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ARROW HOLDER AND RELEASE SIGNAL DEVICE FOR A BOW

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FIG. 1

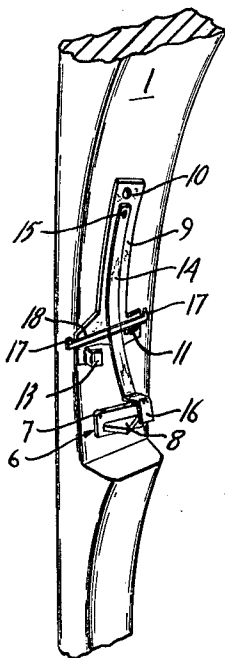
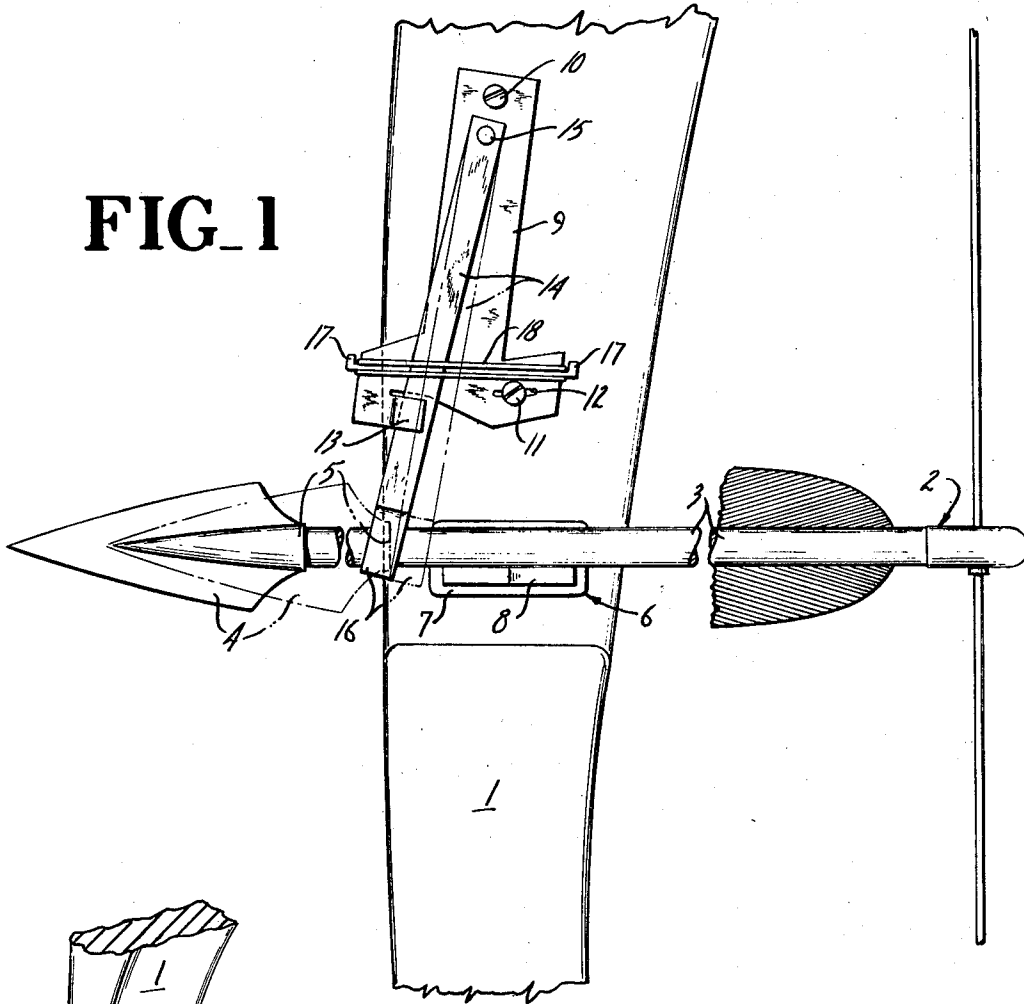


FIG. 2

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ARROW HOLDER AND RELEASE SIGNAL DEVICE FOR A BOW

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12 Claims

ABSTRACT OF THE DISCLOSURE

A bow and arrow having a sounding device which emits a detectable signal when the bow has been drawn to a desired limit.

The signal device is a leaf-spring which is held in tension over the arrow shaft and slidably holds the arrow against a guide-rest when the bow is being drawn, and which is released to swing up and vibrate when an abutment on the arrow shaft engages one edge of the spring.

