April 2, 1946. G. S. MC ARTHUR 2,397,800

GUN

Filed March 20, 1944 2 Sheets-Sheet 1

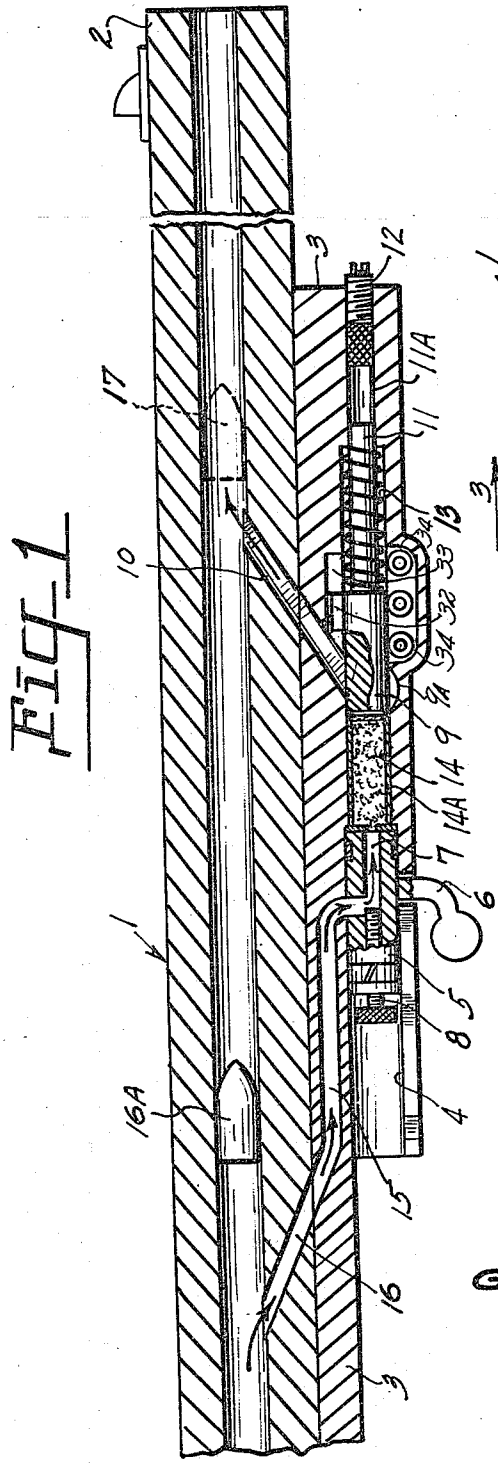


Fig-1

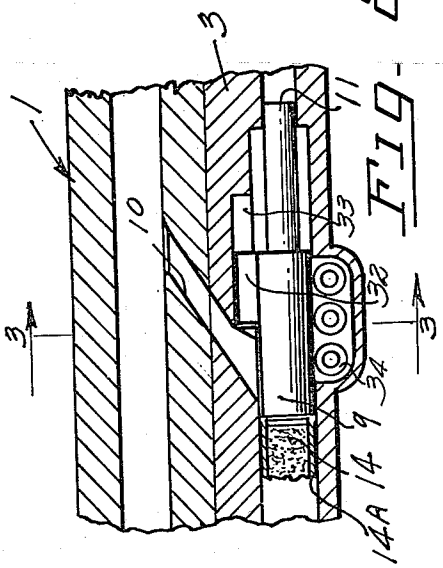


Fig-2

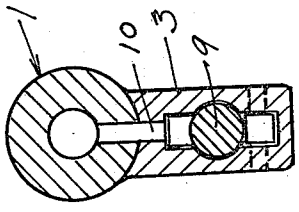


Fig-3

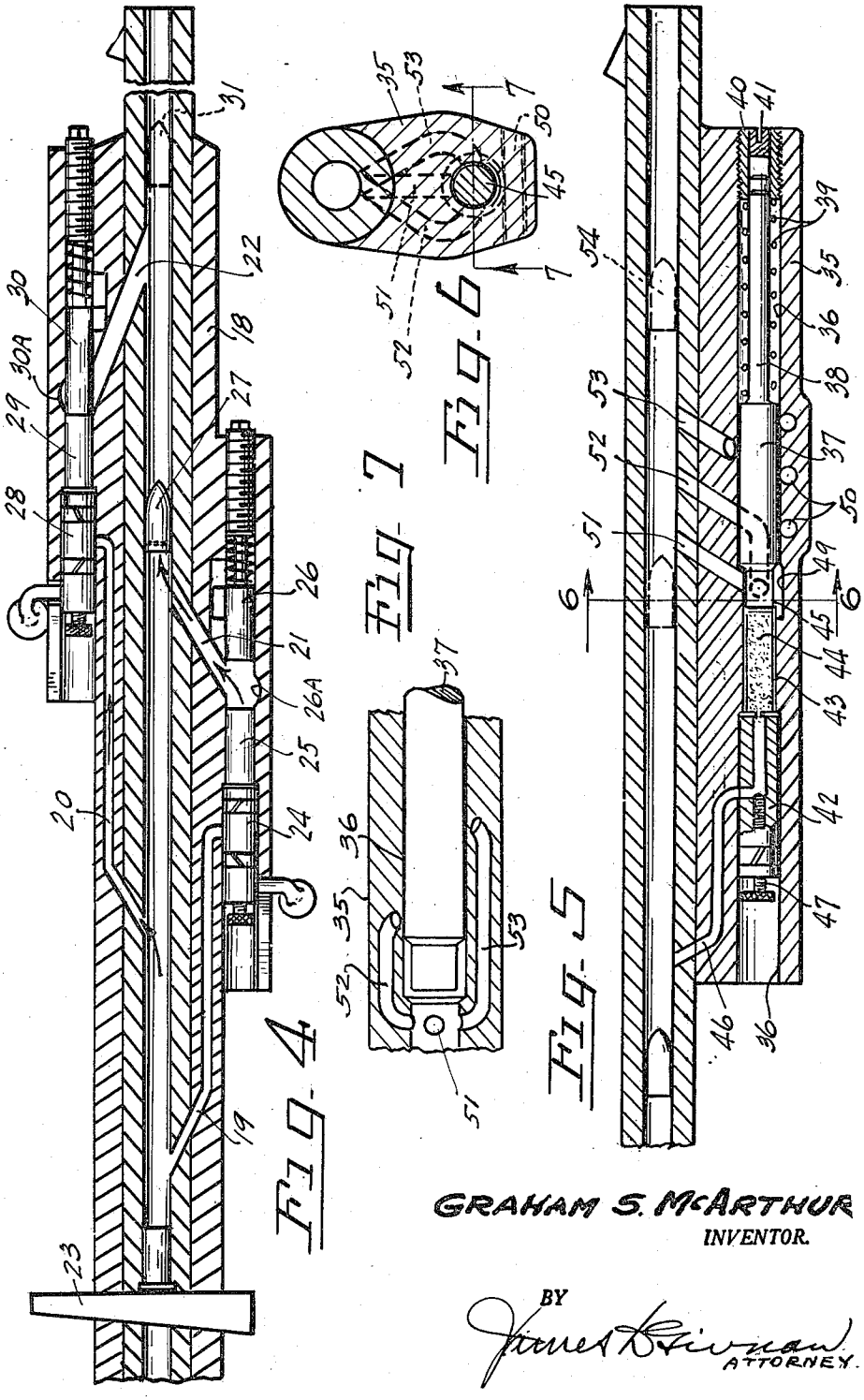
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April 2, 1946. G. S. MC ARTHUR 2,397,800

GUN

Filed March 20, 1944 2 Sheets-Sheet 2



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Patented Apr. 2, 1946 2,397,800

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2,397,800

GUN

Graham S. McArthur, Portland, Oreg.

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2 Claims. (Cl. 89—8)

This invention relates to improvements in guns and has for its principal object the provision of means attached to or built into a gun for progressively firing a projectile with successive charges of powder in addition to that used to start the projectile on its way through the gun barrel. By this arrangement the velocity of the bullet through the barrel is maintained at a maximum since the additional charges of powder supplement that used in the cartridge in the initial firing of the projectile and part of which is wasted in overcoming the inertia of the projectile in getting it started.

The foregoing and other objects will appear as my invention is more fully hereinafter described in the following specification illustrated in the accompanying drawings, and finally pointed out in the appended claims.

In the drawings:

Figure 1 is a longitudinal sectional elevation of a gun made in accordance with my invention.

Figure 2 is an enlarged fragmentary sectional detail view.

