Oct. 29, 1963 M. ANDIS 3,108,583

PROJECTILE LAUNCHER

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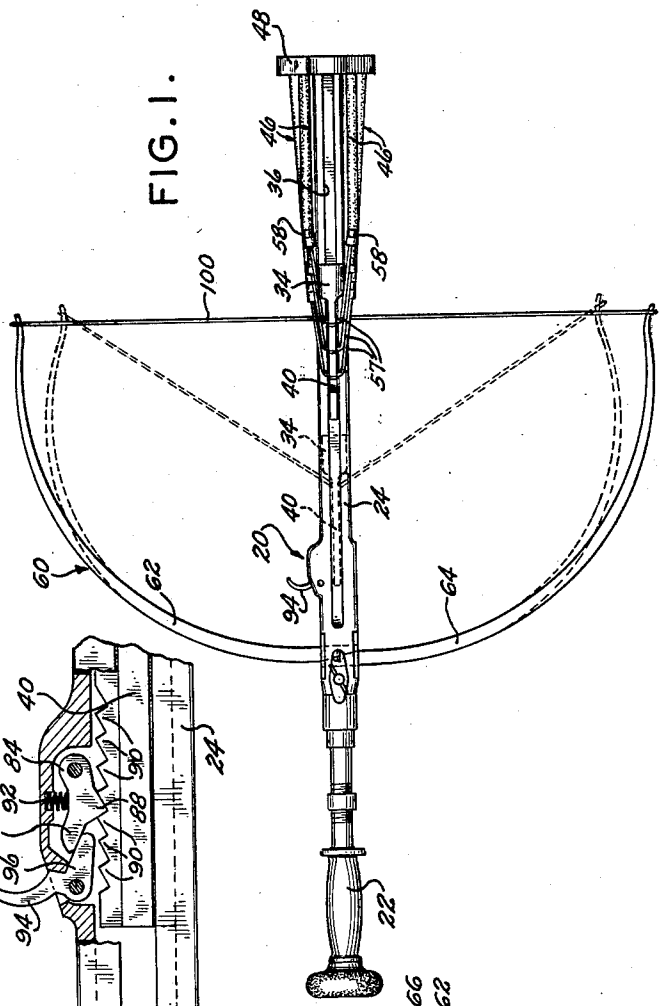


FIG. 1.

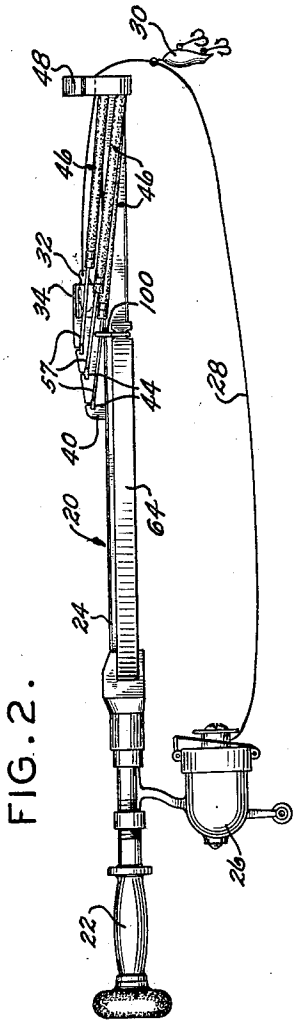


FIG. 2.

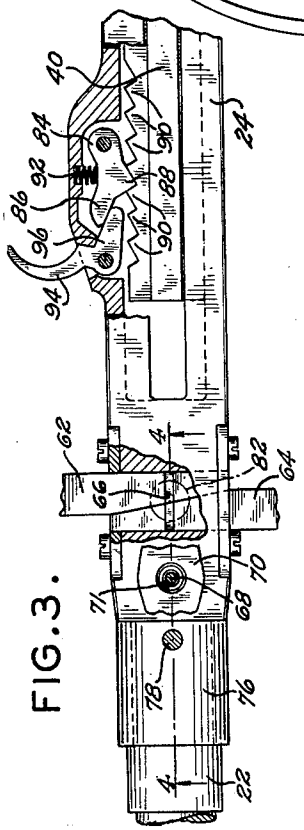


FIG. 3.

