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3,450,122

ARCHERY BOW WITH ARROW-ACTUATED SIGNALLING MEANS

Filed June 2, 1965

Sheet 1 of 2

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Sheet 2 of 2

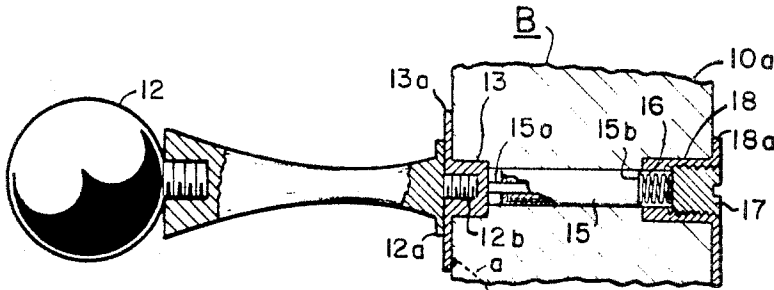


Fig. 5

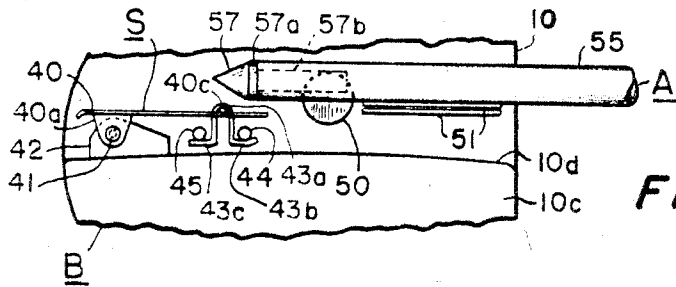


Fig. 6

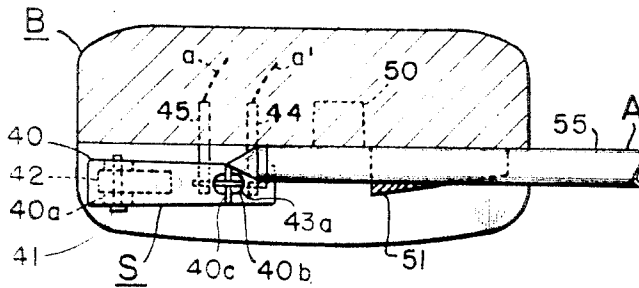


Fig. 7

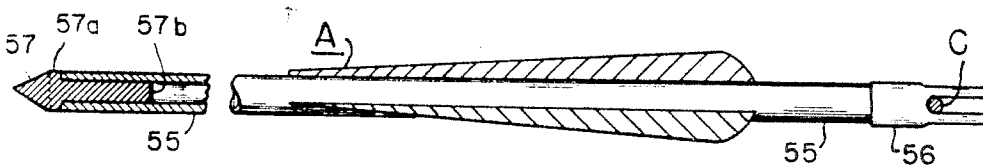


Fig. 8

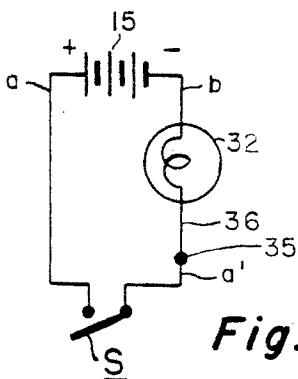


Fig. 9

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1

2

ARCHERY BOW WITH ARROW-ACTUATED SIGNALLING MEANS

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13 Claims

ABSTRACT OF THE DISCLOSURE

A bow and arrow mechanism or construction is provided that utilizes a magnet carried by a central portion of the bow for energizing a tip end or head of the arrow to, in turn, energize and close a switch when the arrow and its head has been drawn back to a proper, accurate, shooting position. A source of electrical energy such as a battery is carried by the bow and is connected to the switch for energizing a light bulb signaling means that is carried by the bow near its sighting element. As a result, the archer can keep his eyes on the target while aiming through the sighting element, without looking at the arrowhead to determine if it is properly aligned with respect to the bow before release.

