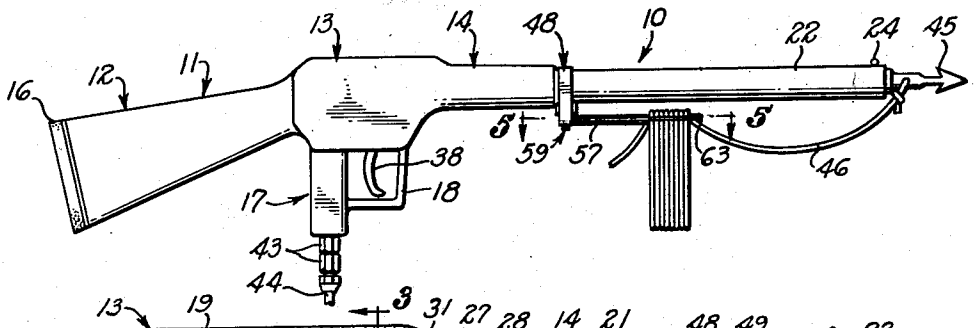
June 16, 1953 R. E. HARRIS 2,642,056

HARPOON GUN

Filed Sept. 1, 1950

Fig. 1



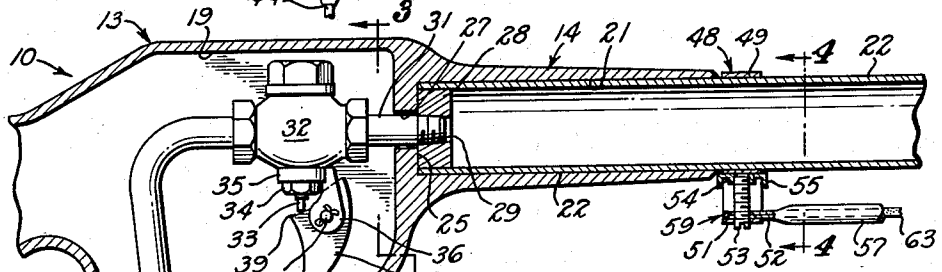


Fig. 2

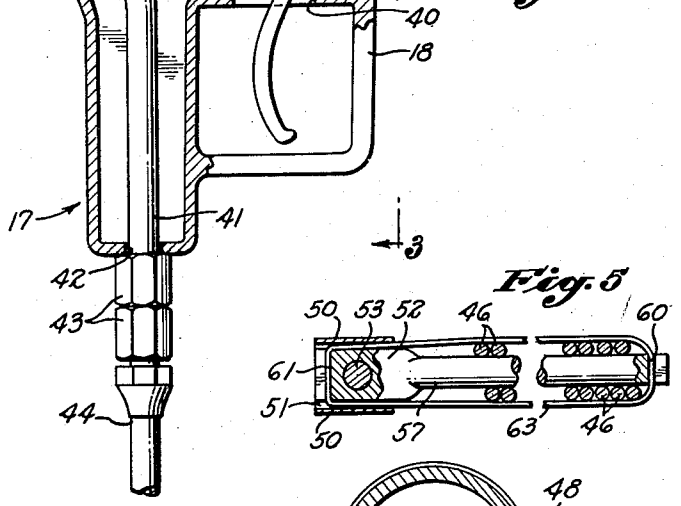


Fig. 5

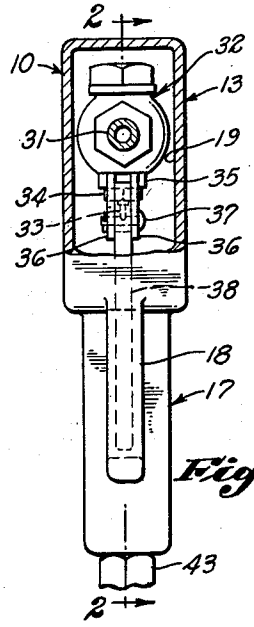
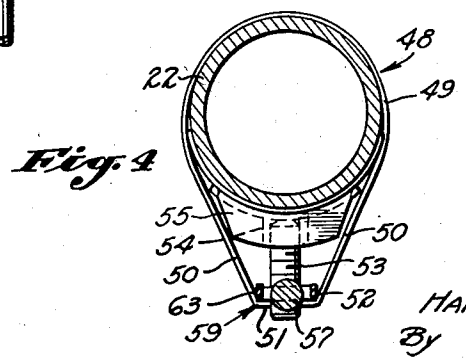