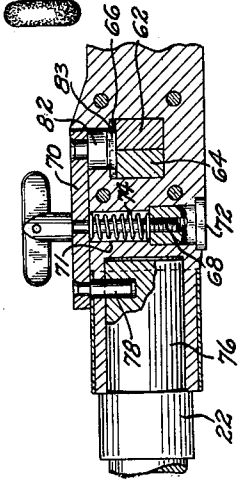


FIG. 4.

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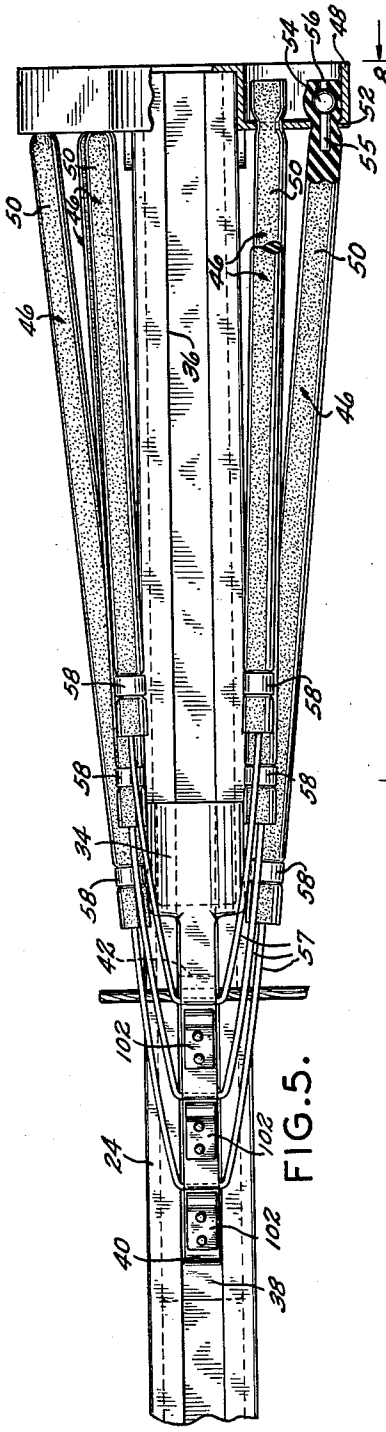


FIG. 5.

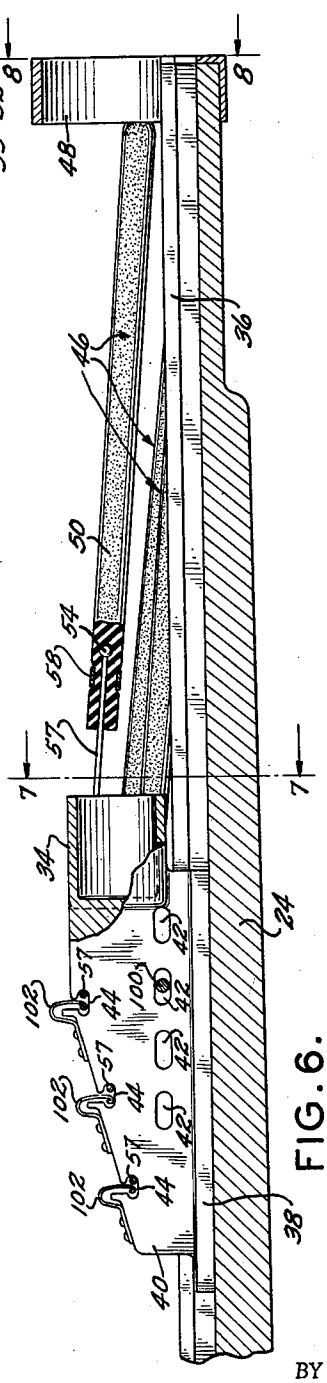


FIG. 6.

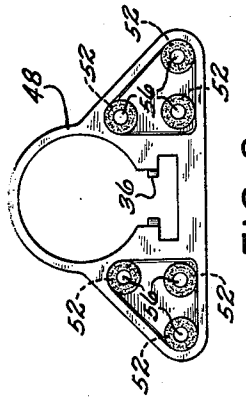


FIG. 8.

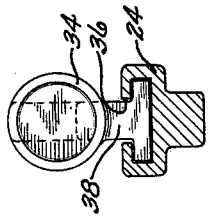


FIG. 7.

