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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
61/038,286	03/20/2008		105	EPH01 P-100		

CONFIRMATION NO. 2327

28101
VAN DYKE, GARDNER, LINN & BURKHART, LLP
SUITE 207
2851 CHARLEVOIX DRIVE, S.E.
GRAND RAPIDS, MI 49546

FILING RECEIPT



OC000000029121117

Date Mailed: 03/28/2008

Receipt is acknowledged of this provisional patent application. It will not be examined for patentability and will become abandoned not later than twelve months after its filing date. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please write to the Office of Initial Patent Examination's Filing Receipt Corrections. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Douglas A. Vandewater, Wyoming, MI;

Power of Attorney: The patent practitioners associated with Customer Number 28101

If Required, Foreign Filing License Granted: 03/27/2008

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 61/038,286**

Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

ARROWHEAD WITH PIVOTING BLADE

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page 1 of 3

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Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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Provisional Application for Patent Cover Sheet

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c)

Inventor(s)

Inventor 1

Remove

Given Name	Middle Name	Family Name	City	State	Country
Douglas	A.	Vandewater	Wyoming	MI	US

All Inventors Must Be Listed – Additional Inventor Information blocks may be generated within this form by selecting the **Add** button.**Add****Title of Invention** ARROWHEAD WITH PIVOTING BLADE**Attorney Docket Number (if applicable)** EPH01 P-100**Correspondence Address**

Direct all correspondence to (select one):

☒ The address corresponding to Customer Number ☐ Firm or Individual Name**Customer Number** 28101

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

☒ No.☐ Yes, the name of the U.S. Government agency and the Government contract number are:

Entity Status

Applicant claims small entity status under 37 CFR 1.27

☒ Yes, applicant qualifies for small entity status under 37 CFR 1.27☐ No**Warning**

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Signature

Please see 37 CFR 1.4(d) for the form of the signature.

Signature	/taf/			Date (YYYY-MM-DD)	Mar 20, 2008
First Name	Timothy	Last Name	Flory	Registration Number (If appropriate)	42540

This collection of information is required by 37 CFR 1.51. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 8 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **This form can only be used when in conjunction with EFS-Web. If this form is mailed to the USPTO, it may cause delays in handling the provisional application.**

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	EPH01 P-100
		Application Number	
Title of Invention	ARROWHEAD WITH PIVOTING BLADE		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

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☐	Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)
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Applicant Information:

Applicant 1					Remove	
Applicant Authority		☒ Inventor		☐ Legal Representative under 35 U.S.C. 117		☐ Party of Interest under 35 U.S.C. 118
Prefix	Given Name	Middle Name	Family Name		Suffix	
	Douglas	A.	Vandewater			
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service						
City	Wyoming	State/Province	MI	Country of Residence i	US	
Citizenship under 37 CFR 1.41(b) i		US				
Mailing Address of Applicant:						
Address 1		3585 Bluebird Avenue				
Address 2						
City	Wyoming	State/Province	MI			
Postal Code	49519	Countryi	US			
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.						Add

Correspondence Information:

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☐ An Address is being provided for the correspondence Information of this application.			
Customer Number	28101		
Email Address	flory@vglb.com	Add Email	Remove Email

Application Information:

Title of the Invention	ARROWHEAD WITH PIVOTING BLADE		
Attorney Docket Number	EPH01 P-100	Small Entity Status Claimed ☐	
Application Type	Provisional		
Subject Matter			
Suggested Class (if any)		Sub Class (if any)	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	6	Suggested Figure for Publication (if any)	

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	EPH01 P-100
		Application Number	
Title of Invention	ARROWHEAD WITH PIVOTING BLADE		

Publication Information:

☐	Request Early Publication (Fee required at time of Request 37 CFR 1.219)
☐	Request Not to Publish. I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

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Please Select One:	☒ Customer Number	☐ US Patent Practitioner	☐ Limited Recognition (37 CFR 11.9)
Customer Number	28101		

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Prior Application Status		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.			Add

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			Remove
Application Number	Country ⁱ	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
			☒ Yes ☐ No
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Assignee 1	Remove

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number		EPH01 P-100	
		Application Number			
Title of Invention		ARROWHEAD WITH PIVOTING BLADE			
If the Assignee is an Organization check here. ☒					
Organization Name		EP Hunting LLC			
Mailing Address Information:					
Address 1		8672 Shoreway Drive			
Address 2					
City		Byron Center	State/Province		MI
Country i	US	Postal Code		49315	
Phone Number				Fax Number	
Email Address					
Additional Assignee Data may be generated within this form by selecting the Add button. Add					

Signature:

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Signature		/taf/		Date (YYYY-MM-DD)	
2008-03-20					
First Name	Timothy	Last Name	Flory	Registration Number	42540

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7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
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ARROWHEAD WITH PIVOTING BLADE

FIELD OF THE INVENTION

[0001] The present invention relates generally to arrows used archery hunting and, more particularly, to arrowheads used in conjunction with archery hunting.