This invention relates to an archery aiming device or position indicator for use in facilitating the use and aiming of an arrow employed in the sport of archery. A phase of the invention relates particularly to means for accurately indicating to the user or archer when the arrow is in a proper releasing position from a bow.

Heretofore, difficulty has been encountered by the archer in accurately sighting or aiming an arrow, while at the same time, accurately determining when the arrow has been drawn back on a bowstring to the most desirable releasing or shooting position along the bow and particularly, without diverting the archer's attention from properly sighting the arrow at the time of its release. Further difficulty is encountered in maintaining the head or tip end of the arrow in close adjacency or abutment with the surface portions of alignment means, such as may be provided on the central stock or shank body part of the bow, without diverting attention from the proper sighting of the arrow at the time of its release.

In carrying out my archery invention, I have been able to meet or solve the above difficulties by relatively simple operating means or mechanism. Such means is actuated to close an electric circuit for energizing a signaling means in such a manner that the operator or archer will know when the arrow has been drawn back to a desired shooting position. It also serves to position the head, tip or end of the arrow in a proper aligned relation with respect to a guide portion of the bow in such a manner that the operator or archer does not have to worry about manually doing so. The archer does not have to worry about the retention of the arrow in proper alignment with guide means, and he can thus, at all times, keep his eyes aligned on a sight and the target to thereby increase the accuracy of his shooting.

It has been an object of my invention to meet the disadvantages factors heretofore encountered in shooting an arrow and particularly, from the standpoint of adversely diverting the attention and sighting of the arrow by the archer.

Another object of my invention has been to devise a relatively simple mechanism or means which will be energized to indicate to the archer a proper shooting position of the arrow and which, at the same time, may be employed for retaining the arrow tip or head in a properly guided or aligned shooting position.

A further object of my invention has been to provide means for improving the accuracy of arrow shooting in the sport of archery.

A still further object of my invention has been to provide simple means or mechanism for permitting the archer to aim an arrow without diverting his attention from sighting the arrow.

These and other objects of my invention will appear to those skilled in the art from the illustrated embodiment thereof in which:

FIGURE 1 is a side view in elevation showing a drawstring of a bow and an arrow in a drawn-back typical shooting position;

FIGURE 2 is an enlarged side fragment in elevation through a central body, draw or shank of a bow with which a construction of my invention is shown incorporated; this view is taken along a wide, arrow guiding side face of the bow;

FIGURE 3 is a back end view in elevation on the scale of FIGURE 2 and of substantially the same fragmental part of the bow body, further illustrating mechanism or means of my invention; this view is taken at right angles to FIGURE 2;

FIGURE 4 is a fragment on the scale of FIGURES 2 and 3 along an opposite wide side face of the central bow part with respect to FIGURE 2 and at right angles to FIGURE 3;

FIGURE 5 is a further enlarged fragment through an upper part of the bow on which a stabilizer may be positioned; in this view, a source of electric energy such as a battery is illustrated in an operating position within the bore of the bow part;

FIGURE 6 is a full scale view taken along the same wide face or side as FIGURE 2 and particularly illustrating switch, guiding and aligning means for the arrow;

FIGURE 7 is a horizontal section through the central body part of the bow on the scale of FIGURE 6 and further illustrating the means of FIGURE 6 and its positioning with respect to the bow part;

FIGURE 8 is a broken away top plan view partially in section showing an arrow that may be employed with the mechanism of my invention;

And FIGURE 9 is a circuit diagram illustrating means for energizing and de-energizing a signaling means such as a small or miniature electric light bulb.

