Jan. 31, 1950 C. H. KEARNY 2,496,217

HARPOON GUN

Filed April 16, 1948 2 Sheets-Sheet 1

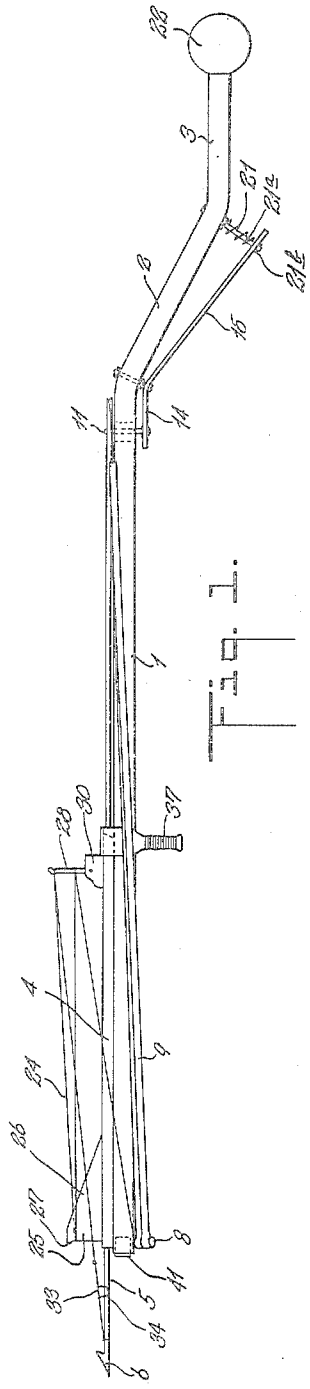


Fig. 1.

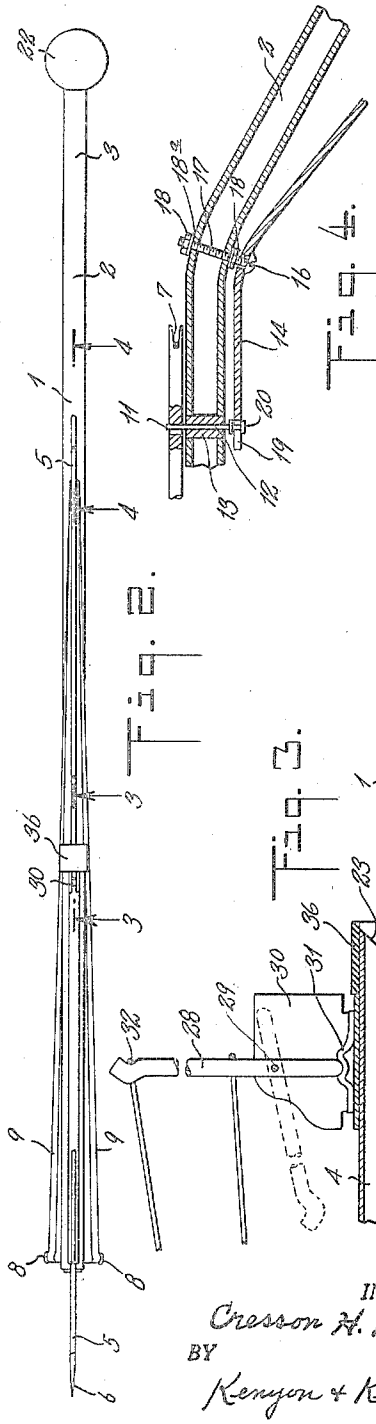


Fig. 2.

Fig. 4.

Fig. 3.

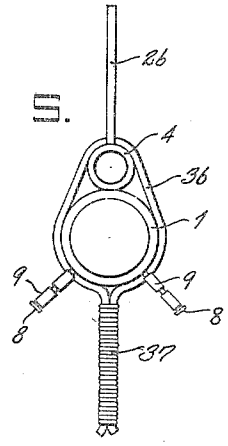
INVENTOR.
Cresson H. Kearny
BY
Kenyon & Kenyon
ATTORNEYS

Jan. 31, 1950 C. H. KEARNY 2,496,217

HARPOON GUN

Filed April 16, 1948 2 Sheets-Sheet 2

Fig. 5.