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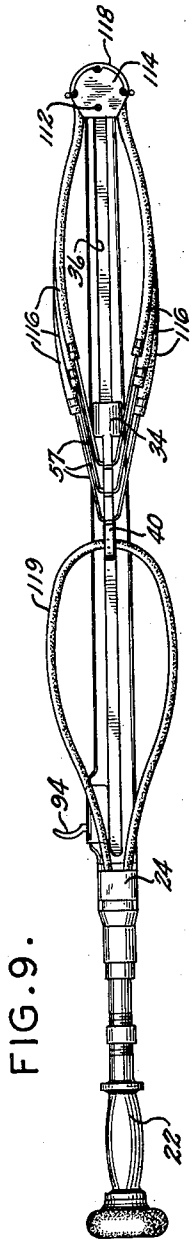


FIG. 9.

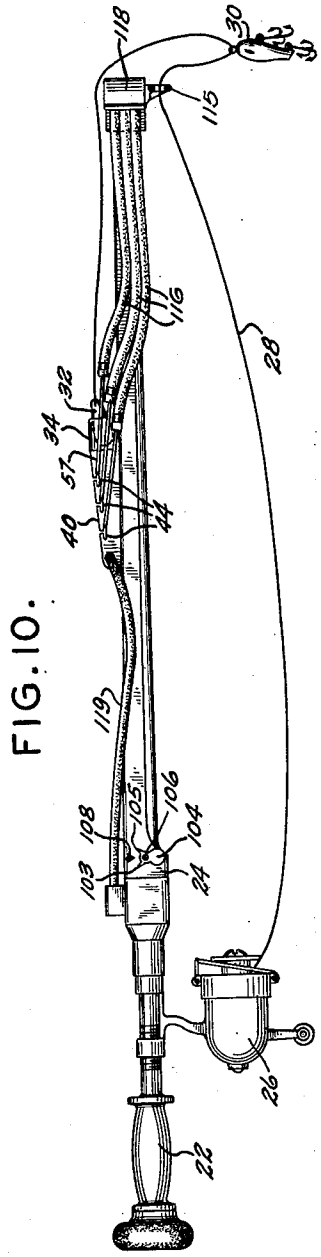


FIG. 10.

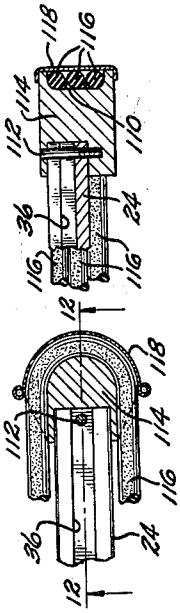


FIG. 11.

FIG. 12.

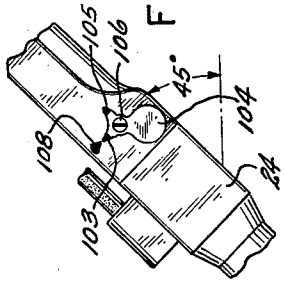


FIG. 13.

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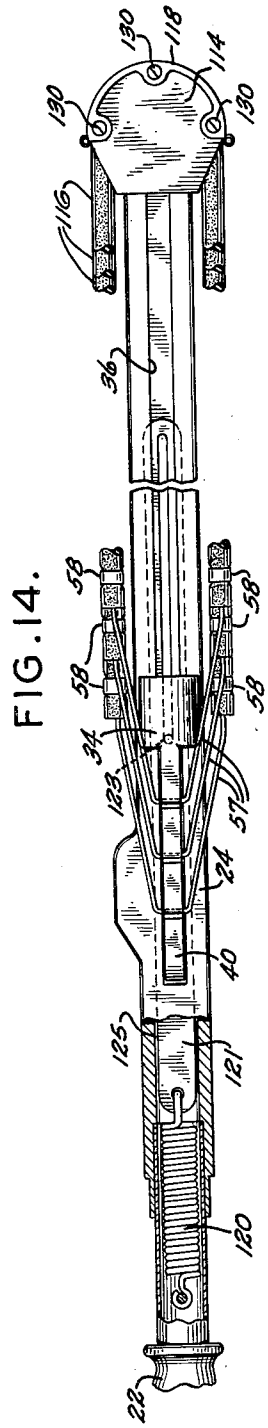


FIG. 14.

