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ARCHER'S BOW

Filed April 3, 1968

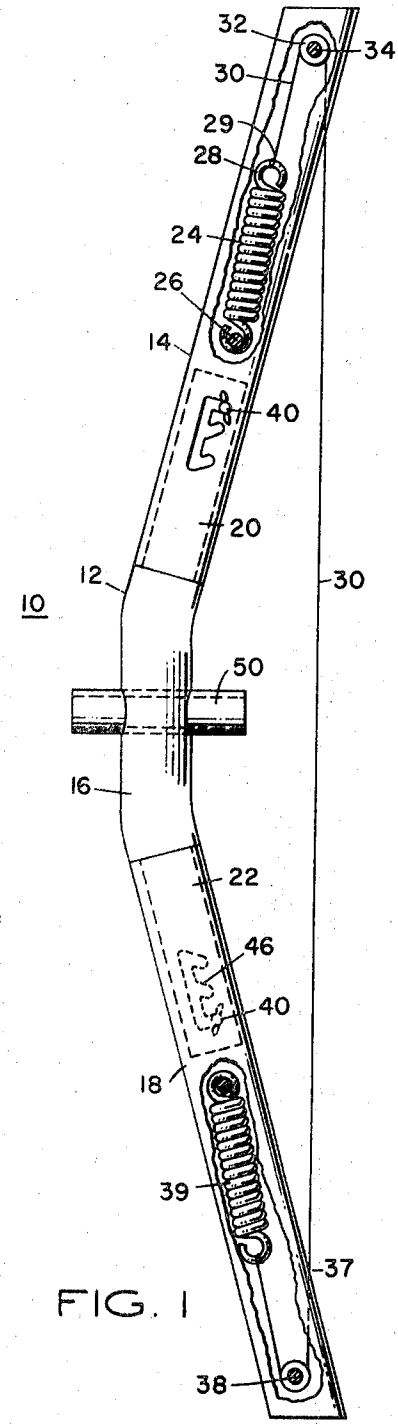


FIG. 1

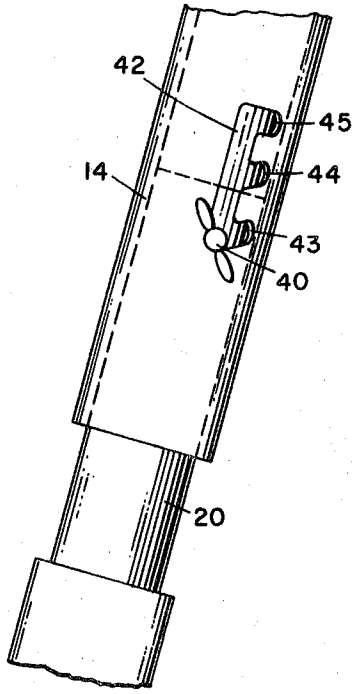


FIG. 2

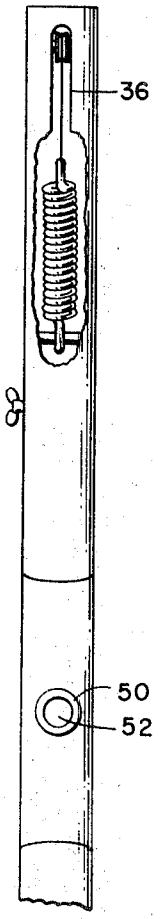


FIG. 3

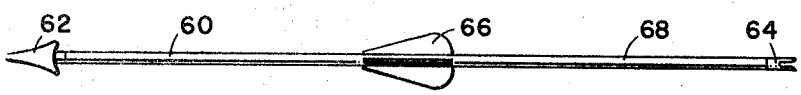


FIG. 4

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ARCHER'S BOW

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ABSTRACT OF THE DISCLOSURE

An apparatus disclosed for launching an arrow. The apparatus has as its main part an elongated bow-shaped frame comprising three sections with two outer sections sleeved to a center section facilitating adjustment of the overall length of the frame. Each of the outer sections carries within it a coil spring that is attached at one end to the frame and at the other end to one end of a bow string. The bow string is supported by guides or rollers at the ends of the frame and the springs are positioned such that distortion of the path of the bow string between the ends of he frame, as by pulling back on it with an arrow, causes increased tension in the springs and thereby in the bow string.