BACKGROUND OF THE INVENTION

[0002] It is an aim of hunters to promote a humane kill of an animal. Archery hunters may kill animals by causing blood loss in the animal. Therefore, it is desirable to provide an arrowhead that promotes maximum penetration into the animal, thereby increasing the rate of blood loss of a wounded animal to allow for a more humane kill. Additionally, for an archery hunter to be effective and to prevent undue suffering of an animal, the hunter's arrow should travel a straight or substantially straight path to its intended mark, so that the hunter may place his or her shot to rupture vital organs of an animal.

SUMMARY OF THE INVENTION

[0003] The present invention provides a pivotable arrowhead for an arrow with an arrowhead body including a substantially pointed portion or tip, at least one blade pivotally mounted at the body and including a notched portion and a substantially sharpened portion or edge, and a retaining mechanism adapted to substantially engage a notch in the notched portion, thereby impeding rotation of the blade about the pivotal connection.

[0004] These and other objects, advantages, purposes and features of the present invention will become apparent upon review of the following specification in conjunction with the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] FIG. 1 is a side elevation of an arrowhead with a pivoting blade in accordance with the present invention;

[0006] FIG. 2 is a sectional view of the arrowhead of FIG. 1, illustrating components of the arrowhead;

[0007] FIG. 3 is a another section view of the arrowhead of FIG. 1;

[0008] FIG. 4 is a side elevation of another arrowhead with a pivoting blade in accordance with the present invention;

[0009] FIG. 5 is a sectional view of the arrowhead of FIG. 4, illustrating the internal components thereof;

[0010] FIG. 6 is a profile sectional view of the arrowhead in FIG. 4;

[0011] FIG. 7 is a side elevation of another arrowhead with pivoting blades in accordance with the present invention, shown with the blades in a folded position;

[0012] FIG. 8 is another side elevation of the arrowhead of FIG. 7, shown with the pivoting blades in the deployed position;

[0013] FIG. 9 is an exploded partial sectional view of the arrowhead of FIG. 7;

[0014] FIG. 10 is a sectional view of the arrowhead of FIGS. 7-9, shown with the blades in the folded position;

[0015] FIG. 11 is another sectional view of the arrowhead of FIGS. 7-9, shown with the blades in the deployed position; and

[0016] FIG. 12 is a profile sectional view of the arrowhead of FIG. 7.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0017] Referring now to the drawings and the illustrative embodiments depicted therein, an archery hunting device or arrowhead 10 includes a blade 12 that is pivotally mounted at a body 14 and is pivotable about a pivot pin or axis 16 (FIGS. 1-3). Blade 12 pivots between a first or center position and a second or angled position in response to contact of a blade edge 18 with an object, such as bone, cartilage, or the like in a target animal. A retaining mechanism 20 is biased or urged against a rear arcuate edge or portion 22 of blade 12 to resist such pivotal movement unless and until the force acting against a side region of the blade edge 18 is sufficient to cause the blade to pivot. Thus, arrowhead 10 will minimally impede travel of an arrow through an animal after encountering bone or cartilage, thereby resulting in a deeper wound cavity for a more humane kill.

[0018] In the illustrated embodiment, body 14 has an elongated shape, such as a cylindrical shape, and may have a substantially pointed portion or tip 26. Body 14 may have a slot or passageway 15 (FIG. 3) for receiving blade 12 and to allow passage of blade 12 through body 14 during assembly. Slot 15 may be located substantially coincident with the longitudinal axis of body 14 to promote balanced flight and accuracy of arrowhead 10. Further, body 14 may include a biasing element passageway and internally threaded portion 30 for receiving retaining mechanism 20 (discussed below) and a pin passageway for receiving pivot pin 16. Optionally,

the pin passageway may include a passageway or threaded bore 28 to accept a threaded pivot pin 16 or, alternatively, may be adapted to receive pivot pin 16 by a press-fit or interference-fit or the like.

[0019] Body 14 may further include an externally threaded portion 32 for connection to an arrow shaft. In such a configuration, arrowhead 10 may be used as an arrowhead attached to a conventional arrow for use with a bow or crossbow. Optionally, it is envisioned that arrowhead 10 may be unitarily formed with or otherwise attached to a shaft of an arrow, while remaining within the spirit and scope of the present invention.