This invention relates to an improved bow and arrow having a signal device. More particularly, the invention provides a spring element on a bow which holds the arrow in place and gives rise to a signal when the spring is released from a loaded position by drawing the bow string back and pulling the arrow against the spring.

Accuracy in bow and arrow shooting is dependent on numerous factors. An arrow trajectory is determined by the initial velocity and angle of firing. The initial velocity is directly dependent on the force exerted by the bow string on the arrow when both are released; and, in turn, the force exerted at that moment depends on how far back from the center of the bow the bow string has been drawn.

A skilled hunter will use a bow which he is capable of drawing to the fullest extent possible, since the greater the speed he can impart to the traveling arrow, the straighter the arrow trajectory will be. However, since the force of gravity will necessarily cause the arrow trajectory to arch towards the earth no matter what the arrow speed, the skilled bow hunter will make judgments as to the distance from the target and compensate for his arch by aiming the arrow above the target.

By practice the bow hunter educates his senses to quickly judge a distance and the compensating aim correction needed. But his aim is also dependent on whether he has drawn the bow string back to the proper position. His ability to accurately judge the compensating angle is impaired if he does not draw the bow string consistently to the same position. Even though the bow hunter tries to pull the bow string to its fullest extent, the limit being approximately the point at which the arrow head has reached the bow, small variances in the pull can alter the arrow enough to render his aim incorrect. Thus, the hunter strives for consistency in the extent of pull on the bow string.

However, since his eyes are occupied with the task of sighting the line of fire, the hunter experiences difficulty in training his senses to judge the proper pull. Much practice is needed to maintain consistency and no reliable means of training assistance has been developed over the years in which bow hunting has been used.

For purposes of assisting the bow hunter in his efforts to develop his aim, the present invention provides a strip segment which springs outward and which may vibrate to emit an audible hum when it is released from a loaded position by pulling the bow string back a predetermined amount. One end of the spring segment is attached to the bow by a rivet or other suitable means which allows the spring to pivot about the point of attachment. The

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spring segment is curved away from the bow and is positioned and shaped to fit over an arrow shaft resting on a guide member attached near the center of the bow. A plate is also adjustably fastened to the bow and includes a catch under which the strip segment may be placed to hold the same against the arrow shaft. When so held the spring is loaded and in a position to be engaged by a protruding surface on the arrow shaft, such as the back portion of the arrow head. By drawing the bow string a predetermined amount, the arrow head engages the spring segment and the latter element pivots around the rivet and is forced from underneath the catch to release the stored spring energy, thus causing it to spring outward and to vibrate and emit an audible hum.

Another problem in bow and arrow shooting is that some manipulation is always required to keep the arrow in a firing position, which is against the bow and usually on a guide rest secured to the bow. Bow hunters must constantly hold the arrow in place as they hunt, or otherwise allow the arrow to be in an un-ready position at the time game is spotted and quick firing is needed. Also, when the hunter is sitting, as in a blind, he would not have the arrow in firing position without expending effort to keep the arrow from falling off the guide rest.

The problem of keeping the arrow in firing position is worsened when hunting is done in cold climates. Usually, the bow hunter will hold the arrow in a ready position by placing two fingers of one hand on either side of the arrow shaft and curled around the bow string to hold the arrow in engagement with the string. In cold weather, holding the fingers in such a position results in much discomfort, since the fingers are more exposed to the cold and may even become numb.

Another aspect of the problem is that during shooting of an arrow, only the more experienced archer is able to pull the bow string and arrow and confidently expect the arrow shaft to remain against the bow and on the guide rest. The arrow tends to fall or move away from the bow. Previous devices, which have attempted to solve the arrow holding problem, were of no help in this area because they were constructed so as to release the arrow whenever the bow was drawn slightly.

To solve these problems, the invention provides, in addition to a spring sounding device, an arrow holding structure. The leaf-spring which engages the arrow shaft is of sufficient rigidity to slidably hold the arrow against the bow and on a guide rest. The arrow is so held until an abutment on the arrow shaft releases the spring as in the signaling operation described above. This occurs when the bow string is drawn the predetermined amount.

The drawing shows the invention in its presently most preferred embodiment.

In the drawing:

FIG. 1 is a side elevation of a bow with an arrow shown positioned for firing and showing the invention; and shown in phantom is the position of the spring segment when engaged by the arrow head;

FIG. 2 is a perspective view of the bow showing the invention.