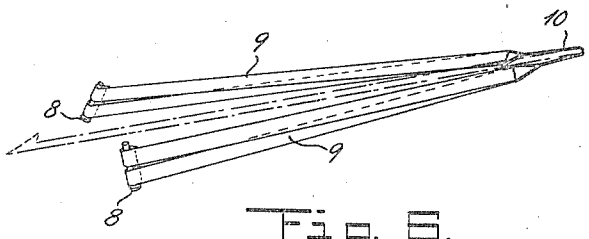


Fig. 6.

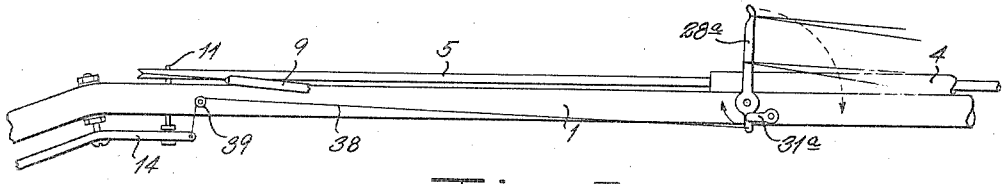


Fig. 7.

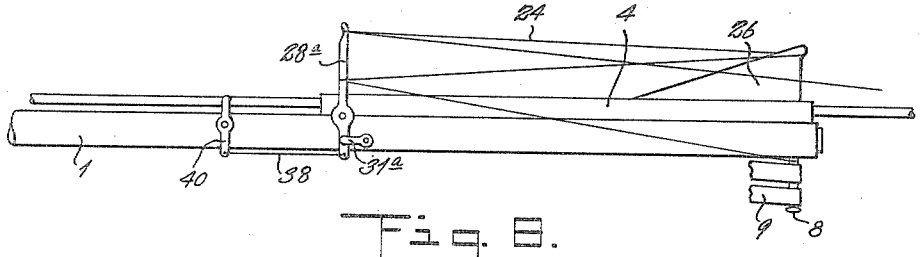


Fig. 8.

INVENTOR.
Cresson H. Kearny
BY
Kenyon & Kenyon
ATTORNEYS

Patented Jan. 31, 1950

2,496,217

UNITED STATES PATENT OFFICE

2,496,217

HARPOON GUN

Cresson H. Kearny, San Antonio, Tex.

Application April 16, 1948, Serial No. 21,457

2 Claims. (Cl. 124—22)

1

This invention relates to harpoon guns of the type adapted to mechanically propel the harpoon and with the harpoon fixed to a line by which the harpoon may be retrieved together with any game impaled thereby.

One of the objects is to construct such a gun so it is reasonably safe when in firing condition. Another is to provide an arrangement for storing the harpoon line on the gun in such a fashion that it is not easily entangled either during the time the gun is carried prior to firing or when the line is following the harpoon when the latter is in flight. Further objects include the provision of an arrangement permitting the gun to be comfortably cocked even though embodying very strongly elastic harpoon propelling means. Other objects will become apparent from the following disclosure.

The accompanying drawings illustrate specific examples of harpoon guns embodying the principles of the invention in what is at present believed to be their best form and including certain modifications, the various figures being as follows:

Fig. 1 is a side view of the first example of the gun;

Fig. 2 is a top view of Fig. 1;

Figs. 3 and 4 are longitudinal sections taken from the lines 3—3 and 4—4, respectively, in Fig. 2 but on a considerably larger scale.

Fig. 5 is an enlarged scale showing of the muzzle end of the gun with the harpoon and line removed to clarify the illustration.

Fig. 6 is a simulated perspective illustrating the harpoon propelling means used, as they appear when removed from the gun; and

Figs. 7 and 8 are side views of modifications of the form illustrated by Fig. 3.

The illustrated gun is assembled around a piece of metal pipe having a long straight portion 1, providing the gun's forearm, a drop section 2, formed by bending the pipe, and another straight, but much shorter, section 3. The sections 2 and 3 provide the gun's stock, with the drop section 2 providing the proper drop for making aiming comfortable. The sections 1 and 3 are shown parallel to each other, and the section 2 bent at an angle of about 25° respecting the straight sections. The section 2 is illustrated as also being a straight section, but it could be made with reverse curves, that is to say S-shaped, if preferred. The pipe used may be either the butt-welded or seamless tube varieties.