[0020] Blade 12 has one or more substantially sharpened cutting front portions or edges or faces 18 and a rear edge 22 with a notch 24, and includes an aperture adapted to facilitate pivotable connection to body 14 with pivot pin 16. Blade 12 is positioned at body 14 and through slot 15, such that the thickness of blade 12 is sufficiently thin as to allow the blade to fit in the slot during assembly and pivot therein when in use, as discussed below. In the illustrated embodiment, blade 12 has two substantially symmetrical sharpened side portions or wings for balanced flight and a large cutting surface. Notch 24 is located at rear edge 22 opposite cutting edges 18 and may be centrally located so as to be substantially equidistant from the ends of rear edge 22 and thereby centering the blade when notch 24 is engaged with retaining mechanism 20.

[0021] In the illustrated embodiment, retaining mechanism 20 includes a ball bearing 34 urged toward notch 24 by a biasing element 36. Biasing element 36 may be set to a compressed state by threadably connecting a set screw (not shown) to internally threaded portion 30 of body 14. Biasing element 36 may comprise any suitable element or material for urging ball bearing 34 toward notch 24, such as, for example, a conventional spring-steel compression spring, or an elastomeric material such as rubber or the like. However, skilled artisans will recognize that other methods of urging ball bearing 34 toward notch 24 can be utilized without departing from the principles of the present invention.

[0022] When blade 12 is set or positioned in its initial or central position, ball bearing 34 is urged into notch 24 to substantially retain blade 12 in its initial or centered position. When a force is applied to one of the side portions or wings of the blade that is greater than a force applied to the other side portion or wing of the blade, and when such an imbalance in forces is sufficient to overcome biasing element 36, ball bearing 34 will be urged downward by pivotal

movement of blade 12, whereby blade 12 will pivot in a direction away from the side at which the greater force is applied.

[0023] In addition to holding blade 12 in a centered position relative to body 14, retaining mechanism 20 may be employed to dampen pivotal motion of blade 12. As the amount of force exerted by biasing element 36 on ball bearing 34 increases (such as when ball bearing 34 is urged out of notch 24 by pivotal movement of the blade), ball bearing 34 may act to impede or limit pivotal movement of blade 12 (even after ball bearing 34 has been forced out of notch 24). Thus, a desired resistance to pivotal motion can be achieved by selecting a biasing element 36 capable of delivering a desired amount of force and damping.

[0024] Pivotal movement or resistance to pivotal movement of blade 12 may be limited or controlled by the configuration of rear edge 22 and/or spring force and/or engagement of the ball bearing 34 with the blade. For example, pivotal movement of blade 12 and/or resistance to such pivotal movement of blade 12 may be controlled or adjusted by altering the shape of rear edge 22. Accordingly, if rear edge 22 has a substantially constant radius of curvature, the radius of curvature of such circle may have an origin at the pivot axis of the blade or longitudinally toward or away from the rear edge of the blade with respect to the pivot axis, in order to influence pivotal movement of the blade when the blade is not in its initial or centered position. Rear edge 22 may also take non-circular or non-arcuate forms, such as a linear or angular profile, for varying the pivotal characteristics of blade 12.

[0025] During assembly of arrowhead 10, blade 12 is attached to body 14 by pivot pin 16 or other pivot connection. Such pivot connection may be made with a set screw or other threaded connector attached to threaded bore 28. Alternatively, the pivot connection may be an interference-fit pin, cotter, or other such device as will be apparent to the skilled artisan. Ball bearing 34 is placed in the biasing element passageway of body 12 with biasing element 36 being disposed in the passages below ball bearing 34. A set screw may then be threadably connected to body via internally threaded portion 30, and may be tightened against the force of biasing element 36 until a desired tension at ball bearing 34 is achieved. Finally, the arrowhead assembly 10 may be attached to a bolt or arrow by externally threaded portion 32 or via other connection means or the like.

[0026] When the arrow is fired and during its flight, retaining mechanism 20 acts to hold blade 12 in its centered position relative to body 14, thereby maintaining a substantially even weight

distribution about the longitudinal axis of body 14 for balanced flight and accuracy. When arrowhead 10 finds its mark on the animal being hunted, the centered position of blade 12 is maintained in its center position until one wing of blade 12 encounters a harder material than the material encountered by the other wing. Such differential hardness may overcome the force of retaining mechanism 20 at notch 24, thereby allowing blade 12 to pivot about pivot pin 16. For example, one wing may impact a bone in the ribcage of an animal, while the other wing may pass through the space between two ribcage bones. In this situation, the wing contacting bone would pivot to clear the bone, facilitating further penetration of the arrowhead. During such pivoting, ball bearing 34, now dislodged from notch 24, traces rear edge 22 as the blade pivots toward one side or the other. The pivoting of blade 12 allows arrowhead 10 to continue its path into the animal, rather than slowing or stopping as a result of resistance encountered by one side of the blade as it hits bone or cartilage.