The drawings illustrate a bow 1 having an arrow 2 positioned on the bow for firing. The arrow has a shaft 3 and an arrow head 4 of the broadhead type. The broadhead type arrow head has a base 5 fitting over the arrow shaft and is slightly larger in diameter than the shaft 3. Base 5 can be used to actuate the signal device of the invention.

The arrow shaft 3 rests on a lower guide 6 which consists of fastener plate 7 serving to attach the guide securely to the bow by suitable means such as an adhesive or screws. Plate 7 has a perpendicularly protruding portion forming a guide rest 8 which supports the arrow shaft 3 when it is in firing position. The lower guide 6 is

made of suitable smooth surfaced material to allow the arrow shaft 3 to slide freely on the guide.

Above lower guide 6 is a T-plate 9 which is attached to the bow by screw 10 and adjusting screw 11 so as to lie flat against the side surface of the bow 1. A slot 12 is provided in the rearward leg of the T-plate 9 to permit angular adjustment of the plate 9 by loosening screw 11 and pivoting the plate 9 about the screw 10 to varying angles with respect to the vertical axis of the center portion of the bow 1, and then retightening screw 11.

The forward leg of T-plate 9 is provided with a cut-out portion on its lower edge and a corresponding protruding portion extends in a direction away from the plate to form the catch 13. Catch 13 extends toward the center line of the stem of T-plate 9 and at the rear edge of the catch 13 an open space is provided between catch 13 and T-plate 9. A leaf spring segment 14 is fastened to the upper end of plate 9 by rivet 15. In FIG. 1, the strip-spring segment 14 is positioned beneath catch 13. In phantom, spring 14 is shown being pivoted out from underneath catch 13 by the arrow head. The lower end of strip-spring segment 14 is curved away from the bow and provided with a bend so that the segment is generally concave. A bent portion 16 generally extends away from the bow for a distance corresponding to the usual diameter of arrow shaft 3. When held by catch 13, as in FIG. 1, leaf-spring segment 14 is slidably engaged with arrow shaft 3 and is in tensed, stressed condition. Leaf-spring segment 14 is made of material which provides sufficient resiliency as to cause the strip to spring back to its usual arcuate unstressed shape when released by catch 13. The spring can also be made of sufficiently rigid material so as to serve as an arrow holder in conjunction with the guide rest 8.

The positioning of T-plate 9 with its catch 13 is generally, as adjusted by slot 12 and adjusting screw 11, near the forward edge of bow 1, so that the forward edge of leaf-spring segment 14, when confined by catch 13, will be engaged by the rear surface of base 5 on arrow head 4, or other suitable abutment, as arrow 2 is drawn back by the normal firing operation. The dimensions required to so position the assembly are variable according to the type and size of the bow.

In accordance with the invention, the operation of the bow and arrow is initiated by placing arrow 2 into engagement with the bow string and at once positioning arrow shaft 3 to rest on guide rest 8 and against fastener plate 7 on the bow. Leaf-spring segment 14 is then pivoted about rivet 15, flexed, and forced underneath catch 13 with the bent portion 16 of leaf-spring segment 14 slidably fitting over arrow shaft 3. The bow then being drawn, base 5 of arrow head 4, or any other desired abutment on the arrow shaft, is forced against spring segment 14 to pivot it backwards and out from beneath catch 13, thus actuating the signal device. Upon release the spring attempts to assume its usual arcuate shape and swings away from the bow and will vibrate for a time about rivet 15. Being in the line of sight of the archer, a signal is thus provided, and in vibrating, strip-spring segment 14 will cause an audible hum or signal to be heard. In the manner of the invention, the bow hunter can first determine the proper pull on bow 1 and by adjusting screw 11 in slot 12 he can set spring segment 14 to be triggered by arrow head 4 at the precise point desired. Either the hum of the released strip-spring segment 14 or the released strip spring 14 itself, signals the hunter that he has drawn the bow string the desired amount.

Since the hunter may desire a louder signal for practice than he would wish while hunting, fearing that the game would be startled by the signal, the device of the invention can also be provided with a sound damping device. In this embodiment of the invention, T-plate 9 has hooks 17 disposed on the ends of the forward and rear legs of the T. A resilient strap or rubber band 18 is

drawn tightly across the stem of plate 8 and attached to both hooks 17. The hooks 17 extend away from T-plate 9 a distance sufficient to position the rubber band a short distance over spring 14. The rubber band 18 will thus be engaged by strip-spring segment 14 when the latter is triggered and will damp the vibrations. The result is that the hum ordinarily emitted is considerably lessened in volume, as desired by the hunter.

