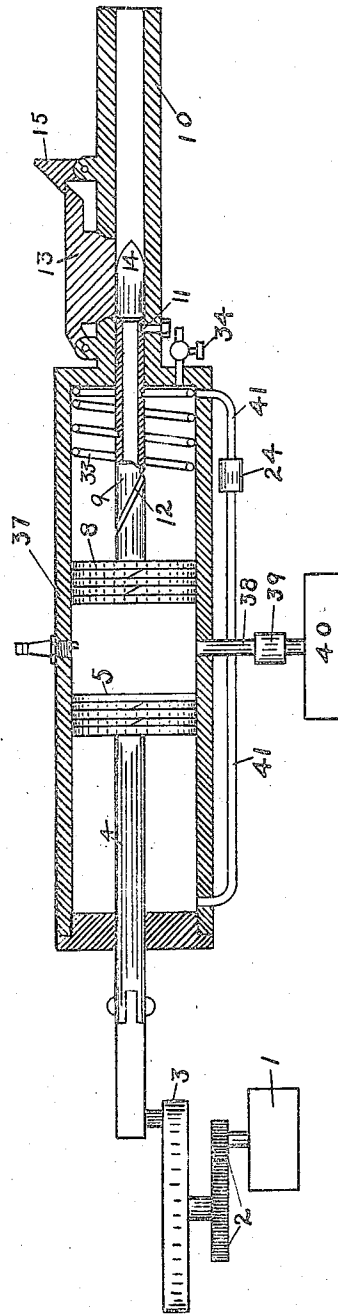


GUN.

Patented Sept. 2, 1919.

1,314,801.



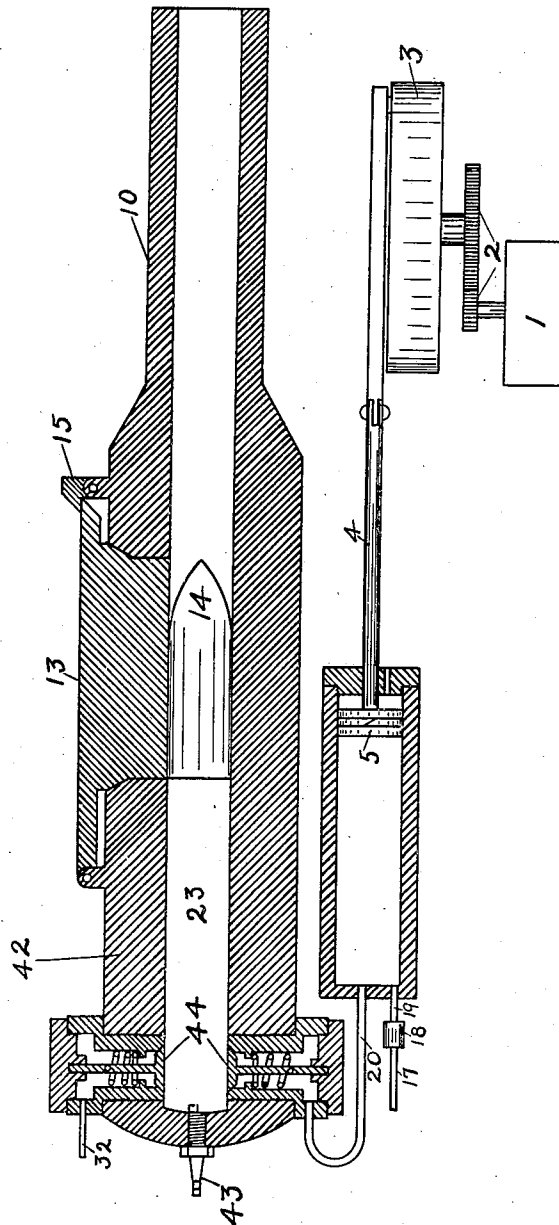
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1,314,801.