[0027] Thus, arrowhead 10 achieves deeper penetration in to the animal than it otherwise would absent the pivoting of blade 12. Deeper penetration, in turn, results in a faster rate of bleeding of the animal and a more humane kill. Once past the bone or cartilage or object, the blade may pivot back toward its center position as the other wing then encounters a greater resistance than the first blade wing (that is pivoted to be generally along the arrowhead upon impact with the bone or the like). In addition, the arrowheads are durable, and the arrowheads are capable of being reset to their centered position and reused many times before parts fail from wear. This is because the ball bearing will not wear out or degrade by the small amount of movement of the blade relative to the ball bearing, such that the arrowhead may be re-used multiple times without adverse affects on its performance.

[0028] Referring now to FIGS. 4-6, an archery hunting device or arrowhead 110 includes a wheeled retaining mechanism 120 for retaining a blade 112 in a centered position. Similar to arrowhead 10, arrowhead 110 includes blade 112, which is pivotally mounted at a body 114 with a slot 115 and is pivotable about a pivot pin or axis 116, and wherein blade 112 includes one or more sharpened portions 118 and notched rear edge 122. Body 114 may include a pointed portion 126 and a pivot passageway or threaded bore 128, such as a threaded passageway or the like, and an externally threaded portion 132. Arrowhead 110 may be similar to arrowhead 10, discussed above, such that a detailed discussion of the arrowheads need not be repeated herein.

The similar components are referenced in FIGS. 1-6 with like reference numbers, but the reference numbers of FIGS. 4-6 having 100 added thereto.

[0029] In the illustrated embodiment, retaining mechanism 120 includes a wheel 134 adapted to rotate about pivot pin 116 as blade 112 pivots. Wheel 134 allows for pivotal movement of blade 112 by compressing of wheel 134 or movement of wheel 134 away from blade 112 or both. For example, wheel 134 may be made of a flexible material, such as rubber, elastomeric material or the like, such that wheel 134 may compress to allow the blade to rotate. Alternatively, the wheel may be connected to a linear retaining mechanism, such as in a similar manner as discussed above, to facilitate displacement of retaining mechanism 120 away from notch 124. Retaining mechanism 120 may further include a bearing or bushing (not shown) to aid in smooth rotation of wheel 134. Such bearing or bushing may be any suitable bearing or device that may ease rotation of wheel 134, such as, for example, a ball bearing, a bronze iolite-type bushing, or the like as will be apparent to the skilled artisan.

[0030] During assembly, wheel 134 may be pivotably attached to body 114 by axle 136. Axle 136 may, for example, be by a set-screw, cotter, press-fit pin, or the like. Retaining mechanism 120 may be located in a slot or passageway in body 114, thereby substantially centering wheel 134 with respect to body 114 for balance (see FIG. 6). After assembly, arrowhead 110 may be connected to an arrow or used as a projectile as described above. When fired and during flight, blade 112 is in an initial centered position wherein wheel 134 is at and partially in notch 124. When force is exerted at blade edge 118, as when one wing of the blade 112 encounters a harder material than the material encountered by the other wing, wheel 134 may be compressed or displaced by such force differential whereby blade 112 may then pivot as described above.

[0031] In addition to holding blade 112 in a centered position relative to body 114 (such as during flight), retaining mechanism 120 may be used to dampen rotational motion of blade 112. As the material used for wheel 134 increases in resilience, it acts to impede rotation of blade 112 even after wheel 134 has been forced out of notch 124. Also, the presence or absence of a ball bearing or bushing will affect how freely wheel 134 rotates and thus how freely blade 112 pivots. Thus, a desired resistance to pivotal movement of blade 112 can be achieved by selecting a material for wheel 134 that is capable of delivering a desired or appropriate amount of force, and/or selecting or omitting a bushing or bearing to promote or impede rotation of wheel 134.

[0032] Referring now to FIGS. 7-12, an archery hunting device or arrowhead 210 includes a first blade 212 and a second blade 213 pivotally mounted at a body 214 and pivotable about a pivot pin or axis 216. Arrowhead 210 may otherwise be substantially similar to arrowhead 10, discussed above, such that a detailed discussion of the arrowheads need not be repeated herein. The similar components are referenced in FIGS. 1-3 and 7-12 with like reference numbers, but the reference numbers of FIGS. 7-12 having 200 added thereto.