Figure 3 is a sectional end elevation taken on the line 3—3 of Figure 2.

Figure 4 is a longitudinal sectional side elevation of a modified form of the invention.

Figure 5 is a longitudinal sectional elevation of a further modified form of the invention.

Figure 6 is a sectional end elevation taken on the line 6—6 of Figure 5.

Figure 7 is a sectional view taken on the line 7—7 of Figure 6.

Referring now more particularly to the drawings:

In Figure 1, reference numeral 1 indicates the barrel of a gun, of any caliber, provided at one of its ends with any approved form of breech mechanism, not shown. Between the breech and the muzzle 2 of the gun, I attach a body member 3 which is bored as at 4 to receive a breech block 5 which is removably secured in place within the bore 4 by any approved means as indicated at 6. The breech block 5 is formed with a right angular bore 7 adapted to receive a needle valve 8. Also within the bore 4 and in spaced relation to the breech block 5 is a slide valve 9 adapted to open and close a duct 10 extending from the bore 4 to the interior of the gun barrel 1. One end of the valve 9 is reduced in diameter as at 11 and is slidably mounted within a reduced portion 11A of the bore 4 which is closed by a plug 12 securely threaded into the body member 3. The valve 9 is backed by a spring 13 of sufficient resistance to return the valve to a position to close the duct 10.

Between the inner end of the valve 9 and the breech block 5 I place a charge of gun powder 14 in any approved form of shell 14A. The body member 3 is bored as at 15 to communicate with a duct 16 in open communication with the interior of the gun barrel as shown.