H. N. HANZLIK.
GUN.
APPLICATION FILED MAR. 18, 1918.

Patented Sept. 2, 1919.
2 SHEETS—SHEET 2.

Fig. 3.



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UNITED STATES PATENT OFFICE.

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GUN.

1,314,801.

Specification of Letters Patent.

Patented Sept. 2, 1919.

Application filed March 18, 1918. Serial No. 223,242.

To all whom it may concern:

Be it known that I, HERMAN N. HANZLIK, a citizen of the United States, and a resident of Wonewoc, in the county of Juneau and State of Wisconsin, have invented certain new and useful Improvements in Guns, of which the following is a specification.

One object of my invention is to provide a gun in which gas or gases are exploded to propel the projectile instead of using powder, as is ordinarily the case.

Another object of my invention is to provide a method for introducing gas or gases into the explosion chamber in such style that an explosion may be produced therein under the most advantageous conditions for creating a maximum pressure in the chamber.

Another object of my invention is to provide in a gun an explosion chamber and a firing barrel and improved means for directing the force generated in the explosion chamber to a projectile carried in the barrel.

Another object of my invention is to provide in a gun multiple means for introducing gas into the explosion chamber and exploding the gas to the best advantage.

Another object of my invention is to provide in a gun means for creating a direct pressure against a projectile and also means for providing a follow up pressure on a projectile as it is in motion.

Another object of my invention is to provide improved means for giving a projectile in a gun a rotary as well as a forward motion.

With these and incidental objects in view the invention consists of certain novel features of construction and combination of parts, the essential elements of which are hereinafter described with reference to the drawings which accompany and form a part of this specification.

In the drawings Figure 1 is a plan view of a gun embodying my invention and shown mostly in section to better illustrate the operation of the mechanism. Fig. 2 is a similar view of a modification of the gun shown in Fig. 1. and Fig. 3 is a second modification in which the firing barrel of the gun and the explosion chamber are the same diameter.

As shown in Fig. 1, a motor 1, or any other suitable source of power, drives through gears 2 the fly wheels 3, which, by the ordinary crank and connecting rod

mechanism, reciprocate the piston rod 4 and piston 5 carried thereon in the cylinder 6.

An explosion chamber 7 has reciprocally mounted therein a piston 8 from which extends a tube 9 slightly mounted in the barrel 10 of the gun, and the pin 11, carried in the barrel riding in the groove 12 imparts a rotary motion to the tube 9.

The barrel 10 has an aperture closed by the block 13 through which the projectile 14 may be inserted into the barrel of the gun, the block having a gas tight fit with the barrel and being latched into place by the latch 15.

A suitable source of supply of gas is connected by pipes 17 and through inlet check valve 18 and pipe 19 to the interior of the cylinder 6, so the backward stroke of the piston 5 will draw a charge of explosive gas or mixture from the reservoir 16.

The forward stroke of the piston 5 will drive this gas through the pipe 20, chamber 21, and valve opening 22 into the explosion chamber 23. A suitable valve 24 is normally held closed by the spring 25 until the pressure created in the cylinder 6 is sufficient to overcome the pressure on the valve 24 and thus admit the gas into the explosion chamber.

With the gas admitted, an electric spark is created at one or both of the spark plugs 26 and 27 by an ordinary make and break system, the primary circuit being closed by contact between the point 28 carried on the piston rod 4 and the contact maker 29 adjustably mounted on and insulated from the rod 30, so the time of spark in the cycle of the stroke of the position 5 may be regulated.

The explosion in the chamber 23 will force the piston 8 outwardly, the pipe 9 driving the projectile 14 through the barrel 10, and there may also be a direct action of the gases on the head of the projectile 14 through the inside of the pipe 9 so that after the piston 8 has taken its full stroke the projectile is still under the influence of the explosive force created in the explosion chamber 23.