In FIGURE 1, an arrow A is in a drawn-back, ready to shoot, aimed position towards a target, as accomplished by the archer by with one hand gripping the central part of a bow B at the hand grip portion thereof and with the fingers of the other hand pulling back a bowstring C to flex the flexible or resilient opposite or upper and lower end portions of the bow B. When the fingers of the hand gripping the bowstring C are released, then the arrow A will be released to, under tension force of the bow, shoot the arrow in the direction of the target. It will be apparent that for accurate shooting, it is necessary for the archer to not only accurately align the arrow A by such means as sight element 33 (shown of a cross hair type) of a sighting assembly D, but to also retain the tip part 57 (see FIGURE 8) of the arrow in a properly aligned and guided position from the standpoint of a shaft or central body part 55 of the bow B. In carrying out my invention, the archer may concentrate on properly sighting the arrow on a target using end-positioned sighting assembly D, without diverting his attention, even momentarily, to see if the tip or head 57 of the arrow A is at a proper shooting position and is properly guided and aligned from the standpoint of the bow B.

I provide signaling means 32 which is energized at the exact moment that the arrow tip 57 is in a proper, drawn-back position with respect to the bow B. The signaling

means 32 will be visible to the archer while he is concentrating on sighting the arrow through the sight element 33, such as a cross hair or peep-eye sight. The signaling means 32 may be in the form of a miniature, battery-energized light bulb of a voltage corresponding to the voltage of the energizing source, such as a DC dry cell battery 15 (see FIGURES 5 and 9). The arrow head part 57 which is of a magnetizable material, such as of iron or steel or any suitable alloy, passes magnetic energy from an adjacently positioned magnet 50 which, for simplicity, may be of a permanent magnet type. This magnetic energy is transmitted through the arrow tip 57, when it has been moved to a desired releasing or shooting position, to magnetically energize and raise an operating switch arm 40 to connect or close switch contacts 44 and 45 and electrically energize the signaling means 32. The switch arm 40 is also of a magnetizable material, such as of iron, steel or a suitable alloy, and is normally balanced to an open position (see FIGURE 2) to normally de-energize the signaling means 32.

As shown in FIGURE 1, the bow B may be conventionally provided with adjustable stabilizing or bow-balancing knobs 12 and 12' that are removable to facilitate transporting and packing the equipment. Although the battery or electric energy source 15 may be a separate source or may be carried in any suitable position or location from the standpoint of the bow B, I have as shown particularly in FIGURE 5, incorporated it with an upper stabilizer 12 and its mounting by merely extending the bore opening in an upper body portion 10a of the bow B to provide a battery housing and mounting. One lead, such as the positive lead a from the battery 15 may, as shown in FIGURES 2 and 5, be connected to outwardly-projecting side-mounted, pin-like, switch contact 45 (see also FIGURES 6 and 7) which is one of a pair of contacts of a switch mechanism S. A second and adjacent, outwardly-projecting, pin-like, switch contact 44 has a positive lead a' connected to a brass, wood-screw terminal post 35 that is carried by a back sighting end face of a central body shank, stock or draw portion 10 of the bow A. A flexible, spring-like, insulated, conductor wire lead 36 is soldered to the post 35 to provide a positive terminal lead to socket 31 for the light bulb 32.

The negative lead from the battery 15 is made, as shown particularly in FIGURES 2 and 5, from a base contact made by one end of a spiral tension spring 16 that is soldered or brazed to an inner end of a removable closure plug 17. The plug 17 is threadably-removably-secured within a bore-mounted, end sleeve 18 that carries both the plug 17 and the spring 16. The mounting sleeve 18 has a flange portion 18a that carries an electrically-conductive, bifurcated, metal mount 20 for one end of a longitudinal guide bar 21 of the sighting means D and for a calibrated, sight-aligning bar 34. A metal slide guide block 23 is slidably-adjustably mounted on the guide bar 21 and conducts electricity from the flange 18a, mount 20 and guide bar 21, through an angle-shaped metal mounting bracket or arm 30a (see FIGURE 3) to the negative terminal of a socket 31 for the signaling means 32.

