May 19, 1931. G. J. LEJEUNE 1,806,067

VORTEX RING TOY GUN

Filed June 17, 1929

FIG. 1.

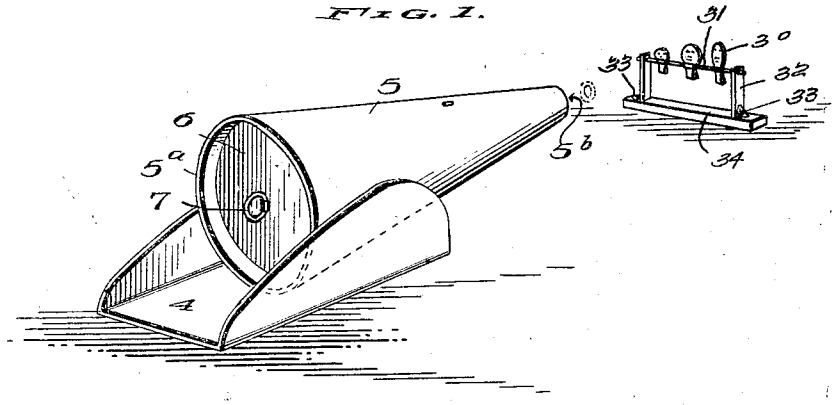


FIG. 2.

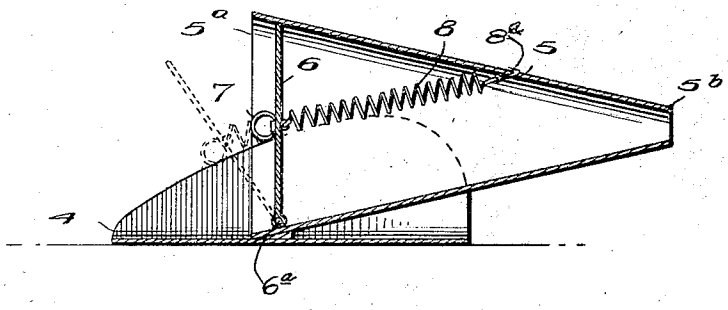


FIG. 3.

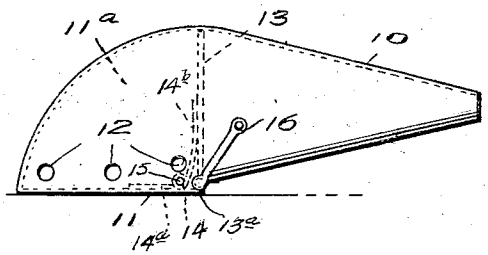


FIG. 4.

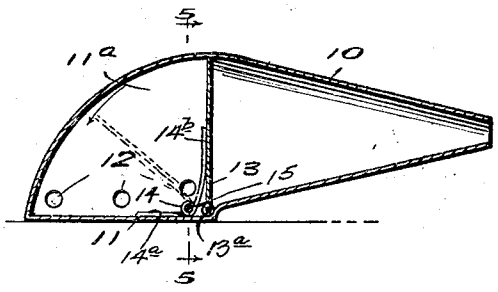
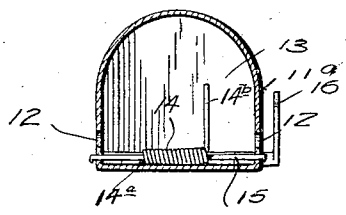


FIG. 5.



INVENTOR.

G. J. Lejeune

BY Miller B. Stevens Co.

ATTORNEYS.

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UNITED STATES PATENT OFFICE

GEORGE J. LEJEUNE, OF PHILADELPHIA, PENNSYLVANIA

VORTEX RING TOY GUN

Application filed June 17, 1929. Serial No. 371,456.

My invention relates to improvements in toys and has particular reference to a toy gun of pneumatic type adapted to emit a vortex air or smoke ring, which is the projectile fired at a target, or the like.

Briefly stated, the invention contemplates a novel and improved vortex ring gun, which is very simple in construction, inexpensive of manufacture, easy to operate and which involves a minimum number of working parts, all of which are of a sturdy nature.

Another object of the invention resides in the provision of a device, as stated, wherein the ring may be expelled from the barrel with a minimum of friction, thus utilizing to the maximum the impelling force, whereby to give the missile accuracy at a greater range than would otherwise be possible.

A further object of the invention resides in a vortex ring gun, the barrel of which is so formed as to keep the pneumatic or other vapor ring to small diameter at long ranges, whereby individual targets may be singled out from a group so that in the use of the device more interest will be developed because the results will depend to a large extent upon the skill of the gunner.

A still further object is to furnish in a device of this kind a novel shutter and operating means therefor,—the shutter being arranged to generate the air pressure within the barrel of the gun.

The invention also resides in certain other novel features of construction, combination and arrangement of the various parts and in certain modes of operation, all of which will be readily understood and appreciated by those skilled in the art upon reference to the accompanying drawing in conjunction with the following detailed descriptive matter.

It is understood that the subject matter claimed hereinafter permits considerable change in, and departure from, the disclosure of the preferred form of the invention, which is illustrated in the accompanying drawings, wherein,—

Figure 1 is a perspective view of one form of gun and showing also a type of target that may be used;

Figure 2 is a longitudinal sectional view showing a frusto-conical form of the barrel;

Figure 3 is a side elevational view of a modified form of gun;

Figure 4 is a longitudinal sectional view through the gun shown in Figure 3, and

Figure 5 is a cross section on the line 5—5 of Figure 3.