A gun barrel is provided in the form of a piece

2

of metal pipe 4 about half as long as the forearm section 1. This pipe 4 is, of course, made as straight as possible, and it is fastened to the forearm section 1 so that its muzzle is about flush with the front end of the forearm section. The two pieces may be fastened together by banding or by brazing or welding the two together. Brazing or welding naturally provides more permanent joining, but banding has the advantage of permitting easy disassembly should straightening of the parts become necessary due to an accident.

The harpoon 5 may have any kind of attacking end, a barb naturally being most appropriate since it prevents the harpoon from being withdrawn from impaled game during retrieving of the latter. Thus a barb is illustrated at 6. The back end of the harpoon has a notch 7 such as is conventional in the case of an arrow.

Two arms 8 extend radially from the front end of the forearm 1, with the arms spreading symmetrically apart from the center line of the bottom of the forearm. The arms may be metal rods brazed or welded to the forearm. Elastic bands 9 are fastened to each of the arms 8 and extend rearwardly with their back ends joined by a cord 10. The bands may be used either singly or as multiple strands, two strands being illustrated by the drawings. The elastic material may be rubber, either natural or synthetic, and the cord 10 is preferably the synthetic product merchandised under the trade mark "Nylon". This type of cord works well when wet and has good wearing properties. The bands 9 should be made as strongly elastic as is consistent with the force used to manually stretch them, and the cord 10 should be strong enough to carry the maximum stress these bands can exert.

Now it is to be understood that this harpoon gun is not a toy. It is intended for shooting game. This type of weapon is frequently used underwater in the shooting of large fish. Therefore, it is potentially a very dangerous thing if adequate safeguards are not provided. Heretofore guns of this type have had the disadvantage that when provided with a safe sear it is very difficult to discharge them. The great force exerted against the sear prevents easy movement by the trigger. This has led to the practice of using a sear arrangement that is not very safe against accidental discharge and, although this may permit easy firing without material aim disturbance, it makes the gun a very hazardous thing to handle, particularly during underwater work.

With the above in mind, the drawings show

the harpoon 5 with a transverse hole 11 formed through it near the notch 7. The sear is in the form of a pin 12 working upwardly through a vertical bushing 13 fixed inside the forearm section 1 near its junction with the drop section 2. This pin 12 is moved upwardly through the hole 11 in the harpoon, when the gun is cocked, and thus provides an extremely safe arrangement. But its resistance to release is rather high due to the great force of the bands 9 and the large friction areas between the sear and the sides of the hole 11 in the harpoon, and also the sides of the hole in the bushing 13.

According to the invention a bent lever having a short arm 14 and a long arm 15 is provided with a hole 16 in its fulcrum. A screw 17 is passed through a hole formed in the junction between the forearm and drop sections 1 and 2 and through the hole 16 in the bent lever. This screw extends at an angle approximately bisecting the angle formed by the lever arms. The hole 16 should be smaller than the head of the screw 17 but substantially larger than the latter's shank, thus permitting the bent lever to have a pivoting action loosely about the screw 17. The screw 17 may be an ordinary machine screw with nuts 18 screwed on it on either side of the pipe forming the drop section 2, with the nuts tightened to rigidly fix the screw 17. The lower one of the nuts 18 should be spaced from the head of the screw 16 to leave a space in which the bent lever may work. A suitable pin with appropriate shoulders might be substituted for this screw. The short arm 14, of this lever, projects forwardly and is provided with a longitudinal recess 19 in its end, to provide a fork-like effect. The lower end of the pin 12 is provided with longitudinally spaced shoulders or heads 20 and the pin is fitted in the slot 19 with these heads 20 on either side of the short lever arm 14. The longer lever arm 15 then automatically extends along the drop section 2 and, through the mechanical advantage it provides, permits smooth and easy withdrawal of the sear pin 12 from the hole 11, in the harpoon 5, without disturbing the aim. The recess or slot 19, in the short lever arm, permits smooth translation of the arcuate lever swing to the linear motion of the sear pin.