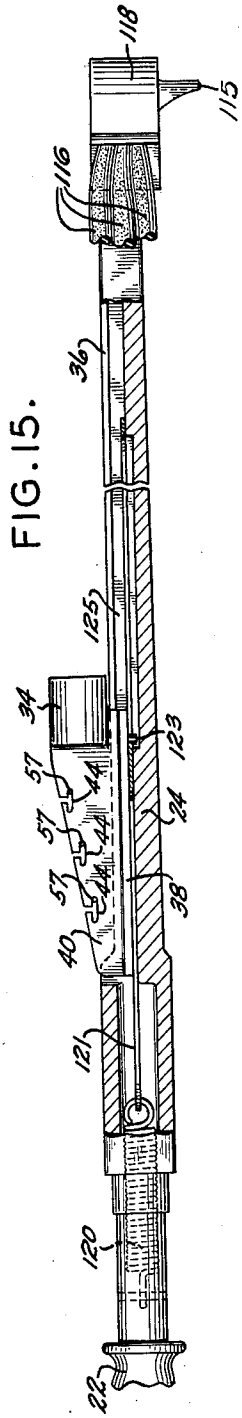


FIG. 15.

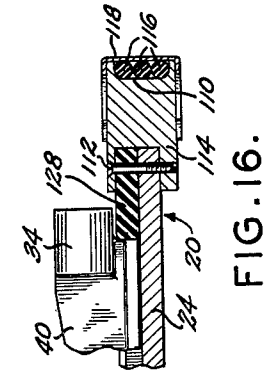


FIG. 16.

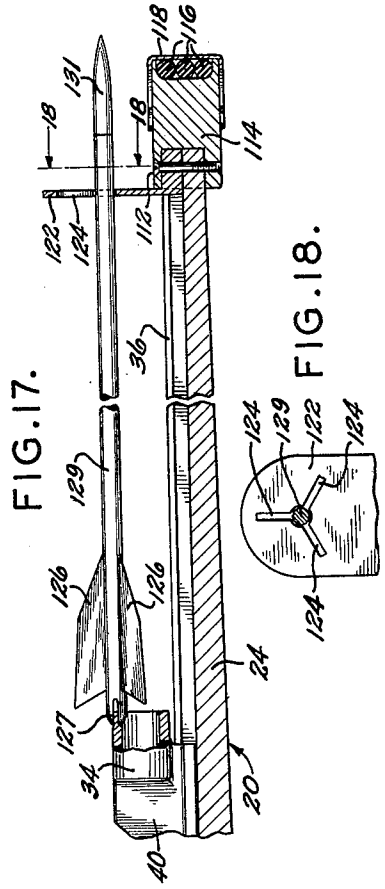


FIG. 17.

FIG. 18.

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United States Patent Office

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PROJECTILE LAUNCHER

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Filed Oct. 28, 1959, Ser. No. 849,212
8 Claims. (Cl. 124—22)

The present invention relates to a projectile launcher.

The device of the present invention is particularly useful in projecting a bait in surf fishing and the like. A number of people desirous of engaging in the sport are incapable of handling the heavy equipment normally required.

The frame member of the present device is composed of barrel and stock portions. A spinning reel of a well-known type is secured to the stock portion. A cup is slidable on a track on the barrel. A weight attached to the line on the spinning reel is dropped into the cup and the cup is cocked to store energy which can be released by a trigger mechanism. Upon release the cup will slide the length of the track until suddenly stopped by a cup arrester, hurtling the lead weight and the line and an attached lure a considerable distance.

In one embodiment of the present invention the thrust applied to the cup is supplied by a series of slings and an inverted crossbow arrangement. In this embodiment the bowstring is connected with the rear end of the cup whereby the bowstring itself acts as the arrester which stops the cup, holding it captive at the end of its forward travel.

Several other embodiments are shown and include an elastic sling connected to the handle. Another cup arrester embodiment mounts a coil spring in the handle, one end of the spring being secured to the handle and the other end being passed through a hole in the rear of the cup.

An indicator is provided on the handle to indicate the angle of elevation from the ground so that the operator may obtain maximum trajectory from the use of the invention.

A further embodiment of the present invention adapts the present invention for use in firing a projectile such as an arrow.

All of the embodiments of the present invention will be described in the specification and are shown in the accompanying drawings in which:

FIG. 1 is a plan view of the crossbow embodiment of the present invention.