It will be noted that the socket 31 is secured on the projecting end of the mounting bracket 30 and that this bracket has an angle-shaped extension portion 30a which, at its inner end, fits within a transverse bore in the slide block 23; it is removably and adjustably-secured therein by a set screw 23a. It will be apparent that when the electrical switch means S of FIGURE 9 is closed, that positive electric energy will be carried along the leads a and a', the terminal 35 and the flexible wire 36 to the one side of the socket 31, and that negative energy will be carried from the mounting flange 18a through the sight assembly D to the negative side of the socket 31 to energize the signaling means or light bulb 32.

As shown in FIGURE 5, the upper stabilizer 12 (like lower stabilizer 12') has a flange portion 12a and a projecting, threaded stud 12b. The stud 12b is adapted to be

removably-screwed into an internally-threaded, sleeve-like, mounting means or boss 13 which is carried within the opposite end of the battery-carrying bore of the bow B. The stabilizer 12 may be tightened-down until its flange 12a securely abuts a flange 13a of the mounting sleeve 13. Positive pole 15a of the battery 15 is shown in electrical contact with the mounting boss or sleeve 13 and the positive lead a is shown soldered to its flange 13a.

Operating or control arm 40 of the switch S, as shown particularly in FIGURES 2, 6 and 7, has a downwardly or outwardly projecting pair of spaced-apart mounting ears 44a adjacent its forward end that are pivotally-mounted on an upwardly-projecting mount 42 by a pivot pin 41. The pin 41 has a head at its outer end and may be removable to permit the arm 40 and an associated switch swing piece or U-shaped switch contact element 43 to be removed when the bow B is being packed for transportation or storage. The mount 42 is cemented or in any other suitable manner, secured on a horizontal sighting shelf or ledge portion 10d of the bow B adjacent its hand grip portion 10c. Since the one or front end portion of the arm 40 is pivotally secured on the mount 42, it will be apparent that it is normally balanced downwardly at its opposite or back end. U-shaped switch, swing piece or contact element 43 of loop-like form is carried by the back end portion of the switch control arm 40 to project downwardly through a control hole or opening 40b in the arm (see FIGURE 7) for swingable or pivotal mounting on a cross pin 40c which is brazed, or in any suitable manner, secured on the arm 40 to extend across the hole or opening 40b therein.

A back end portion 43b of the switch swing piece or contact element 43 is upwardly curved to provide one switch contact with switch contact pin 44. It will be noted (see FIGURES 6 and 7) that I have shown a pair of horizontally spaced-apart switch contact pins 44 and 45 that are secured within transverse bores in the stock part 10 to project outwardly from its wide side face. As shown in FIGURE 2, these two contact pins 44 and 45 are respectively connected to wire leads a and a' (see also FIGURE 9). The other or front end portion 43c of the element 43 is also curved upwardly and is adapted to be normally out of engagement with switch pin 45 when the switch is in the open position of FIGURE 2 and to be in electrical engagement therewith when it is in its closed position of FIGURE 6. The end portions 43b and 43c are in closing engagement with the pins 44 and 45 when the operating arm 40 has been magnetically energized by the head or tip 57 of the arm A and when the head 57 has been moved or drawn back to the "ready" position of FIGURE 6 and magnetically energized by its adjacency with a magnet 50.

The means for energizing the switch S and also for simultaneously retaining the head or tip 57 of the arrow A in a drawn-in aligned position, is provided by the magnet 50 which may be of cylindrical shape (as shown in FIGURES 2, 6 and 7) and which, as shown in FIGURE 7, is mounted in a transverse bore in the wide side face of the stock 10. An arrow rest 51 may consist of a pair of guide feather elements that are, along their inner edges, secured as by cementing, to the wide side face of the stock 10 for, in a conventional manner, guiding the arrow during its draw back and release. It will be noted that the operating switch arm 40, when in its magnetically drawn, upwardly-pivoted or closing positioning, constitutes a substantial horizontal continuation of the upper portion of the arrow rest 51.

