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Nelson et al.

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[54] **GAS FIRED CASELESS AMMUNITION RIFLE**

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[51] **Int. Cl.**.....**F41f 1/04,** F41f 11/00

[58] **Field of Search**.....42/1 R, 84; 89/7, 89/26

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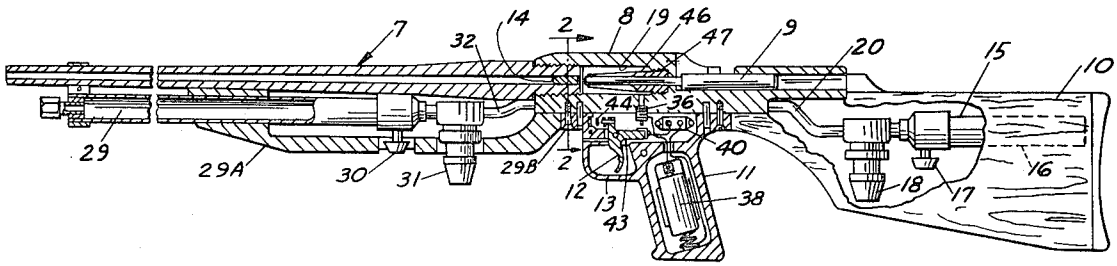
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[57] **ABSTRACT**

A caseless ammunition, bolt action, rifle charged with gas and fired electrically. The firing chamber is sealed with a truncated cone insert, having thin walls which are contracted around the bolt by gas pressure, to seal against back pressure leakage.