This invention relates to a type of hunting and target bow particularly adaptable for use in all phases of archery. More particularly the invention relates to an apparatus or bow of a type wherein the long frame or main bow member is rigid rather than resilient and wherein the arrow derives its launching power from a source other than the inherent resiliency of the main bow member. That is, where the arrow receives its launching power from resilient or spring means, separate from, though attached to, the main bow frame. Bows, as they are conventionally thought of, have, for centuries, been made by skilled craftsmen or artisans who expended a great deal of time and care in the production of each individual bow. As labor became more expensive and production methods changed many new manufacturing techniques were developed for making bows and for reducing the number of man hours expended on each bow made. These changes were however basically in the method of production of the bow and in the material or materials used in its construction rather than its overall concept or design. Though there have been some changes in the overall concept and design of the bows these changes have, on the whole, not met with a great deal of commercial success.

It is not a complete mis-statement then to say that bows presently in popular use are not too far removed from those of the last several centuries. The bows being made today are still rather expensive to manufacture where top quality is important and the parts, if the bows are made in sections, are not readily interchangeable as most often they must be matched to one another. Moreover, bows of the conventional type referred to are not adjustable. That is, the pull or force required of the archer to draw back on the bow string in the act of launching the arrow is not adjustable. Thus, it is often necessary for an archer to have a bow with a different pulling force for use in hunting than the one he uses in target shooting. Additionally, several weights of hunting bows may be required according to the various sizes of game sought.

The present invention provides a bow that is different in concept and design from the conventional bows referred to above rather than differing only in style and method of manufacture. Briefly the bow comprises an elongated, rigid frame member which may be shaped like the main bow member of the conventional bow. Spring means, preferably coil springs, are attached to or positioned in the rigid frame and to either end of a bow string which passes over guides or rollers at each end of the frame.

The spring means are positioned in such a manner that pulling back on the bow string causes deformation of the springs thereby exerting tension of the bow string urging it toward the normally straight configuration and thereby providing launching power for the arrow.

In a preferred embodiment, the frame is comprised of three sections with two outer sections being extendably sleeved to a center section and with means being provided for fixing them at various positions of extension. Thus, extending or lengthening the frame causes the guides to be positioned further apart and thereby the bow string placed in more tension. The effect of this lengthening is to cause the pulling power of the bow to be adjustable according to the position of extension chosen, allowing one bow to replace several of the non-adjustable types.

Since, as will be seen, readily available materials can be used in construction of the bow of the invention without further working, quality bows can be produced at considerable savings in cost of manufacture over bows of the conventional type. Moreover, parts can be easily replaced without having to be matched and as with the preferred embodiment of the bow the various sections of the frame can be easily disassembled for ease of transportation and storage.

While the novel features believed characteristics of this invention are set forth in the appended claims many of the objects, features and advantages of the invention will be more easily understood with reference to the foregoing specification and drawings wherein:

FIG. 1 is a side elevational view, partially broken away for clarity, of a preferred embodiment of the bow in accordance with the present invention;

FIG. 2 is an expanded detailed view of the adjustment device of the bow of FIG. 1;

FIG. 3 is a back view of the bow of FIG. 1 with parts broken away for added clarity; and

FIG. 4 is a plan view of an arrow especially adapted for use with the bow of FIG. 1.

Referring again to the drawings, a preferred embodiment of a bow in accordance with the present invention is shown denoted generally by the reference numeral **10**. The bow shown in FIG. 1 is not intended to be to scale or in the best proportions but is shown as it is for clarity of explanation only. The bow in this particular configuration comprises an elongated main bow frame member **12** which is itself comprised of three sections. The frame **12** comprises a first tubular outer section **14**, shown at the top as viewed herein, a center section **16** and a second tubular outer section **18**. The center section **16** includes outwardly projecting extensions **20** and **22** which are circular in cross section and the outer sections **14** and **18** are mated in a sleeved manner over the extensions.