FIG. 2 is a side view of FIG. 1.

FIG. 3 is an enlarged view of the stock and the rear barrel portion showing the crossbow connection and the trigger mechanism.

FIG. 4 is a vertical section along line 4—4 of FIG. 3.

FIG. 5 is an enlarged plan view of the sling mechanism.

FIG. 6 is a side view of FIG. 5.

FIG. 7 is a section along line 7—7 of FIG. 6.

FIG. 8 is a section along line 8—8 of FIG. 6

FIG. 9 is a top plan view of another embodiment of the invention.

FIG. 10 is a side view of FIG. 9.

FIG. 11 is an enlarged section through the end of the barrel showing another embodiment of a sling-fastening device.

FIG. 12 is a section along line 12—12 of FIG. 11.

FIG. 13 is a view of a section of the stock showing an inclinometer.

FIG. 14 is a top plan view of another embodiment of the present invention.

FIG. 15 is a side elevation of FIG. 14.

FIG. 16 is a section through the end of the barrel showing an additional embodiment of a cup arrester.

FIG. 17 is a side elevation of the present invention adapted for firing a projectile.

FIG. 18 is a view taken along line 18—18 of FIG. 17.

There is shown in FIGS. 1 and 2 a bait-casting gun 20 including stock portion 22 and a barrel portion 24. A spinning reel 26 is mounted on the stock portion 22 having a line 28 thereon. A bait 30 and a weight 32 are connected in spaced relation on line 28.

Barrel portion 24 of gun 20 has a cup 34 slidably mounted thereon in the manner shown in FIG. 7.

In FIG. 7 barrel portion 24 is shown as having a longitudinal groove 36 of T-shaped cross section. Groove 36 runs substantially the length of the barrel portion 24. Cup 34 is mounted on slide 38 which is also T-shaped in cross section and reciprocable in T-shaped groove 36 of the barrel.

A handle 40 which extends rearwardly of cup 34 is used for cup manipulation in cocking the device. One or more holes 42 and a series of grooves 44 are provided in handle 40 for reasons which will be described.

The cup is propelled by elastic slings 46 attached at their ends to front support 48 on barrel 24. A preferred sling construction is shown in FIGS. 5 and 6. At each side of the barrel, each sling comprises two sling straps 50 anchored at their ends in respective holes 52 in support 48. A socket 56 is provided in the end of each sling strap 50. When the end of strap 50 is fed through hole 52 in support 48, a ball 54 and pin 55 is inserted in socket 56 thereby expanding the socketed end of strap 50 to prevent withdrawal through hole 52. Two straps 50 thus anchored are joined by a wire 57. To anchor the wire to the straps 52 each end of the wire has a ball 54 fixed thereon and anchored in a socket 56 in the rear end of the respective strap 50. Surrounding strap 50 at a point behind ball 54 on wire 57 is a ball retaining clamp 58. When more than one sling 46 is provided, the several slings are desirably of differing length as shown in FIG. 5.

In the embodiment of FIGS. 1 and 2 a bow 60 is supplied for a dual purpose.

The bow string 100 provides thrust on the projection cup, supplementing that of the slings and it also acts as an arrester to stop the cup following its release. The bow 60 is desirably comprised of separately fabricated spring arms 62 and 64 which fit into a slot in the rear of barrel portion 24. The assembly of bow 60 and barrel 24 is shown particularly well in FIGS. 3 and 4. The ends of bow arms 62 and 64 have beveled abutting surfaces wedged within the slot. A channel 66 is cut in the upper surface of each arm 62 and 64. When arms 62 and 64 are wedged in said slot the channels 66 are aligned. Barrel 24 at its back end is provided with a socket to receive end 76 of stock 22. A plate 70 locks arms 62 and 64 to barrel 24 and also serves to lock stock 22 to barrel 24 in the following manner. A machine screw 68 having a plate 70 mounted thereon extends through a passage 71 in barrel 24 and fits into a nut 72 countersunk in barrel 24. A spring 74 fits around screw 68 abutting a plate 70 at one end and a nut 72 at the other end whereby tightening of screw 68 into nut 72 places spring 74 under tension. Stock 22 has a pin 78 insertable into barrel 24 which has a groove therein to receive pin 78. Pin 78 is mounted at one end of plate 70. At the end of plate 70 remote from pin 78, a pin 82 extends downwardly from plate 70. Extending downwardly from pin 82 is a key 83 of proper dimension to fit into channel 66 of members 62 and 64.