1 Claim, 4 Drawing Figures



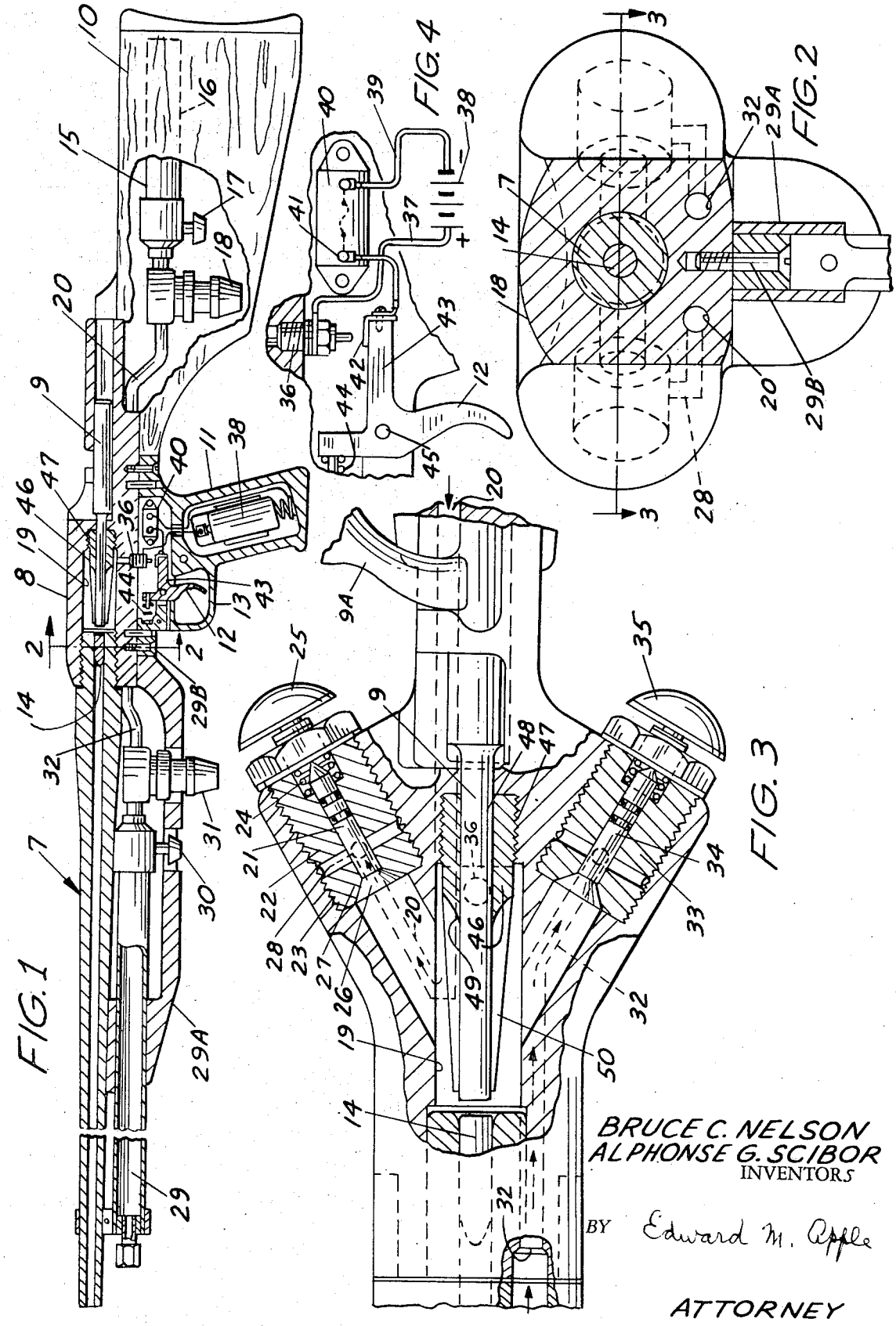


FIG. 1

FIG. 2

FIG. 3

FIG. 4

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GAS FIRED CASELESS AMMUNITION RIFLE

This invention relates to a rifle designed to shoot caseless ammunition by charging the rifle with gas, and firing the charge electrically.

An object of the invention is to provide a rifle which will not jam after firing, because there is no empty cartridge shell or case to be ejected.

Another object of the invention is to gas charge, and electrically fire, a rifle in much the same manner as an internal combustion engine is operated. In this instance a projectile is substituted for the engine piston.

Another object of the invention is to provide a rifle which may be fired with hydrocarbons and oxygen, both in a gaseous state. This has various advantages over rifle using metal cases in that it is more economical to shoot and there is no need of buying expensive metal cased ammunition.

Another object of the invention is to provide a rifle which may quickly be adjusted to provide different amounts of foot pounds of muzzle energy, so that the same rifle can fire at long range, medium range, and for target practice with less wear and tear on the device and less fatigue to the operator.

Another object of the invention is to provide a device of the character indicated, which is provided with integrated receptacles for holding the gases which are to be mixed in the firing chamber.

Another object of the invention is to provide a device of the character indicated, which may be supported in the arms of the operator, or may be used as a light machine gun, in which event the gas tanks could be detached from the gun and carried separately.

Another object of the invention is to provide a device which may be mounted on a stationary member, or may be mounted on a mobile unit, or an airplane, with the tanks incorporated into the structure of the machine.

Another object of the invention is to provide a device of the character indicated, which fires clean and emits only CO_2 and H_2O.

Another object of the invention is to provide a rifle which may be fired electrically, or with caps, or with the compression of its own gases.

Another object of the invention is to provide a device of the character indicated, which is provided with a truncated cone insert in the firing chamber, which insert has comparatively thin walls which are contracted about the bolt by the exploding gases to prevent leakage of the gas around the bolt.

Another object of the invention is to provide a device of the character indicated, which may be manufactured and assembled inexpensively, in as much as it has few machined parts.

Another object of the invention is to provide a device of the character indicated, which will warm itself in cold weather and will facilitate its use under adverse weather conditions.

The foregoing and other objects and advantages of the invention will become more apparent as the description proceeds, reference being made from time to time to the accompanying drawing, forming part of the within disclosure, in which drawing:

FIG. 1 is a longitudinal, sectional view taken through a rifle embodying the invention.

FIG. 2 is an enlarged section taken substantially on the line 2—2 of FIG. 1.

FIG. 3 is a section taken substantially on the line 3—3 of FIG. 2.

FIG. 4 is an enlarged detail illustrating a typical wiring circuit when the device is fired electrically.