The above description is by way of example only and numerous changes may be made in the invention. For example, the device would not require extensive alteration to work with a variety of guide means or with the absence of the same. Also it may be desired to provide a lock means to which strip-spring segment 13 may be connected and thus temporarily secure the segment in an inoperable position away from the guide rest 8.

Various modes of carrying out the invention are contemplated as being within the scope of the following claims particularly pointing out and distinctly claiming the subject matter which is regarded as the invention.

I claim:

1. In a bow and arrow construction, the bow having an arrow guide rest to support the shaft of the arrow, audible signal generating means carried by the bow for indicating a predetermined drawing distance of the arrow along the bow, said signal generating means having an extended portion disposed to engage the arrow shaft; and actuating means, comprising an abutment on the arrow for actuating the signal generating means when the arrow has been drawn through a predetermined distance along the bow.
2. The structure of claim 1, wherein the abutment is located adjacent the head of the arrow.
3. The structure of claim 1, wherein said extended portion of the signal generating means engages the arrow shaft in a slidable fashion to releasably hold the arrow shaft to the guide rest.
4. In a bow and arrow construction: an arrow guide rest on the bow to support the shaft of the arrow; signal generating means carried by the bow for indicating a predetermined drawing distance of the arrow along the bow, said signal generating means having an extended portion disposed to slidably engage the shaft of the arrow, and further having a spring element; actuating means comprising an abutment on the arrow for actuating the signal generating means when the arrow has been drawn a predetermined distance along the bow; and catch means attached to the bow adjacent the guide rest for selectively engaging the extended portion of the signal generating means and confining the spring element in a tensed state, said extended portion being disposed to be engaged by the abutment on said arrow when the latter is drawn said predetermined distance to thereby release the spring element from the tensed state and provide a signal.
5. The structure of claim 4, wherein the signal generating means is a generally curved leaf-spring having one end pivotally attached to the bow and the opposite end curved outwardly from the bow when the spring is not held by the catch means.
6. The structure of claim 4 and including adjusting means for changing the location of the signal generating means and the catch means on the bow to vary the drawing force required to release the signal generating means from the catch means.
7. The structure of claim 6, wherein said adjusting means comprises a plate adjustably mounted flatwise on the bow and carrying said signal generating means and said catch means.
8. The structure of claim 4 in which said signal generating means generates an audible signal, and including

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damping means on the bow and disposed to be engaged by said signal generating means for resisting the vibratory motion of said released signal generating means to quiet the audible signal therefrom.

9. The structure of claim 8, wherein said damping means comprises an elastic element disposed across the signal generating means.

10. A releasable arrow holder for use with a bow and arrow where the arrow slidably engages the bow at an arrow rest section of the bow during the course of drawing the bow and arrow to a full drawn firing position, the arrow holder comprising:

resilient arrow holding means carried by the bow at the arrow rest section for slidably holding an arrow while the arrow is drawn generally to a full drawn position; and

catch means connected to the bow, the catch means having a slot disposed to receive and hold said resilient arrow holding means in an arrow holding and stressed position, said catch means being disposed to release said resilient arrow holding means from the slot in response to engagement of the resilient arrow holding means with an abutment on the arrow, so that said resilient arrow holding means returns to an unstressed condition and is not in an arrow holding position.

11. In a bow and arrow construction for firing an arrow from a generally full drawn bow having an arrow guide rest to support the shaft of the arrow;

arrow holding means carried by the bow to releasably hold the arrow shaft against the guide rest, the arrow holding means comprising a generally curved leaf spring having an end pivotally attached to the bow and the opposite end adapted to fit over the arrow shaft when the arrow is resting on the guide rest; and

an actuating abutment on the arrow, the abutment being located so that it is disposed at the guide rest when the arrow is full drawn and so that it releases the arrow holding means from engagement with the arrow shaft in response to a given drawing distance to full draw of the arrow shaft along the arrow rest.

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12. An arrow release signal device for use with a bow and arrow, where the arrow slidably engages the bow at an arrow rest section of the bow at least when the arrow is at a generally full drawn position, the device comprising:

signal generating means carried by the bow at the arrow rest section for generating a detectable signal in response to a predetermined full draw of the arrow along the arrow rest section of the bow, the signal generating means having a resilient member disposed at the arrow rest section of the bow, with a part thereof extending to a position for engagement with an arrow at full draw, the signal means further having catch means connected to the bow for holding the resilient member in a flexed position and for releasing the resilient member from this flexed position in response to the predetermined full draw position of the arrow.

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