[0033] Body 214 may include a pointed portion 226, a passageway or threaded bore 228, and an externally threaded portion 232, similar to body 14, but may further include a wider slot 215 to accommodate at least two overlapping blades (FIG. 12). First blade 212 and second blade 213 each have one or more substantially sharpened portions 218 and 219, respectively, and include apertures adapted to facilitate pivotable connection to body 214 with pivot pin 216. Each blade may include an interlocking tab 222 that lock the blades in a deployed position. The interlocking tabs may comprise non-planar portions or curved or turned portions of otherwise planar blades with the tabs 222 extending toward the other adjacent blade, such that when first blade 212 and second blade 213 pivot or open sufficiently, the non-planar portion or tab of the first blade snaps over the edge or non-planar portion or tab of the second blade, thereby substantially locking the two blades to form a substantially unitary whole blade. First blade 212 and second blade 213 may be substantially identical to promote manufacturing efficiency and cost effectiveness.

[0034] In the illustrated embodiment, first blade 212 has a first opening lever 224 configured to convert the force of impact on first opening lever 224 with an object such as an animal into rotational motion of first blade 212 toward its open position (FIG. 8). Second blade 213 may be configured similarly to first blade 212, where a second opening lever 225 is configured to translate the same or similar force employed in rotating first blade 212 into rotation of second blade 213 toward its upper position.

[0035] A retaining mechanism (not shown in FIGS. 7-12) may also be utilized with arrowhead 210, such as a biasing element with a ball bearing or a spring wheel in accordance with retaining mechanisms disclosed herein. If a retaining mechanism is employed, first blade 212 and second blade 213 may each comprise a notched portion of a rear edge (not shown) to create a rear edge substantially similar to those described above when in the deployed position. The retaining mechanism may retain the blades in their folded or aligned positions to provide a straighter flight, and/or the retaining mechanism may retain the blades in a centered position when in their

deployed position. Thus, such a retaining mechanism could act to retain the blades in a centered deployed position until one blade encounters a material harder than the other blade encounters, as described in detail above.

[0036] First blade 212 and second blade 213 may overlap in a folded or centered or aligned position (FIG. 10) or shift to a deployed position (FIG. 11), wherein first blade 212 and second blade 213 may interlock to hold the deployed position. Once interlocked, the blades, acting as a unitary whole, may be acted upon by a retaining mechanism. The pivot connection between blades 212 and 213 and body 214 may be made with a set screw or other threaded connector or the like. Alternatively, the pivot connection may be an interference-fit pin, cotter, or other such device as will be apparent to the skilled artisan.

[0037] Thus, while arrowhead 210 is in flight, first blade 212 and second blade 213 may be in a folded position (FIG. 7) to minimize frontal area of the blades, thereby reducing wind drag and the potential for accuracy-degrading aerodynamic imperfections. Upon impact with an object such as an animal, first blade 212 and second blade 213, responding to forces exerted on first opening lever 224 and second opening lever 225, respectively, pivot to a deployed position (FIG. 8), thereby forming a broad cutting blade for promoting an increased rate of bleeding and a more humane kill. Further, when in the deployed position, the interlocked blades may pivot about pivot point 234 in a similar manner as described above.

[0038] Therefore, the function of the pivoting or pendulum blade allows for deeper penetration because the blade will rotate upon contact with bone or harder tissue. This allows an arrow equipped with the arrowhead disclosed herein to pass through the animal with less resistance and without being jolted off its intended course. This provides enhanced penetration, and results in an efficient kill.

[0039] With the pivoting of the blade, there may be little or no loss in accuracy because the retention mechanism ensures the blade will stay at a centered position during flight, thereby limiting problems that may arise from an unbalanced arrowhead. With two pivotable blades, the flight characteristics can be improved still further, providing for a more aerodynamic arrowhead with the same potential for a large wound cavity associated with the single-blade embodiments.

[0040] Changes and modifications to the specifically described embodiments may be carried out without departing from the principles of the present invention, which is intended to be limited only by the scope of the appended claims as interpreted according to the principles of patent law.

The embodiments of the invention in which an exclusive property is claimed are defined as follows:

1. An arrowhead for use with an arrow in archery, said arrowhead comprising:
a body;
at least one blade pivotally mounted at said body, said at least one blade having a cutting edge and a rear edge, said rear edge having a notch, wherein said blade pivots relative to said body and about a pivot axis between a generally centered position and an angled position; and
a retaining mechanism disposed at said body and engaging said notch when said blade is in the centered position, wherein said retaining mechanism is adapted to impede pivotal movement of said blade about the pivotal connection.
2. The arrowhead of claim 1, wherein said body further defines a substantially pointed portion.
3. The arrowhead of claims 1 or 2, wherein said retaining mechanism comprises:
a ball bearing adapted to engage said notch;
a biasing element adapted to act on said ball bearing, wherein said biasing element urges said ball bearing toward said rear edge and at least partially into said notch when said blade is in the centered position.
4. The arrowhead of claim 3, wherein said biasing element comprises one of: (i) a coil spring and (ii) an elastomeric material.
5. The arrowhead of claim 1, wherein said retaining mechanism comprises:
a wheel rotatably attached to said body and adapted to engage said notch when said blade is in the centered position.
6. The arrowhead of claim 5, further comprising a bearing attached to said spring wheel to facilitate rotation of said spring wheel.