Fig. 3

Fig. 4



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HARPOON GUN

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2 Claims. (Cl. 124—11)

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This invention relates to improvements in guns and, more particularly, to improvements in guns which utilize a source of compressed fluid to provide the activating energy by means of which a projectile may be expelled from the gun.

Although my invention is described as embodied in a gun of the aforementioned type designed to be utilized in conjunction with a harpoon, it is conceivable that it may be used with projectiles other than harpoons, such as brass balls, bullets, etc.

Pneumatically operated guns of the conventional type usually include a housing consisting of a plurality of essential elements such as a wooden stock attached to a metal receiver and a barrel fixed, by any suitable means, in said receiver. Since such guns must, of necessity, because of the weight and size of the projectile, be considerably larger than conventional guns, the bulk and weight of previously designed pneumatically activated guns have been factors preventing their general acceptance for use in life saving and other activities.

It is, therefore, a primary object of my invention to provide a pneumatically activated gun of the aforementioned type which consists of a minimum number of light weight component parts and which is so constructed that the gun can be easily handled and aimed.

Another object of my invention is the provision of a pneumatically activated gun of the aforementioned type which includes a unitary housing and a barrel fixed in said housing. An associated object of my invention is the provision of a unitary housing which is formed of metal and which includes a stock portion, a valve chamber portion, and a barrel receiving portion, said barrel receiving portion providing a seat for the barrel of the gun.

Conventional pneumatically activated guns are usually energized by means of fluid from an internal fluid pumping system, the inclusion of such pumping system materially increasing the overall weight and bulk of the gun. A few guns, however, have been provided with activating fluid from an external source. However, no consideration has been given to the manner in which the fluid was conducted to the discharge valve of such guns and the lines carrying the fluid to the guns have frequently been so disposed as to materially interfere with the aiming of the gun.

An additional object of my invention is the provision of a pneumatically activated gun of the aforementioned type which is designed to be energized by a remotely positioned power source and

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in which the line conducting the compressed gas used as a source of power is disposed intermediate the stock and the barrel of the gun to provide a better balanced gun and to eliminate the possibility that the line may interfere with the aiming of the gun.

An additional object of my invention is the provision of a pneumatically activated gun which consists of a unitary housing having integrally formed therewith a depending hand grip portion which is associated with the aforementioned valve chamber portion of the housing to permit the utilization of the hand grip to support and aim the gun and also as a means for introducing the gas conducting line to the discharge valve of the gun.

Since the projectiles fired from the gun are generally utilized to convey one end of a line to a remote point, support means for the line must be provided either separately from or upon the body of the gun.

Another object of my invention is the provision of a support means for the line associated with the projectile fired from the gun which consists of an elongated spindle adapted to be secured to the barrel of the gun with its axis substantially parallel with the axis of said barrel.

A further object of my invention is the provision of a pneumatically activated gun which is simple in construction and which is capable of sustaining a great deal of abuse without materially affecting the operation or accuracy thereof.

Other objects and advantages of my invention will be apparent from the following specification and the accompanying drawing which is for the purpose of illustration only and in which:

Fig. 1 is a side elevational view of a gun constructed in accordance with my invention;

Fig. 2 is a vertical sectional view taken on the broken line 2—2 of Fig. 3;

Fig. 3 is a transverse, partly sectional view taken on the broken line 3—3 of Fig. 2;

Fig. 4 is a transverse, partly sectional view taken on the broken line 4—4 of Fig. 2; and

Fig. 5 is an enlarged, longitudinal cross section showing the elastic retainer of my invention and taken on the broken line 5—5 of Fig. 1.