The rear end of the long lever arm 15 is provided with a helical compression spring 21 working between it and the point where the drop section 2 joins with the stock section 3, this compression spring being retained by a stud or rod 21*a* extending from that end of the drop section 2 and passing through a longitudinally elongated hole in the adjacent or rear end of the long lever arm 15. A pin 21*b* is passed through a transverse hole in the end of this stud, to retain the lever arm 15 against disengagement from the stud by the spring force. The stud may be passed through holes in the drop section 2 and retained by brazing or welding.

It is to be noted that the arrangement illustrated is extremely simple. There is nothing to get out of order yet accidental firing is not a great hazard. The drop section 2 may be grasped by the hand with the fingers between it and the long lever arm 15, and when the gun is handled in this fashion accidental firing is practically impossible. At the same time the hand can be quickly shifted to firing position with all fingers, excepting the thumb, engaging the long lever arm 15 near its swinging end, the great mechanical advantage of the system then permitting a smooth and easy withdrawal of the sear pin 12 from its harpoon engaging position. The stud 21*a* serves to steady the two-armed lever to prevent any tendency to wobble. Thus it is a guide for the trigger. Should the parts become bent, due to extremely rough handling, disassembly for straightening is very easy. Removal of the screw 17 and of the stud 21*a* used to position the spring 18, completely frees the bent lever from the gun's trigger and sear operator. The short lever arm 14 may be very easily pulled away from its engagement with the sear pin. The stud 21*a* must pass through an elongated hole in the long lever arm to permit the latter to swing.

Cocking of a powerful gun, of the type being described, is normally difficult. The natural procedure is to put the gun stock in the groin and to pull down with both arms on the cord 10 so as to fit it in the notch 7 of the harpoon, the latter being positioned since its front is in the barrel's breech and its rear is retained by the sear pin in the hole 11. According to the present invention the butt end of the stock section 3 is fitted with a large soft ball 22. This ball may be provided with a hole in which the end of the pipe, comprising the butt section 3, is pushed, with a strong water-proof cement holding the ball on. The ball may be in the nature of a large rubber sponge ball having a non-porous exterior skin. Preferably it is about 3 inches in diameter. The rubber used may be either natural or synthetic. With this arrangement the groin of the person cocking the gun is not injured, cocking being a relatively comfortable and safe operation. At the same time the ball does not get in the way of the person manipulating the gun.

When the gun is fired the energy released drives the cord 10 forward with a very great force, the elastic bands also, of course, flying forwardly. The present invention provides an arrangement for preventing these parts from getting entangled each time the gun is fired. This is done by providing the breech end of the barrel 4 with a downwardly angled end 23 which provides, in cooperation with the forearm pipe section 1, a notch. Therefore, when the gun is fired the cord 10 drives forwardly, while performing its function of propelling the harpoon, and when it arrives at the breech it finds a notch into which it drives so as to be retained thereby. The length of the bands and of the cord should be proportioned so that the cord is drawn snugly into the notch, shown at 23, after the gun is fired. It follows that there is never any chance of the elastic bands 9 and the cord 10 becoming entangled.

As previously indicated, the gun being described is of the type where the harpoon is kept captive with the gun. This is done by the harpoon line 24 which is fixed to the forward end of the harpoon and to one of the arms 8 which anchor the elastic bands 9. The line may be permanently or releasably fastened. If this line becomes entangled, during the firing of the arm, the flight of the harpoon is interfered with. The handling of the line, on a gun of this type, has always been a problem which has never been heretofore completely solved. However, in the present invention the nozzle end of the gun is provided with a front sight 25 in the form of a relatively large fin equipped with a ramp 26. It looks like a large ramp sight excepting that the forward end is provided with a forwardly extending projection 27 at the top of the sight.

The rear sight is provided by an upstanding arm 28 adapted to swing longitudinally of the gun by being mounted on a pivot pin 29 transversely

supported between the upstanding arms 30 of an inverted U-shaped bracket which is fixed to the top of the gun barrel near its breech end. The bracket may be fastened by brazing or welding, or in any other convenient fashion. The bottom end of the pivot rear sight 28 is releasably engaged by a spring clip 31, retained in any convenient fashion inside of the bracket end, of the type permitting release of the bottom end of the rear sight by the application of sufficient displacing force. The upper end of the rear sight 28, which may be in the form of a thick wire or a rod, is bent to provide a rear notch 32.