In a protruding portion at the side of the rear end of barrel 24 is a pivotally mounted pawl 84 having a release finger 86, a detent 88 and a trigger 94 pivotally mounted in engagement with pawl 84. A series of teeth 90 are provided in the face of the back end of cup slide 40 with

which detent 88 may be selectively engaged. Pawl 84 is biased by spring 92 to continuously force detent 88 into engagement with teeth 90. The trigger 94 has an extending finger 96 thereon to engage release finger 86 of pawl 84. When cup slide 40 is cocked, detent 86 of pawl 84 is engaged with teeth 90. Rearward pressure exerted against trigger 94 will release it in the following manner: Trigger 94 will pivot and press finger 96 upwardly against finger 86 of pawl 84 releasing detent 88 from teeth 90. Finger 86 urged by trigger 94 overcomes the biasing action of spring 92 and pivots ratchet 84 releasing detent 88 from teeth 90. Cup 34 is thereby released to move forwardly along T-shaped slot 36 in response to forces acting in that direction on cup 34.

Bowstring 100 attached to the ends of members 62 and 64 is connected to cup 34. Preferably, bowstring 100 is passed through one of a plurality of holes 42 therein. Notches 44 on slide 40 are provided to receive wires 57. Said notches 44 are in spaced relation on slide 40 to receive the plurality of wires 57. One, all, or any combination of the slings 46 may be used to apply force against cup 34. Engagement of pawl 84 with teeth 90 prevents forward motion until the trigger 94 is pivoted, releasing pawl 84. Additionally, as cup 34 is retracted along the groove 36 bowstring 100 places members 62 and 64 under tension. Force is applied to cup 34 by engaging one or more slings 46 as desired in grooves 44, each additional sling 46 adding additional force.

The bait 30 attached to line 28 hangs free of barrel 24 when weight 32 on the end of line 28 is placed in cup 34. When trigger 94 is operated releasing pawl 84 the cup shoots forward until stopped by an arrester such as bowstring 100. Sudden stopping will eject weight 32 taking line 28 and bait 30 along. A spring clip 102 extends into each notch 44 to insure that wire 57 does not slip out of groove 44, interfering with the unreeling of the fishing line 28.

Maximum projection of the bait is obtained if the launcher is fired at an angle of elevation of 45°. For this purpose a weighted inclinometer 104 is pivotally mounted by screw 106 to barrel 24. An elevation mark 108 is provided on barrel 24. A pair of pointers 103 and 105 are provided on inclinometer 104. As the operator pivots the barrel upwardly from horizontal, the inclinometer 104 will pivot pointers 103 and 105. A change in position of the pointers from a position where mark 108 is between the pointers to a position where pointer 103 is at mark 108 indicates the launcher forms an angle of elevation of 45° with horizontal. Conversely, if pointer 105 is at mark 108, barrel 24 forms an angle of depression of 45° with horizontal.

An additional embodiment of the present invention is shown in FIGS. 11 and 12. The front end of barrel 24 is illustrated in these figures. In this embodiment a screw 112 connects a sling mounting support 114 to the end barrel 24. The sling mounting support 114 has a U-shaped groove 110 in its surface. A plurality of slings 46 may be received and guided in groove 110. One long elastic strap 116 is substituted for straps 50 of previously described embodiments. The ends of strap 116 are interconnected by wire 57 as previously described. Strap 116 is received intermediate its ends in groove 110. A spring clip 118 is attached to sling mounting support 114 to prevent straps 116 from escaping groove 110 when cup 34 is released. Clip 118 may also be attached by screws 130 as illustrated in FIG. 14. Fig. 10 illustrates a line guide 115 attached to the bottom of sling mounting support 114.

FIGURES 9 and 10 are illustrative of an additional embodiment of cup arrester. An arrester strap 119 formed from elastic material similar to straps 116 and 50 is attached at both ends to the rear end of barrel 24. Stop 119 is connected to cup 34.