7. The arrowhead of any preceding claim, wherein said body further defines an externally threaded portion, said externally threaded portion being adapted to threadably attach to an arrow.
8. The arrowhead of any preceding claim, wherein said body further defines a slot, said slot being adapted to receive said at least one blade.
9. The arrowhead of any preceding claim, wherein said at least one blade comprises at least two blades.
10. The arrowhead of claim 9, wherein said blades are adapted to pivot to a folded position wherein said blades are in substantial alignment with said body, and wherein said blades are adapted to pivot to a deployed position in response to an impact force, said blades being substantially secured in said deployed position.
11. The arrowhead of claim 10, wherein said blades are adapted to pivot together about said pivot axis when in said deployed position.
12. The arrowhead of any of claims 9-11, further comprising a retaining mechanism adapted to impede pivotal movement of said blades about the pivotal connection.

Applicant : Douglas A. Vandewater
 Title : ARROWHEAD WITH PIVOTING BLADE
 Docket No. : EPH01 P-100
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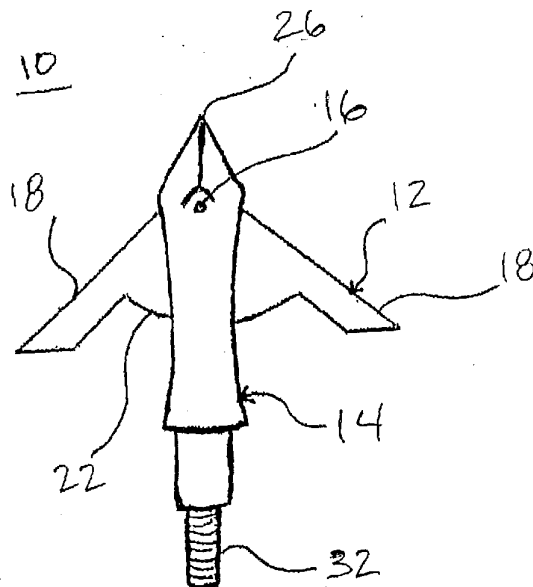


FIG. 1

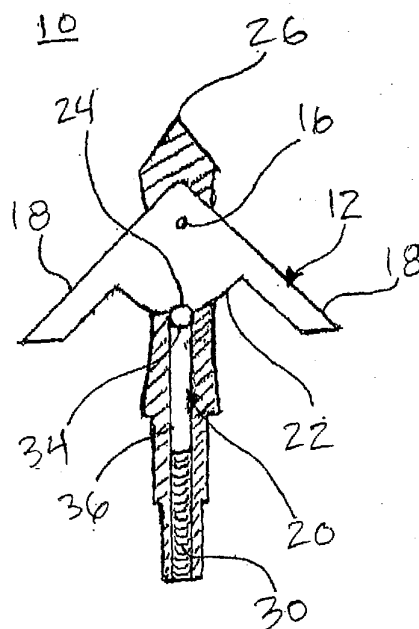


FIG. 2

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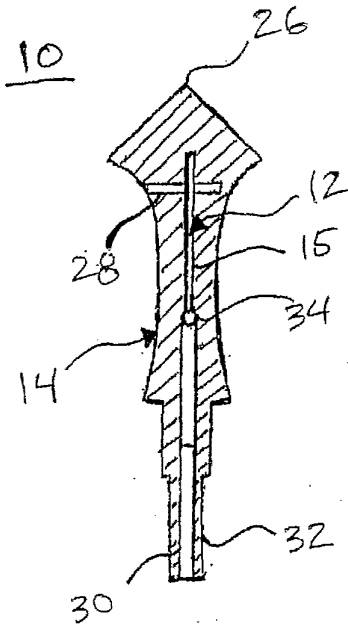