FIGURES 2, 3 and 4 show a suitable sighting means D which is on a narrow sighting end face of the stock 10 of the bow B. A bifurcated, ear-like mount 20 extends from the flange 18a, secures the means D at one end and a bifurcated, ear-like mount 24 secures it in position at its other end. A wood screw 19 further secures the flange 18a of the mount 20 and a wood screw 25 secures the flange of the mount 24. A threaded pin or screw 22

is provided with a nut and extends through one end of the guide bar 21 and the calibrated alignment bar 34 to secure them on the mount 20, and a threaded pin or screw 26 is provided with a nut and extends through the other end of the bars 21 and 34 to secure them on the mount 24.

The slide block 23, in addition to carrying the signaling or light means 32, is shown provided with the cross hair sight ring or element 33 which has a supporting pin 33a (see FIGURE 3) that extends through a bore hole in the bar 23 and is adjustably-secured therein by a set screw 23b. It will be noted that the light 32 is thus moved along with the sight element 33 so as to be in close adjacency thereto during the use of the sight element in a suitable adjusted position along the calibrated scale bar 34. The slide block 23 carries a finger 23c to indicate its position with reference to the scale of the calibrated bar 34.

In FIGURE 8, I have illustrated an arrow A whose main body or shaft portion 55 may be of hollow or tubular construction of a suitable material, such as reinforced resin or aluminum alloy. It is also shown provided with typical guide feathering and a bow-string-receiving notched nock 56 that is secured thereon. The head or tip part 57 which, as previously indicated, should be of a magnetizable type of material or metal; it is shown provided with an annular stop portion 57a and an extending plug portion 57b, so that it can be securely mounted within the front end portion of the tubular body or shaft 55 of the arrow A. As indicated in FIGURE 6, the plug part 57 is in transverse alignment with the face of the magnet 50 when the arrow has been drawn back to the desired shooting position. Thus, at this time, the tip 57 is magnetized to, in turn, magnetize and raise the operating switch arm 40 and close the switch S. This, of course, energizes the signaling means or light 32. At the same time, the magnetization of the tip 57 causes the tip to be drawn against and into abutting alignment with the wide side face (see FIGURE 7) of the bow B, without any particular attention being paid thereto by the archer.

Although I have described a preferred embodiment of my invention for the purpose of illustration, it will be apparent that various modifications and changes as well as adaptations may be effected without departing from its spirit and scope as indicated by the appended claims.

What I claim is:

1. An archery bow and arrow mechanism wherein an arrow head is to indicate the desired shooting position of the arrow with respect to the bow which comprises, a source of electric energy, signaling means, switch means connected between said source and said signaling means, and switch operating means positioned on the bow and energized by an adjacent unconnected positioning of the arrow head to close said switch means and energize said signaling means when the arrow head has been moved to a shooting position.

2. Archery mechanism as defined in claim 1 wherein, energizing means is positioned on the bow for energizing the arrow head when the arrow is moved into the desired shooting position, and said operating means has means energized by the energization of said arrow head to close said switch.

3. Archery mechanism as defined in claim 2 wherein, switch contact means is carried by said operating means and is normally balanced to an open position, the arrow head and said operating means are of magnetizable material, said energizing means is a magnet, and said operating means is actuated to close said switch by magnetic energy imparted to it by the arrow head when the arrow head is magnetically energized by said energizing means.

4. An archery bow and arrow mechanism for a bow wherein a magnetizable head of the arrow indicates a desired shooting position of the arrow which comprises, magnet means carried by the bow for magnetizing the head when the head has been moved into an adjacent position therewith to draw the head towards the magnet means into shooting alignment along the bow, switch

means positioned on the bow in a spaced relation from and adjacent said magnet means and having magnetizable means actuated by magnetization of the head to move said switch means to a closed position, and signaling means connected between a source of electrical energy and said switch means for visually indicating a desired shooting position of the arrow when the head is magnetized by said magnet means.