With further reference to Figure 1, reference numeral 16A indicates a projectile which has been fired from the breech of the gun in the conventional manner and has passed over the duct 16 which permits the gas following the projectile to enter the duct, bore 15, then to pass through the breech block 5 to explode the charge of gunpowder 14 within the bore 4. The exploding of the charge drives the valve 9 away from the lower end of the duct 10 to enable the gases from the exploded charge to pass therethrough and to follow in behind the projectile which at this time is in the approximate position shown in dotted lines and indicated at 17 within the bore of the gun. By this arrangement the projectile is driven by twice as much gun powder as ordinarily provided within the shall casing.

In Figure 4 I illustrate a duplication of the form of the invention shown in Figure 1 and wherein the projectile after its original firing is followed up by two additional explosions of gun powder instead of one. In this form of the invention the body member 18 along the bottom of the barrel is identical with that shown in Figure 1 and so is that shown on the top thereof. But the two body members are so arranged that the gas intake ducts 19 and 20 and the explosion ducts 21 and 22 overlap. By this arrangement the projectile is fired from the breech block 23 in the usual manner and as it passes the entrance to the duct 19 the gas following the projectile enters the duct, passes through the second breech block 24 and explodes a charge of gun powder 25. This explosion drives the valve 26 away from the entrance to the duct 21 to allow the gases from the exploded charge 25 to pass therethrough to follow in behind the projectile which has reached the position indicated at 27. After the projectile has passed the entrance of the second intake duct 20, a portion of the gas enters it and passes through a third breech block 28 to explode another charge of gun powder 29 which moves the valve 30 and discharges through the duct 22 in behind the projectile which has now reached the position as indicated at 31 within the gun barrel.

In the two forms of the invention just described I slightly relieve the bore 4 around or below the slide valves 9, 26 and 30 as at 9A, 26A and 30A, respectively, so that some of the explosion from

the gunpowder will partially surround one end of the slide valve and prevent it from binding. As a further precaution I form a block 32 on the opposite end of the slide valve which is slidable in a groove 33 formed in the body member 3. In addition to this I may also provide a series of rollers 34 as a rolling support for the slide valve to further reduce any binding tendency.

In the modified form of the invention shown in Figures 5, 6 and 7, the body member 35 is bored as at 36 throughout its length. Within the bore I slidably mount a valve 37 formed with a reduced extension 38 around which is wound a compression spring 39 whose one end bears against the valve 37 and whose opposite end bears against a hollow plug 40 threaded into the body member 35 to form an adjustable abutment for the spring 39. The plug is bored for a portion of its length to form a slidable bearing for the reduced portion of the valve and is also slotted as at 41 for convenience in advancing the plug on its threads. Within the opposite end of the bore 36, I place a breech block 42 similar in construction to the breech block 5 shown in Figure 1. The breech block is opened to a reduced portion 43 of the bore 36 within which I place a cartridge of gun powder 44 which is in open communication with the adjacent and reduced end portion 45 of the valve 37.

A duct 46 extends from the interior of the gun barrel into communication with the breech block 42 which as previously stated is in open communication with the charge of gun powder 44 in accordance with adjustments made by a needle valve 47.

Beneath the reduced end portion 45 of the slide valve 37 I relieve the bore 36 as at 49 to enable a part of the explosion from the cartridge 44 to surround the slide valve and to resist any tendency of its binding within the bore. I also provide a series of rollers 50 as a rolling support for the slide valve to further reduce any tendency of its binding within the bore.

In open communication with the interior of the bore 36 in advance of the charge of gun powder 44 are three ducts 51, 52 and 53 whose ends terminate in alignment with each other as they open into the gun barrel. When the charge 44 is fired by the gas from the duct 46, the explosion drives the valve 37 away from the entrance to the three bores and then enters the gun barrel in progressive steps behind the projectile which has reached the approximate position indicated at 54.

While I have shown a particular form of embodiment of my invention, I am aware that many minor changes therein will readily suggest themselves to others skilled in the art without departing from the spirit and scope of the invention. Having thus described my invention, what I claim as new and desire to protect by Letters Patent is:

1. A gun barrel, means in the form of a chamber attached to the gun barrel and constructed and arranged to retain a charge of gun powder, a duct in communication with the gun barrel and said chamber for directing the gases from a fired projectile into the chamber for exploding the gun powder therein, a second duct in communication with the chamber and the gun barrel for directing the explosion of the gun powder in behind the projectile in its passage through the gun barrel, and valve means actuated by said explosion for opening said second duct for allowing the explosion to pass therethrough.

2. A gun barrel, means in the form of a chamber attached to the gun barrel and constructed and arranged to retain a charge of gun powder, a duct in communication with the gun barrel and with said chamber through a breech block for directing the gases from a fired projectile into the chamber for exploding the gun powder therein, a second duct in communication with the chamber and the gun barrel for directing the explosion of the gun powder in behind the projectile in its passage through the gun barrel, spring resisted valve means actuated by said explosion for opening said second duct for allowing the explosion to pass therethrough, anti-friction means supporting said valve, and means for directing a portion of said explosion beneath the valve.

GRAHAM S. McARTHUR.