With the above described arrangement of sights, the harpoon line, when the gun is cocked and loaded, is passed back to the rear sight from the line's anchorage on the arm 8, the rear sight being raised, the line being then looped around it and back to the front sight, looped around the front sight's front and back to the rear sight, at a slightly higher level, and then looped around the rear sight, it now being in the notch 32, and forwardly to the harpoon. Thus the line is looped back and forth in an orderly fashion and stored in a manner whereby it cannot be easily entangled. The rear sight is used simply by lining it up with the front sight. If sighting is not needed, due to close range work for example, the front and rear sights may be considered simply as arms or mountings for holding the loops of line.

Preferably the line includes a short strand 33 of elastic material, such as a short piece of relatively thin natural or synthetic rubber, with this strand fixed at spaced points to gather a little loop 34 in the line 4. This permits the line to be put under elastic tension while it is looped around the sights and assures snugness of the arrangement.

Now with this arrangement, when the gun is fired, the harpoon 5 drives forwardly and puts more stress on the rear sight 28 than the clip 31 can resist, the latter therefore permitting displacement of the lower end of the rear sight and allowing the rear sight to swing forwardly. This releases the stored loops of line at the instant of firing, the harpoon then driving forwardly and taking its line from loops which are almost literally floating in the air or water, depending on where the gun is used. During this action the smooth, forwardly sloping, ramp 26 permits the loops to be pulled over it without any risk of entanglement. Thus the accuracy of the harpoon flight is not interfered with materially. Furthermore, the line does not become entangled during the handling of the gun prior to firing.

Considerable shock results from the cord 10 striking into the notch provided by the undercut 23 in the breech end of the gun's barrel. This rapidly destroys the cord 10 and renders the gun inoperative until the cord is replaced but, in the illustrated gun, this trouble is avoided by fastening a heavy strap of natural or synthetic rubber, or any easily elastic material, around the parts to provide a shock absorber. More specifically, this strap, which is in the form of a flat strip of the material, is shown at 36 as being looped over the top of the barrel so its projects a little beyond the latter's breech end, the strap ends extending downwardly and being tightly bound together by a cord serving 37. Preferably the depending ends of the strap are narrowed so that, with the aid of the serving 37, a forward handle is provided somewhat in the fashion of a light, shoulder-type sub-machine gun. The width of the strap should be sufficient to provide a firm engagement with the forearm and barrel, it wrapping around them both, and to also project rearwardly a little bit beyond the breech end of the barrel 4. Now, when the gun is fired, the cord 10 must first engage the elastic strap side and elastically deform it, prior to driving into the notch provided by the barrels undercut 23. The elastic deformation gently dissipates a considerable portion of the driving force of the cord, and thus greatly prolongs its service life. Furthermore, it takes up some of the shock transmitted to the gun proper, thus removing some of the jerk incidental to the firing of this type of gun.

In the modification shown by Fig. 7 the rear sight 28*a* is mounted somewhat differently, as by being pinned by a transverse pin projecting from the outside of the barrel, and its lower end is retained against swinging by a friction clip 31*a*. That is to say, its lower end is very strongly, frictionally engaged by a clip, preferably urged against the swinging lower end, of the sight, by its elasticity. The engagement may be made so strong as to interfere with the flight of the harpoon. This does not cause trouble, however, since the lower end is connected by a string 38 with the forward end of the short lever arm 14, the string being looped over a small sheave 39 so it may extend downwardly to the lever end. Now, with this system, operation of the long lever arm 15 not only fires the gun but drags the lower end of the rear sight 28*a* from its engagement with the clip 31*a*, thus relieving the harpoon line from the task of doing this. Consequently, the line loops are again free so that the harpoon is not materially interfered with.

In Fig. 8 the same arrangement is shown as is shown in Fig. 7, excepting that the string 38 connects with a two-armed lever 40 pivoted to the side of the forearm section 1 with its upper arm in the path of the cord 10 as the latter drives forwardly during firing. The string 38 connects with the lower arm of this lever 40. In this instance the string 10 drives forwardly, engages the upper end of the lever 40 and swings it to immediately drag the lower end, of the rear sight 28*a*, from its engagement by the clip 31*a*. This relieves the trigger arrangement from the extra load of releasing the rear sight.