As the outer sections are identical, only the first or upper, outer section **14** will be described with particularity. As mentioned, the outer sections are tubular and each carries within it an elongated coil spring **24**. The coil spring is preferably of constant diameter and is adapted for being placed in tension rather than compression. The spring **24** is attached at one end around a pin **26** which is fixedly carried in the interior of the tubular outer member **14**. The other end **28** of the spring **24** is attached to one end **29** of a bow string **30**.

The bow string is carried at either end of the bow frame **12** over rollers or guides positioned adjacent the ends of the frame. As shown most clearly in FIG. 1, the bow string **30** passes over a roller **32** positioned adjacent the upper end of the tubular member **14**. The roller **32** is rotatably carried on a pin **34** which is supported through the tube **14**. As shown in FIG. 3, the bow string **30** then passes through a slot **36** in the tube, and then through a like slot **37** in the other end of the frame **12**, around

a roller **38** and attaches to a second coil spring **39** positioned in the lower section **18**.

As shown in FIG. 2, the tubular outer section **14** which is sleeved on the extensions, of the center section **16**, is slideable thereon and is connected to the center section by a wing bolt **40**. The tubular section **14** includes an elongated slot **42**, parallel to the axis to the tube, and connecting cross slots **43**, **44**, and **45** which intersect the slot **42**. The slots **42**, **43**, **44**, and **45** are just slightly wider than the diameter of the bolt **40**, but not as wide as the head thereof, so that the bolt **40** can be tightened against the edges of the various slots to securely hold the tubular member **14** in relation to the center section **16**. The purpose of these slots on either of the tubular members is for adjusting the tension of the bow string. Thus, when the tubular member **14** is positioned such that the wing bolt **40** is in the outermost slot **45** as it is shown in FIG. 1, the bow is in the position of the least tension. By loosening the wing bolt **40** and rotating the tubular member **14** to bring the slot **42** into engagement with the bolt, the tubular member can then be extended and again rotated until the bolt **40** is brought into engagement with either of the slots **44** or **43**. It can be easily seen then that the slot **44** would be the point of intermediate tension and the slot **43** the point of greatest tension. Of course, any number of cross slots such as those referred to as **43**, **44**, and **45** could be provided to give an almost infinitely variable amount of tension in the bow string.

The reason that the slots **43** and **44** are canted slightly upward as viewed in the drawing is because the tension of the springs tends to urge the tubular member **14** axially toward the center section **16** and by slanting the slots **43** and **44**, the bolt **40** is urged relatively toward the ends of the slots **43** and **44** where it is positioned securely.

As shown in FIG. 1, slots, referred to generally by the reference numeral **46**, are provided in the tubular section **18** identically with those just described with reference to the tubular section **14**. The reason that both outer members are adjustable is so that the bow will remain symmetrical at all times and for this reason the tubular members should always be adjusted such that the bolts **40** always remain in the corresponding slots for the two members.

As shown most clearly in FIGS. 1 and 3, a short tube **50** is releasably fitted such as with threads on the mating portions through an opening **52** in the center section **16**. As shown, the tube is positioned so that the axis thereof perpendicularly intersects the bow string **30**. Thus, an arrow, such as that shown in FIG. 4, when placed through the tube will be brought into engagement with the bow string **30**. It will be noted that the arrow of FIG. 4 is a special type particularly adapted for use with the guide tube **50**, as the feathers at the rear of a conventional arrow would interfere with the tube.

As shown in FIG. 4, the arrow referred to above comprises an elongated shaft **60** having a head or tip **62** at one end thereof and a nock **64** at the other end thereof. Feathers or fletchings **66** are positioned approximately midway the length of the shaft **60** such that when the arrow is positioned through the guide tube **50** with the nock **64** in engagement with a central part of the bow string **30**, the rear portion **68** of the shaft **60** passes through the tube **50** and the fletching is positioned far enough forward on the shaft **60** that the arrow can be drawn back the desired distance for shooting without the fletching coming into contact with the front of the tube **50**. It will be understood, of course, that the arrow shown in FIG. 4 is not necessarily in scale with the bow shown in FIG. 1.