Referring to the drawing and particularly to Fig. 1 thereof, I show a gun 10 adapted to be pneumatically activated from a remote source, not shown, and designed to discharge a projectile, such as a harpoon 45, over a substantial distance. The gun 10 includes a unitary housing 11 which is preferably cast or otherwise formed from metal

and which includes a stock portion 12, a valve chamber portion 13 and a barrel receiving portion 14. The fact that the housing 11 is formed in one piece materially reduces the complexity and thus the cost of assembling the gun and also is a considerable factor in reducing the over-all weight and bulk of the gun.

Secured to the end of the stock 12 is a resilient recoil pad 16 which is adapted to absorb the recoil encountered when the gun is discharged. Formed integrally with the valve chamber portion 13 of the housing 11 and depending therefrom is a hand grip portion 17 which may be gripped by one of the hands of the user of the gun to enable him to sustain the gun in firing position. The considerable weight of such guns as these has been a factor in reducing the accuracy of fire thereof since it is very difficult to support them in firing and aiming position by holding the stock against the shoulder and by gripping the barrel of the gun, as is done with conventional light weight guns. The hand grip 17 provides an auxiliary means for supporting the gun against the shoulder of the user during firing and aiming and results in a more easily aimed and better balanced gun.

Formed integrally with the hand grip 17 and the under side of the valve chamber portion 13 of the housing 11 is a trigger guard 18. The valve chamber portion 13 of the housing encloses a valve chamber 19, and the barrel receiving portion 14 of the housing 11 provides an elongated recess 21 in which is adapted to be fitted the rearward end of a barrel 22. The forward end of the barrel 22 is provided with a front sight 24 to facilitate the aiming of the gun.

The rearward end of the barrel 22 abuts a wall 25 which divides the longitudinal recess 21 from the valve chamber 19, said wall having an opening 27 formed therein. Pressed into the rearward end of the barrel 22 adjacent the wall 25 is a plug 28 which has an opening 29 which is concentric with and communicates with the opening 27 in the wall 25.

The opening 29 in the plug 28 is threaded and is adapted to receive one end of a nipple 31 which projects through an opening 27 in the wall 25 and has mounted upon its opposite end a valve body 32 which encloses a conventional poppet valve mechanism, not shown.

Projecting from the under side of the valve body 32 is a plunger 33 which is adapted, when driven upwardly, to operate the poppet mechanism, not shown, housed in the valve body 32 in a manner to be described in greater detail below.

Supported upon the under side of the valve body 32 by means of a nut 34 is a mounting bracket 35 which includes two spaced depending ears 36 between which extends a pivot pin 37. Pivotally mounted by its upper end upon the pin 37 is a trigger 38 having a working face 39 adapted to engage the lowermost end of the plunger 33 projecting from the valve body 32. The lower end of the trigger 38 projects outwardly through an opening 40 formed in the under side of the valve chamber portion 13 into the space defined by the trigger guard 18. Thus, when the lower portion of the trigger is urged rearwardly, the working face 39 of the trigger 38 is carried upwardly as the upper end of the trigger pivots upon the pin 37 to drive the plunger 33 into the valve body 32 to actuate the valve mechanism thereof.

The manner in which the valve body 32 is suspended in the valve chamber 19 dispenses with the use of fasteners and brackets mounted upon the wall of the valve chamber 19 and thus greatly facilitates installation of the valve body 32 in the chamber and eliminates excrescences upon the exterior of the housing 11. In addition, the manner in which the trigger 38 is supported upon the under side of the valve body 32 eliminates the necessity for pivotally mounting the trigger upon the walls of the valve chamber 19 and greatly simplifies the mounting of the trigger.

A tubing 41 is connected to the input side of the valve body 32, it being understood that the discharge side of said valve body is connected to the nipple 31 to permit the discharge of compressed gas into the interior of the barrel 22 to cause the expulsion therefrom of the harpoon 45 or any similar missile. The lower end of the tubing 41 passes through an opening 42 in the under side of the hand grip 17 and terminates in a swivel coupling 43 which is connected by means of a flexible tubing 44 to a source of compressed gas, not shown, such as a small cylinder of carbon dioxide. The fact that the input tubing 41 passes upwardly through the hand grip 17 into the valve chamber 19 at a point which is substantially the center of gravity of the gun, prevents the flexible tubing 44 and the container, not shown, suspended from said flexible tubing from obstructing the aim of the user of the gun or from unbalancing the gun.