5. An archery construction comprising, a bow having a bowstring and an arrow wherein the arrow has a magnetizable head and the bow has a central body part for guiding the arrow, magnet means carried by the central body part for magnetizing the head when the arrow is in a shooting position, and means carried by the central body part and energized by the magnetization of the head to provide signal indication that the arrow is ready to be released.

6. An archery construction as defined in claim 5 wherein, said magnet means is a permanent magnet mounted within the central body part and has an end exposed to a wide side face thereof, arrow rest means is secured on the wide side face of the central body part to extend substantially horizontally therealong and adjacent the exposed end of said magnet; said means carried by said central body part includes, switch means mounted on the wide side face in a forwardly-spaced relation with respect to said magnet and forwardly with respect to said arrow rest means, a magnetizable switch arm carried by said switch means and swingably-positioned to extend laterally on the central body part, said switch arm being normally balanced downwardly to hold said switch in an open position, an electrically-energized signaling means carried by the central body part, a source of electrical energy electrically connected between said signaling means and said switch means, and said switch arm being magnetically energized by said head to move said switch means to a closed circuit position and energize said signaling means when the head is moved on said arrow rest means to a shooting position.

7. A construction as defined in claim 6 wherein, said source of electrical energy is a battery, mounting means is positioned in a bore of the bow for carrying said battery therein, and electrical connections extend from said battery to said switch means and said signaling means.

8. A construction as defined in claim 6 wherein, a sight is carried by the bow above said arrow rest means, and said signaling means is a light bulb positioned adjacent said sight to illuminate it.

9. An archery construction comprising, a flexible bow and a bowstring and an arrow wherein the arrow has a magnetizable head and the bow has a central body part that is provided with a wide side face for guiding the arrow and that is provided with a narrow sighting end face, sighting means positioned on the sighting end face of the bow and projecting therefrom, signaling means carried by the sighting end face adjacent said sighting means, a source of electrical energy carried within a bore of the bow adjacent the central body part thereof, an electrical switch operatively-positioned on the central body part adjacent the path of flight of the arrow, said switch being normally biased to an open position and having a magnetizable operating arm for movement to a closed position, means electrically-connecting said source of electric energy between said switch and said signaling means, a magnet carried by the central body part and exposed to the wide side face thereof in an adjacent backwardly-spaced relation with respect to said switch, and means carried by the central body part for guiding the head of the arrow along the central part into an adjacent position with said magnet for magnetizing said head and in turn magnetizing said operating arm to close said switch and energize said signaling means when the arrow has been drawn back on the bowstring to a shooting position.

10. An archery construction as defined in claim 9 wherein said signaling means is carried by said sighting means,

7

and means is provided for adjusting said sighting means with respect to the bow to a proper sighting position and for adjusting said signaling means therewith.

11. An archery construction as defined in claim 9 wherein, the bow has upper and lower balancing means, and said source of electric energy is carried within the bore of the bow in alignment with the upper balancing means.

12. An archery construction as defined in claim 11 wherein, said signaling means is a light bulb, threaded mounting sleeve means is carried by the bore of the bow for removably-positioning the upper balancing means and for removably-positioning said source of electric energy therein, said source of electric energy is a dry cell battery, said sighting means has an electrically-conductive mount securing it in position on the sighting end face of the bow and electrically connecting one terminal of said battery to one terminal of said light bulb, and said switch is electrically connected between the other terminal of said battery and the other terminal of said light bulb.

8

13. An archery construction as defined in claim 12 wherein, said sighting means has an adjustable slide, a sight element is carried by said slide, and said light bulb is carried by said slide above said sight element.

References Cited

UNITED STATES PATENTS

769,203	9/1904	Wheeler	340—282
2,642,661	6/1953	Fredrickson	124—24 X
2,763,156	9/1956	Garigal	124—23 X
2,786,461	3/1957	Pelsue	124—35
3,196,860	7/1965	Hoyt	124—24
3,288,988	11/1966	Boggs	124—23 X

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33—46; 124—30