To operate the bow of this invention with the arrow as shown in FIG. 4, the arrow is positioned such that the rear portion **68** of the shaft **60** extends through the guide tube **50** and the nock **64** engages the bow string

30. The bow is then held in a conventional manner and the arrow is pulled back against the string **30** causing it in turn to pull on the deform the springs **24** and **39**. Upon releasing the string **30** from the deformed position, the springs **24** and **39** then return to the normal position shown in FIG. 1, straightening the string **30** and at the same time launching the arrow. As mentioned, the tube **50** is suitably engaged in the opening **52** through the section **16** such that it can be easily removed and the bow can be used in a more conventional manner with a conventional arrow. The center section **16** can also be formed in a more conventional manner such that one of its side surfaces is more in line with the string **30**, making it more adaptable to conventional arrows.

While the present invention has been described with references to a particular embodiment thereof, it is understood, of course, that this description is not to be construed in a limiting sense. Other embodiments of the invention as well as modifications of the disclosed embodiment will be apparent to persons skilled in the art upon reference to the foregoing description. It is therefore contemplated that the appended claims will cover any such modifications or embodiments as fall within the true scope of this invention.

What is claimed is:

1. An archer's bow comprising:

(a) an elongated rigid bow-shaped frame,

(b) a bow string defining a path between the ends of said frame,

(c) resilient means carried by said frame and attached to each end of said bow string for exerting tension thereon when said string is deformed from a normally straight path between the ends of said frame,

(d) said frame including:

(1) An elongated center section,

(2) A first tubular outer section sleeved over one end of said center section,

(3) A second tubular outer section sleeved over the other end of said center section,

(4) Each of said tubular outer sections including an elongated slot substantially parallel to the axis thereof and a plurality of cross slots substantially normal to said elongated slot and connecting with said elongated slot, and

(5) raised means attached to said center section and passing through said slots in each of said outer sections selectively engageable by said cross slots whereby the over-all length of said frame can be adjustably varied for varying the tension in said resilient means and said bow string.

2. Apparatus as defined in claim **1** wherein said resilient means comprises:

(a) a first spring attached at one end thereof adjacent one end of said frame, and

(b) a second spring attached at one end thereof adjacent the other end of said frame,

(c) said bow string being attached at one end thereof to the other end of said first spring and at other end thereof to the other end of said second spring.

3. Apparatus as defined in claim **2** further including guide means positioned at each end of said frame for carrying said bow string and wherein said springs are adapted for being placed in tension and are arranged such that deformation of said bow string from said normally straight path causes increased tension in said springs.

4. Apparatus as defined in claim **3** wherein said other ends of said springs to which said bow string is attached are disposed outwardly toward the ends of said frame and wherein said bow string defines a path from said other end of said first spring, around said guide means at each end of said frame and to said other end of said second spring.

5. Apparatus as defined in claim 3 wherein said guide means comprises a roller mounted at each end of said frame for carrying said bow string.

6. Apparatus as defined in claim 1 wherein said raised means comprises a bolt having an enlarged shoulder of greater cross sectional area than the width of said slots, threadedly engaging a similarly threaded recess in each end of said center section.

7. Apparatus as defined in claim 1 further including guide means positioned at each end of said frame for carrying said bow string and wherein said resilient means comprises first and second springs, each being connected at one end adjacent the ends of said frame and at the other end to said bow string with said other ends being disposed outwardly on said frame, said bow string defining a path from said other end of said first spring, around said guide means at each end of said frame and to said other end of said second spring whereby a pulling force on said bow string normal to the path thereof causes increased tension in said springs.

8. Apparatus as defined in claim 1 further including an arrow guide tube connected to said center section with its axis perpendicular to the bow string when the string lies in its normally straight path.

9. Apparatus as defined in claim 8, wherein said guide tube is removable from said center section.

10. Apparatus as defined in claim 1 wherein said raised means is removable permitting the frame to be disassembled into three parts.

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W. R. BROWNE, Assistant Examiner

U.S. Cl. X.R.

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