Attached to the forward end of the harpoon 45 is a line 46 which is adapted to be coiled and supported upon a line support 48 attached to the barrel 22 of the gun. The line support 48 includes a substantially annular clamp 49 having depending legs 50 which terminate in a seat 51. Supported upon the seat 51 is a nut 52 which engages the lower end of a lead screw 53, the upper end of which is rotatable in a socket 54 which constitutes a portion of an arcuate clamping member 55. When the lead screw 53 is rotated in such a manner that the clamping member 55 is urged upwardly by the upward movement of the lead screw, the clamp 49 is securely fastened to the barrel 22 of the gun. Mounted upon the nut 52 or formed integrally therewith is an elongated spindle 57 over which the line is looped. To prevent the line 46 from falling from the spindle 57 there is provided a retainer means 59 which includes a transverse slot 60 formed in the forward end of the spindle 57 and a transverse slot 61 formed in the back of the nut 52. An elastic band 63 is positioned in the slots 60 and 61 and holds the line 46 on the spindle 57. When the gun is fired the harpoon 45 draws the line from the spindle and releases the band 63.

The line support 48 dispenses with the use of conventional complicated reels and permits the line 46 to be easily withdrawn as the projectile flies through the air subsequent to its discharge from the gun.

I thus provide by my invention a pneumatically operated gun which is characterized by extreme lightness and small bulk and which is characterized by simple valve and trigger mountings. In addition, the unitary housing of the gun, which is an important feature thereof, is provided with a centrally located depending hand grip portion which serves as an additional means of supporting the gun during the aiming and firing processes. Also provided by my gun is a simple and light weight line supporting means from which the line can be readily withdrawn during the flight of the projectile.

Although I have shown and described a preferred embodiment of my invention for the purpose of illustrating the manner of construction and mode of operation thereof, it is obvious that changes, alterations and modifications may be made in the specific details of said construction and I, therefore, prefer not to be limited to the specific details but rather to be afforded the full scope of the following claims.

I claim as my invention:

1. In a gun adapted to be utilized in conjunction with a projectile having a line attached thereto and relying for its activating energy upon an externally positioned container of pressurizing fluid, the combination of: a unitary metallic housing including a stock portion, a valve chamber and a barrel receiving portion, said valve chamber having integrally formed therewith and depending therefrom a hand grip portion which communicates with its interior and said barrel receiving portion having an elongated cavity formed therein communicating with said valve chamber; a barrel supported in said cavity having an apertured plug mounted in the rearward end thereof; a valve positioned in said valve chamber and supported by said plug; a line support mounted upon said barrel and having an elongated, resilient loop means encompassing the loops of said line to maintain them on said support; and a trigger having its upper end pivotally mounted upon said valve for operating said valve located in said valve chamber and projecting downwardly therefrom to the exterior of said housing.

2. In a gun adapted to be utilized in conjunction with a projectile having a line attached thereto and relying for its activating energy upon an externally positioned container of pressurized

fluid, the combination of: a unitary metallic housing including a stock portion, a valve chamber and a barrel receiving portion, said valve chamber having integrally formed therewith and depending therefrom a hand grip portion which communicates with its interior and said barrel receiving portion having an elongated cavity formed therein communicating with said valve chamber; a barrel supported in said cavity having an apertured plug mounted in the rearward end thereof; a valve positioned in said valve chamber and supported by said plug; a line support mounted upon said barrel, said line support including an elongated spindle having its axis parallel with that of said barrel adapted to receive said line and retaining means for holding said line on said spindle, said retaining means being constituted by an elongated, elastic loop extending from one end of the spindle to the other end and encompassing the bights of the line supported upon said spindle; and a trigger having its upper end pivotally mounted upon said valve for operating said valve located in said valve chamber and projecting downwardly therefrom to the exterior of said housing.

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