If desired a second valve 31, connecting through a pipe 32 to a second cylinder similar to the cylinder 6, may be used to provide more gas and a different pressure of the gas in the explosion chamber 23 at the time the explosion is to take place.

I have determined that under certain con-

ditions certain gases will create a greater pressure when fired at a point lower than their point of highest compression. There is a point in the compression of gas at which it may be exploded to the greatest advantage, and by means of multiple cylinders and valves indicated, and by means of the adjustable sparking device I am able to explode the gas at this most advantageous point.

My experiments show that the best results are obtained when the gas is compressed and then allowed to expand a certain amount and the explosion accomplished during or at a certain point in the process of expansion, although I believe the same point is arrived at in the act of compression.

As the pipe 9 is rotated during its forward travel by the action of the pin 11 in the groove 12, the projectile 14 will be given a rotary motion by frictional engagement with the end of the pipe 9 and the same results obtained in the smooth bore gun as is now obtained in a rifle bore, and it is possible, by this mechanical means of rotating the projectile, to use a smooth bore and consequently a long life barrel and still have the desired rotation of the projectile.

A cushion spring 33 is provided to take up the shock of the piston 8 at the end of the explosion stroke and also a valve 34 may be opened and the cushion of air escaping through the valve 34 from behind the piston 8 will also serve to take up the shock of the piston.

To return the piston 8 to the proper position for reloading the gun, I provide a pipe 35 communicating from the cylinder 6 to the cylinder 7 with a check valve 36 interposed therein so the back stroke of the piston 5 will fill the chamber or cylinder 7 with air and hence return the piston 8 to its normal position.

In the type shown in Fig. 2 the cylinder 27 has both pistons 8 and 5 mounted therein, each of the pistons being actuated as heretofore described, with the pipe 38 leading through a suitable check valve 39 to a source of gas supply 40 and with a by-pass pipe 41, provided with a check valve 42, to cause the back stroke of the piston 5 to return the piston 8 to its proper position.

As shown in Fig. 3, the cylinder 42 comprises both the explosion chamber and the firing barrel, the explosion chamber being that portion of the cylinder back of the projectile 14 and the gas being supplied to the explosion chamber and the explosion effected in the same manner as heretofore described,

although I have shown as an alternate construction the spark plug 43 located in the end of the explosion chamber with the valves 44 arranged around the exterior of the barrel near the spark plug.

In each of the constructions shown the principle is the same, the basic idea being that of exploding a charge of gas in a cylinder and using the force resulting therefrom to drive the projectile.

However, as heretofore stated, I have determined that there is a point of compression at which a maximum force of explosion may be effected and this principle forms an important part of my invention and is applicable, not only to a gun, but also to explosive engines, and I expect to claim this principle broadly, whether used in a gun or in an explosive engine.

While I have described my invention and illustrated it in several designs, I do not wish it understood that I limit myself to these constructions, as it is evident that the application of the invention may be varied in many ways within the scope of the following claims.

Claims:

1. In a gun the combination of an explosion chamber, a firing barrel communicating therewith; a piston reciprocally mounted in said explosion chamber and carrying a tube reciprocating in said barrel, a pressure cylinder associated with said explosion chamber, a piston reciprocating in said pressure cylinder, means for drawing an explosive mixture into said pressure cylinder, and communicating means between said pressure cylinder and said explosion chamber whereby gas may be forced from said pressure cylinder to said explosion chamber.

2. In a gun the combination of a firing barrel, an explosion chamber, mechanical means for driving a projectile forwardly in said firing barrel, and means for causing the rotation of said mechanical means when driven forwardly whereby said mechanical means will give a rotary movement to said projectile.

3. In a gun the combination of a firing barrel, an explosion chamber, a driving rod, mechanical means for rotating said driving rod as it moves forward in said firing barrel whereby a rotary movement may be imparted to a projectile driven forward by said driving rod and in mechanical contact with the forward end of said driving rod.

HERMAN N. HANZLIK.