FIG. 3

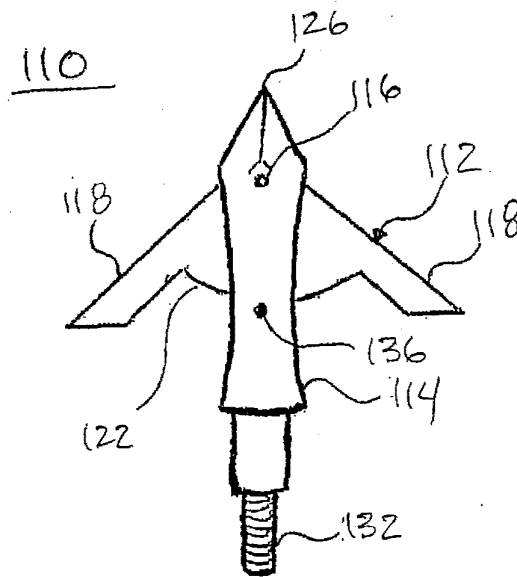


FIG. 4

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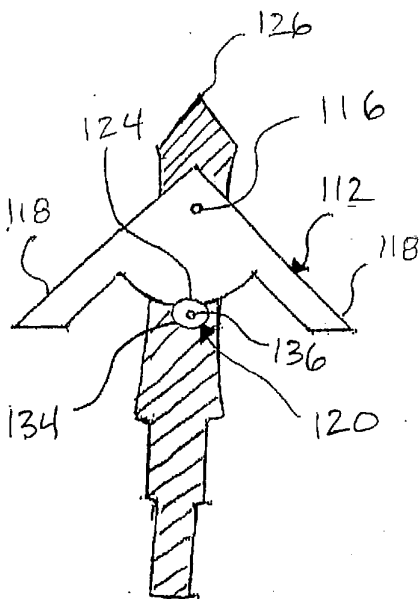