Referring to the form of invention shown in Figures 1 and 2, numeral 4 designates the base which supports the barrel 5, both of these parts being preferably made of sheet metal, and may be spot welded or otherwise secured together. The base has side portions 4^a engaging opposite sides of the barrel. The barrel 5 is of truncated cone or frusto-conical form and open at both ends, as indicated at 5^a, 5^b,—the latter being the smaller or discharge end.

The drawings illustrate a closure shutter 6 at the flared intake end 5^a of the barrel, and which in its seated position is disposed a substantial distance within the barrel. The shutter 6 is pivoted as at 6^a in barrel 5 and has attached thereto one end of a coil spring 8, the other end of the spring being anchored to the barrel 5 as at 8^a. A pull ring 7 is secured to the rear face of the shutter 6. From the construction described and illustrated it will be apparent that when the ring 7 is pulled rearwardly to swing the shutter out of the barrel, (Figure 2) and then released the action of the shutter in seating itself is instantaneous and will generate compression in the barrel 5 forcing a vortex ring from the discharge end 5^b. It is understood that the ring will commence forming as the air is forced toward the discharge end, the tendency being for the rings to decrease in diameter while approaching the discharge end 5^b and to likewise decrease for a substantial distance after having been emitted from such discharge end. Thus, at long ranges the gunner of ability is enabled to single out and hit one target of a group, a thing impossible with guns heretofore used involving the vortex ring principle owing to the fact that the rings emitted rapidly increase in diameter as soon as they leave the barrel.

In Figures 3 and 4, a further form of the invention is illustrated wherein the barrel 10

and the support 11 are integral,—the support defining a barrel-communicating chamber having air inlet holes 12 adjacent the bottom. Thus, air is supplied to chamber 11ª through these holes to be forced into the barrel under the impulse of the shutter 13 in moving from its rearward to its vertical seating position, as shown. The shutter 13 is actuated by a coil spring 14 one lateral end 14ª resting upon the base 11 while the other lateral spring end 14ᵇ bears against the outer face of the shutter 13, the spring having a securing rod 15 extending therethrough and seated in recesses in the side walls of chamber 11ª.

However, in the latter form of the invention the shutter is operated by a control handle 16 secured thereto, the shutter being pivoted, as at 13ª, to the floor of the base 11 at the intersection of the barrel therewith.

The targets 30 are preferably pivoted on a rod 31 carried by spaced uprights 32 which are hinged as at 33 to the base 34 so that they may be folded down on the base when desired.

The novel features of construction and the advantages flowing therefrom are believed to be readily apparent to those skilled in the art from what has been said and shown herein.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A vortex ring gun comprising a base, a barrel carried by said base, the barrel being open at both ends and decreasing in diameter in the direction of the discharge end, and movable closure means at the inlet barrel end for forcing air in the direction of the discharge end of the barrel.

2. A vortex ring gun comprising a base, a barrel carried by said base and decreasing in diameter toward the discharge end thereof, a shutter normally arranged to close the inlet end of said barrel, and means for forcibly actuating said shutter to seated position for forcing air through said barrel.

3. In a vortex ring gun, a barrel having its internal diameter gradually reduced from a point adjacent to and in the direction of the discharge end of said barrel, and movable closure means adjacent the inlet end of the barrel for forcing air therethrough.

4. In a vortex ring gun, a barrel having its internal diameter gradually reduced from a point adjacent to and in the direction of the discharge end of said barrel, means comprising a swingable shutter for sealing the inlet end of the barrel, and means for causing the rapid and forceful seating of said shutter whereby to generate air pressure within said barrel for the emission at the discharge end of a vortex ring.

5. A vortex ring gun comprising a base providing a chamber, said chamber having air inlets, a barrel communicating with said chamber and having its internal diameter decreasing in the direction of the discharge end thereof, a swingably supported shutter separating said base chamber and barrel, yielding means normally tending to hold said shutter seated and for rapidly and forcefully seating said shutter, an operating lever connected to said shutter and projecting laterally of said base member and barrel whereby said shutter may be drawn back, and said base member chamber being dimensioned with respect to the path of movement of the outer end of said shutter so that when the same assumes seated position the space between the end of the shutter and the corresponding wall of the base member chamber will gradually decrease as the shutter approaches seating position whereby to force great volumes of air into and through said barrel.

6. A vortex ring gun comprising a base member having a chamber, air inlets provided in said chamber adjacent the bottom, a barrel carried by said base member and communicating with the chamber thereof, a shutter carried by said base member and within the chamber thereof for sealing the barrel, means for movably mounting said shutter, external operating means without said base member chamber for actuating said shutter, and said barrel decreasing in diameter in the direction of the discharge end thereof.

7. A vortex ring gun comprising a chambered casing, a barrel communicating with the casing and having a constricted discharge end, and a pivoted shutter operable to force air through said barrel.

8. A vortex ring gun comprising a chambered casing, a barrel communicating with the casing and having its bore tapered inwardly adjacent and toward the muzzle, and a pivoted shutter operable to force air through said barrel.

9. A vortex ring gun comprising a chambered casing, a barrel communicating with the casing and having a constricted discharge end, and a pivoted shutter operable to force air through said barrel, and said chamber having a wall gradually approaching the path of the end of the shutter in the direction of said barrel.

In testimony whereof I affix my signature.

GEORGE J. LEJEUNE.