Since the gun is built around the pipe length providing the parts 1, 2 and 3, it is possible to make the gun more or less buoyant by making certain the pipe is watertight throughout its length and by closing its ends. Thus a cork or plug 41 is shown driven in the forward end of the pipe, the ball 22 closing its rear end. The bushing 13 is made watertight respecting the pipe, so that water cannot enter at this point, and, for the same reason, the screw 18 may be provided with rubber washers 18*a* for preventing leaking at this point. The pin 21*a*, or other arrangement, used to position the spring 21 should also be associated with the pipe in a watertight manner, as well as all the other parts. With these precautions the gun may be made so it actually floats. Should the user find this annoying, in underwater work, it is possible to let a little water into the pipe, by removing and subsequently replacing the cork or plug 40, until the preferred feel is obtained. If actual buoyancy is required it is suggested that aluminum parts be used.

Before closing, it is appropriate to again emphasize that this arm is intended for shooting

relatively large game. It is especially designed for use underwater in connection with hunting large game fish. In this field the gun is of particular value in that its design reduces the chances for accidents, retains the harpoon line against entanglement, and has a low drag resistence as it is moved about in the water. The parts are all simple and rugged. Very smooth firing is possible because all of the fingers, excepting the thumb, may be wrapped around the lower end of the long lever arm 15, comprising the gun's trigger, with the thumb and heel of the hand on the drop section 2. Practically all of the hand's power is available for firing. This, together with the mechanical advantage provided by the system, results in a very smooth let-off. At the instant of discharge the harpoon line is freed. Up to this time the rear sight 28 has been available for sighting purposes. Due to the ease with which the gun may be cocked, extremely powerful propeller bands may be used, so the harpoon acquires very high velocity. Altogether the gun makes a very efficient weapon for use in connection with hunting purposes generally, and particularly, in connection with under water fish and shooting.

The gun's advantages adapt it for other than hunting purposes. Thus, it may be used wherever it is necessary to shoot a line from one place to another. Spears, arrows and similar projectiles may be fired by the gun, if they are adapted for the purpose.

I claim:

1. A gun including the combination of a barrel having a downwardly and forwardly slanting breech, a support extending rearwardly from said breech, elastic strands on either side of said barrel with their front ends anchored forwardly of said breech and their rear ends joined by a connection, whereby a harpoon or similar projectile may be mechanically fired through said barrel by propulsion received through said connection from said strands, said connection driving into the notch formed by said breech and said support and retaining itself there after its firing action, whereby to retain itself and said strands against entanglement, and with said combination further including a band of deformable elastic material looped over said barrel near its breech and partly projecting beyond the latter to function as a shock absorber for said connection, with said support comprising a forearm for said gun and with the depending ends of said band extending below said forearm, and serving applied over said depending ends to provide said gun with a fore grip.

2. A gun including the combination of a line storage arm about which a projectile-carried line is looped, a pivot for mounting said arm to the gun so said arm may swing, a clip for frictionally holding said arm upwardly, a moving mechanical propellent for the projectile fired by the gun, an element in the path of said propellent and a connection between said element and said arm for dragging the latter from said clip when said element is struck by said propellent, whereby to release said arm upon the firing of said gun.

CRESSON H. KEARNY.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
477,747	Emerson	June 28, 1892
1,124,726	Gray	Jan. 12, 1915
1,133,189	Shannon	Mar. 23, 1915
1,259,463	DeFir	Mar. 12, 1918
1,580,854	Piessens	Apr. 13, 1926
1,704,810	Sperry	Mar. 12, 1929
1,707,045	Blackman	Mar. 26, 1929
1,726,829	Heinen et al.	Sept. 3, 1929
1,746,246	Elworthy	Feb. 11, 1930
1,971,137	Geraci	Aug. 21, 1934
2,267,065	Wilen	Dec. 23, 1941
2,305,176	Littman	Dec. 15, 1942
2,334,332	Johnson	Nov. 16, 1943