FIGURES 14 and 15 are illustrative of an additional embodiment of cup arrester. A spring 120 is fixedly mounted at one end to the rear end of barrel 24 and at

the other end to a connecting member 121. Connecting member 121 is attached to cup 34 by pin 123 and slides in a guide 125. When trigger 94 is pulled, spring 120 is extended as cup 34 travels forwardly along barrel 24. Forward travel of cup 34 will be halted when spring 120 is extended an exerts a stronger influence on the cup 34 than slings 46.

The operation of elastic arrester strap 119 is similar to that of spring 120 but does not require special construction of the launcher to accommodate it.

A further embodiment of the launcher 20 is illustrated in FIGURES 17 and 18. In these figures a launcher 20 is illustrated which is adapted to project an arrow 129.

Referring now particularly to FIGS. 17 and 18 cup 34 is shown having its upper cup margin adapted to fit the nock 127 of arrow 129. The point 131 of arrow 129 fits through arrow guide 122 mounted on barrel 24. Arrow guide 122 will truly direct arrow 129.

FIGURE 18 shows the arrow guide 122 having slots 124 therein through which the feathers 126 of the arrow 129 are guided.

A further embodiment of cup arrester is shown in FIGURE 16. In this figure guide 114 is shown fixing a rubber arrester block 128 to the front end of barrel 24. The operation of block 128 is to stop forward travel of cup 34 by blocking its path.

I claim:

1. A projectile launcher comprising a stock having a barrel extending therefrom, said barrel having a track thereon, a projectile-launching cup mounted on said track for travel longitudinally of the barrel, energy-storing means for propelling the cup, a cocking detent for said cup including a trigger mechanism, and a cup-arresting means for stopping said cup after it has traveled along said track, for the discharge of a projectile, said cup-arresting means comprising a bow string centrally connected with the cup and a bow mounted on the stock and upon which said bow string is secured.

2. The device of claim 1 in which said projectile-launching cup has a plurality of grooves on a back portion thereof, and said energy-storing means includes a plurality of elastic slings connected to the end of the barrel and having portions adapted for reception in said grooves.

3. The device of claim 2 in which the slings comprise a pair of elastic straps each connected at one end to the front end of the barrel and having the other ends interconnected by a wire adapted for reception in said grooves.

4. The device of claim 2 in which the slings comprise an elastic strap fastened intermediate its ends to the end of the barrel and retained in position by a retainer, the ends of said elastic strap interconnected by a wire adapted for reception in said grooves.

5. A projectile launcher comprising a stock having a barrel extending therefrom, said barrel having a track thereon, a projectile-launching cup mounted on said track for travel longitudinally of the barrel, means for storing energy for the propulsion of said cup and including a pair of bow members each fixed at one end to one end of said barrel and interconnected at the other end by a bowstring, the said bowstring being attached to said cup, detent means for holding the cup in a retracted position wherein the bow members are placed under tension, a trigger mechanism for releasing said detent means for propulsion of said cup, and arresting means for abruptly stopping said cup after it has traveled along said track.

6. The device of claim 5 in which said arresting means includes said bowstring.

7. A projectile launcher comprising a stock having a barrel extending therefrom, said barrel having a track thereon, a projectile-launching cup mounted on said track for travel longitudinally of the barrel and having thereon a trigger-releasable restraining device for said cup, a pro-

jectile in said cup, cup-propelling energy-storing means including at least one elastic strap anchored to the barrel and the cup, and a bow mounted on the barrel and having a bowstring connected with the bow and the cup, and a trigger for releasing said restraining device, said bow string and bow constituting means for stopping said cup after it has traveled along said track whereby the cup discharges the said projectile.

8. A projectile launcher comprising a stock having a barrel extending therefrom, said barrel having a track thereon, a projectile-launching cup mounted on said track for travel longitudinally of the barrel, energy-storing means for propelling said cup including a plurality of elastic slings, and a detent for said cup having a trigger mechanism for releasing said cup, said projectile-launching cup having multiple notches therein in which said slings are selectively engageable, said energy-storing means further including a bow centrally connected to said launcher and having flexible tips and a bow string connecting said tips under tension and having an intermediate portion secured to said cup, the tips of the bow being located at points opposite an intermediate point in the path of travel of the cup on said track whereby said tips will be flexed by the retraction of said cup to said detent and will also be flexed in the advance of said cup beyond said tips, whereby the bow not only constitutes a part of the energy-storing means but also provides means for resiliently arresting the forward movement of said cup upon its release by said detent.

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