 38 pass through the cover. This type of cover may also be used for target points preferably having a larger opening in the fore-end of the cover.

In FIG. 4 internal splines 39 and 40 are illustrated so that too much friction does not occur between the field tip and the cover. Thus, the field tip rests against the raised surface of the spline such as splines 39 and 40 rather than against the continuous wall of opening 38. The presence of splines is preferred so that the arrow will not bind in the cover on impact, but will move forward as intended. Also, illustrated in FIGS. 4 and 5 are external tabs 41 and 42 which may be of a plastic paper, or other sheet-like material having some rigidity and which aid in holding the tip in place once the cover is inserted upon the arrow.

In the field tip cover illustrated in FIGS. 4 and 5 it is preferred to have the forward portion 43 of rather thin cross section between the internal opening 38 and the external surface 33 so that upon contact with a target the field tip 44 can easily punch through the forward wall of the cover. Alternatively, the cover may be provided with fracture lines which are substantially weaker than the remaining sections of the cover so that upon contact with a target the cover opening would burst as the field tip 44 moves forward in the cover thereby placing an outward pressure upon the internal surfaces of the cover opening 38.

The covers of this invention may be constructed of any appropriate material which is frangible or brittle so that the blades of a hunting arrow may easily cut through the thin cross-section between the slot openings and the external surface or the tip of a field arrow may easily punch through the forward portion of such a cover. Such materials of construction may include cellular plastics or paper covers. Of the plastics, cellular polystyrene and polyurethane of a frangible nature are preferred. Cellular polystyrene is especially useful not only because it is economical but because it is readily produced in a frangible form and upon exposure to sunlight and weather over a period of months the material substantially disintegrates thereby eliminating a litter problem.

The covers of this invention may be provided with vanes which are generally cut into the surface of the material by removing a portion of the surface although said vanes could protrude from a conical or pyramidal surface to provide stabilization for arrows having such a cover attached. The invention is especially advantageous in this regard inasmuch as it has not been previously considered to have a cover remain on an arrow in flight. Furthermore, by providing vanes in the covers of this invention the need for aft feathers may be eliminated thereby offering the possibility of providing an open notch in the nock of said arrow to facilitate notching and drawing rapidly of an arrow. Also, such aerodynamic stabilizing arrows are an improvement, especially with flat head arrows in which the flat head is frequently slightly bent, causing the arrow to fly untrue.

Furthermore, the covers of this invention may be provided with a protective paint coating. When said coating on the rear face of the cover is white in color it assists in aiming the arrow and in following the arrow in flight. This is especially true during the dimly lit periods of the day which are the most frequent periods during which an archer encounters game. Thus, it assists an archer in determining if his arrow has hit the target and further assists him in finding the arrow if it has missed its target. If a coating is provided on the aerodynamic surface, a dark coating is preferred.

The novel cover of this invention provides a new type of archery article, viz. an arrow comprising a shaft, a point and a cover of the type described herein, frictionally secured thereto. Furthermore, the arrow shaft need not have feathers when said cover possesses stabilization vanes. Also, a featherless shaft may be provided with a plurality of notches for rapid notching and drawing.

The novel covers may be readily formed by casting a foamable plastic in a mold of appropriate shape. By using a male and female mold combination a cover having the desired internal openings and external shape can be cast and later drilled or cut to provide the appropriate internal cavities.

Although the instant invention has been described with reference to specific embodiments it is not intended that the

invention be limited solely thereto but to include all the modifications and variations included within the scope of the appended claims.

I claim:

1. An in flight cover for arrow points which protects during handling and fractures upon impact comprising
 - a. a frangible material having an external surface of aerodynamic shape, and
 - b. an internal central cavity opening in the rear face of said cover and having such dimensions so as to frictionally secure said cover to an arrow point,
 - c. said cover being of such a material and having a wall thickness sufficiently thin that fracture of said cover occurs upon impact of an arrow having said cover thereon with a target.
2. The arrow cover of claim 1 wherein the shape of the external surface is conical, the fore end being smaller than the aft end.
3. The arrow cover of claim 1 having a plurality of stabilization vanes therein.
4. The arrow cover of claim 1 wherein the central, internal cavity extends along the center, longitudinal axis of said cover from its rear face to its front face, the rear opening of said cavity having a greater width than the front opening.
5. The arrow cover of claim 4 wherein flap-like tabs are secured to the rear face of said cover substantially perpendicularly to the center longitudinal axis of said cover adapted to contact the rear surface of an arrow point and substantially secure said cover to said point.
6. The arrow cover of claim 4 wherein a plurality of longitudinal splines raised above the outer surface of the internal central opening are provided to contact the forward portion of an arrow shaft when said cover is in place on an arrow.
7. The arrow cover of claim 4 wherein a plurality of vanes are recessed in said cover.
8. The arrow cover of claim 7 wherein a pair of opposed vanes are recessed in said cover.
9. The arrow cover of claim 4 wherein the wall thickness

between said internal opening and the front face of said cover is sufficiently thin to permit easy puncturing by a blunt arrow point.

10. The arrow cover of claim 1 wherein the central internal cavity has slot-like openings extending radially therefrom adapted to accommodate the blades of a hunting arrow.

11. The arrow cover of claim 10 wherein flap-like tabs are disposed substantially perpendicularly to the center longitudinal axis of said cover in the outermost surface of said slot-like openings adapted to be sliced by the edge of a hunting point and substantially secure said cover to said point.

12. The arrow cover of claim 10 wherein the wall thickness between the external surface and the outer edge of said slot openings is sufficiently thin to permit easy slicing by the blades of said hunting arrow.

13. The arrow cover of claim 1 wherein the frangible material is a cellular plastic.

14. The arrow cover of claim 13 wherein the cellular plastic is cellular polystyrene.

15. The arrow cover of claim 1 wherein predetermined fracture lines are provided.

16. An arrow comprising a shaft, an arrow point and an in-flight cover having an aerodynamic shape frictionally secured to said arrow, said cover being of such a material and having a wall thickness sufficiently thin that fracture of said cover occurs upon impact of said cover with a target.

17. The arrow of claim 16 wherein said cover has stabilizing vanes.

18. The arrow of claim 17 wherein said shaft is featherless.

19. The arrow of claim 18 wherein said shaft has a double V-shaped, open notch at the aft end of said shaft.

20. In combination with an arrow cover of the type set forth in claim 1, an insertion device comprising a hard, rigid material having an internal opening having substantially the same shape as the external surface of said cover and having alignment means for aligning said cover during placement of an arrow.

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