FIG. 5

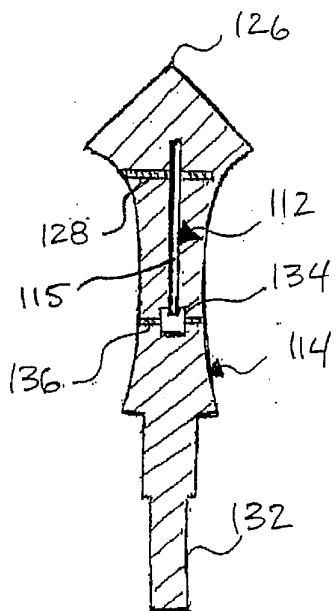


FIG. 6

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Sheet No. : 4 of 6

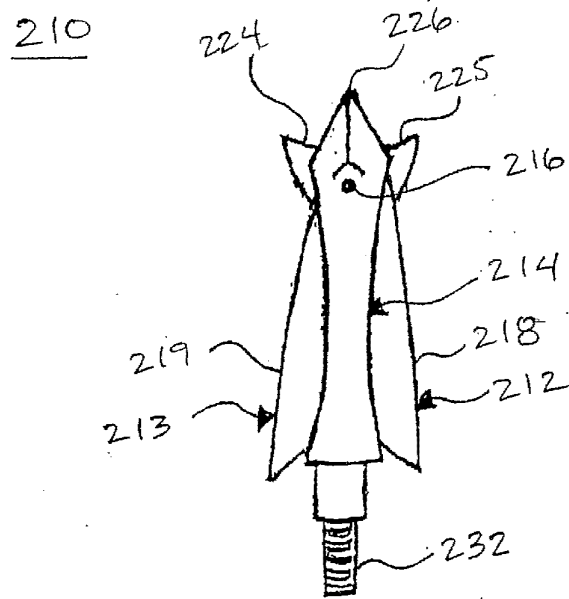


FIG. 7

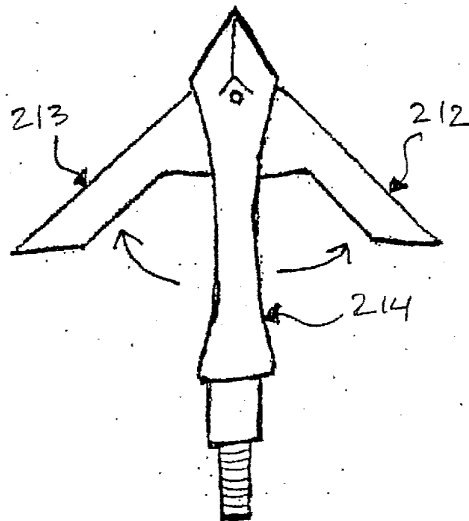


FIG. 8

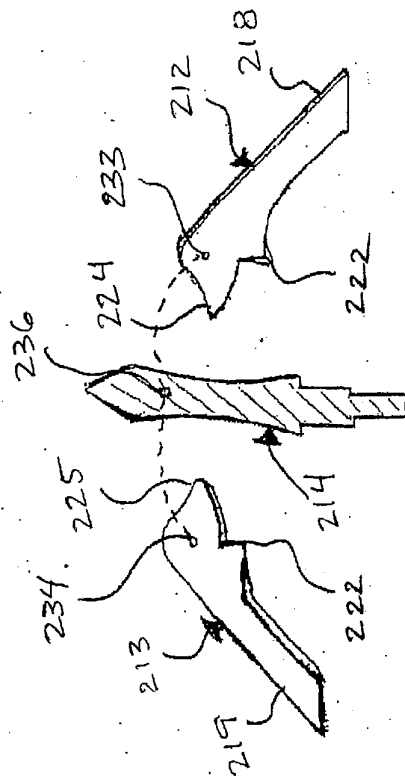


FIG. 9

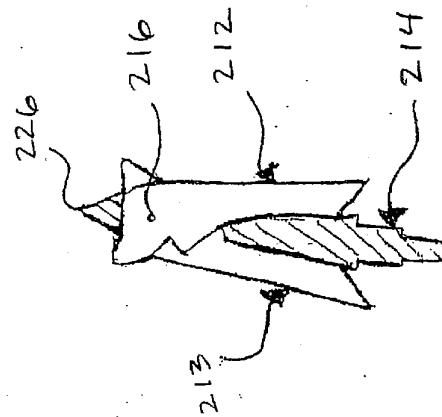


FIG. 10

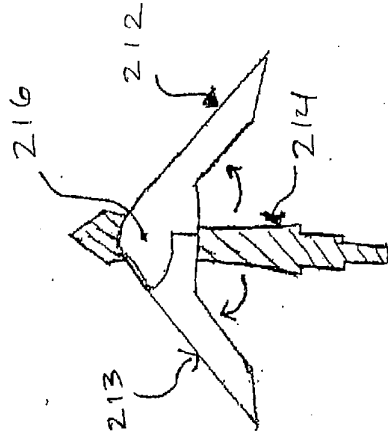


FIG. 11

Applicant : Douglas A. Vandewater
Title : ARROWHEAD WITH PIVOTING BLADE
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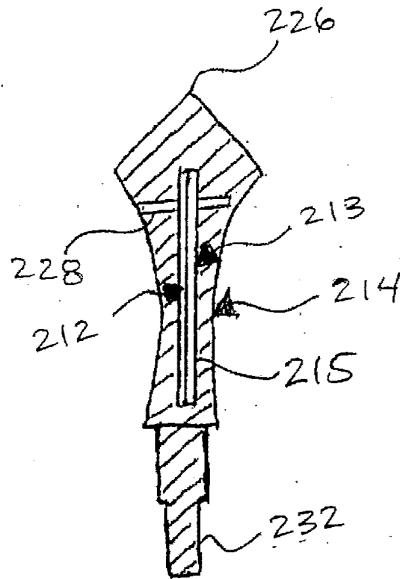


FIG. 12

Electronic Patent Application Fee Transmittal				
Application Number:				
Filing Date:				
Title of Invention:		ARROWHEAD WITH PIVOTING BLADE		
First Named Inventor/Applicant Name:		Douglas A. Vandewater		
Filer:		Timothy A. Flory/Kristen Buter		
Attorney Docket Number:		EPH01 P-100		
Filed as Small Entity				
Provisional Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Provisional Application filing fee	2005	1	105	105
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Total in USD (\$)				105

Electronic Acknowledgement Receipt

EFS ID:	3030283
Application Number:	61038286
International Application Number:	
Confirmation Number:	2327
Title of Invention:	ARROWHEAD WITH PIVOTING BLADE
First Named Inventor/Applicant Name:	Douglas A. Vandewater
Customer Number:	28101
Filer:	Timothy A. Flory/Kristen Buter
Filer Authorized By:	Timothy A. Flory
Attorney Docket Number:	EPH01 P-100
Receipt Date:	20-MAR-2008
Filing Date:	
Time Stamp:	16:41:36
Application Type:	Provisional

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$ 105
RAM confirmation Number	1817
Deposit Account	220190
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1	Provisional Cover Sheet (SB16)	ProvisionalCoverSheet.pdf	1000270	no	3
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Warnings:					
Information:					
2	Application Data Sheet	DataSheet.pdf	967091	no	4
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3		Application.pdf	760369	yes	10
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	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	8	
	Claims		9	10	
Warnings:					
Information:					
4	Drawings-only black and white line drawings	Drawings.pdf	102580	no	6
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5	Fee Worksheet (PTO-06)	fee-info.pdf	8122	no	2
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Warnings:					
Information:					
Total Files Size (in bytes):			2838432		

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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.