Referring now more particularly to the drawing, it will be understood that in the embodiment herein disclosed, the reference character 7 indicates the barrel of the rifle which has a breech block or receiver 8, a bolt 9 having a handle 9A, a stock 10, hand grip 11, trigger 12 and trigger guard 13, all of which are conventional parts of a rifle and constitute no part of the invention except as they are combined with the elements hereinafter described.

The rifle embodying the invention is designed to shoot a bullet, or projectile 14, which may be of any desired caliber and which is fed into the barrel 7, by the bolt 9, as in conventional, single action practice. The rifle may also be equipped to load the bullets automatically, although no claim is made to such mechanism in this application.

Instead of using a brass cartridge to carry the explosive charge, we intend to fire this rifle by means of a mixed charge of hydrocarbons gas (preferably butane) and compressed oxygen.

In the embodiment shown in FIG. 1 a compressed butane cylinder 15, is housed in a suitable bore 16, formed in the stock 10. The cylinder 15 is provided with a shut off valve assembly 17 and a pressure regulator 18. The cylinder 15 is connected to the firing chamber 19 through a passage way 20, which passageway 20 is controlled by means of a valve assembly 21 and 22, which is threadedly mounted on a lateral extension of the breech bolck 8 as at 23. The valve member 21 is spring loaded as at 24, and may be opened by striking the button 25 with the palm of a hand. The valve stem 21 has a head 26 which engages a seat 27 and when the head 26 is lifted from the seat 27, the gas is permitted to enter the chamber 19 through the ports 28.

A compressed oxygen cylinder 29 is supported by any suitable means 29A and 29B, under the barrel 7. The oxygen cylinder 29 is provided with a shut off valve 30 and regulator mechanism 31 and communicates with the firing chamber 19 through a passageway 32 which is controlled by a valve assembly 33 and 34 having a palm button 35 similar to the mechanism 21–28 previously described in connection with the butane gas assembly.

Both the butane and oxygen being under compression, it is simply necessary to strike the buttons 25 and 35 to admit an explosive mixture into the firing chamber 19. The explosive mixture in the firing chamber may be fired electrically, by means of a glow plug 36, which is connected as at 37 to one side of a battery 38 (FIG. 4), the other side of the battery 38 being connected as at 39 to a safety fuse 40, which in turn is connected as at 41 to a contact element 42, which is mounted on a lever 43, which is part of the trigger mechanism 12. The contact 42 is normally held away from the glow plug 36 by a spring 44, which holds the trigger mechanism 12 in vertical position on the pivot 45 as shown in FIG. 4.

The firing chamber 19 is provided with a frusto conical insert member 46, which is threadedly received, as at 47, in a suitable bore formed in the breech block 8. The truncated cone member 46 has a central bore 48 in which is received a reduced portion of the bolt 9. The member 46 is also provided with comparatively thin

walls around the bolt **9**, as at **49**, so that upon the firing of the charge from the chamber **19** the back pressure of the explosive gases contract the walls of the member **46** tightly around the bolt **9**, to prevent escape of gases rearwardly from the chamber **19**. The member **46** is also provided with radial webs **50**, which trap the exploding gases and prevent them from swirling around the bolt **9** to more effectively exert pressure on the thin walls **49** to assist in sealing the firing chamber around the bolt area.

From the foregoing, it will be understood that by regulating the pressures in the passageways **20** and **32**, it will be possible to effect a greater or lesser explosive charge in the chamber **19**.

It is believed that the operation of the device is obvious from the foregoing description.

Having described our invention, what we claim and desire to secure by Letters Patent is:

1. In a rifle having a barrel, breech block, stock, hand grip and trigger assembly, the combination of a firing chamber in said breech block, means to seal said firing chamber against back pressure, means to feed caseless bullets to said barrel, a first compressed gas chamber, means to conduct gas from said first gas chamber to said firing chamber, a second compressed gas chamber in communication with said firing chamber, means to control the flow of gas from each of said gas chambers, and means to fire the mixture of gases in said firing chamber, to eject the bullets from said barrel, in which the means to seal said firing chamber include a truncated cone insert received therein, said cone having thin walls arranged to be compressed about the bullet feed means to seal the area around said feed means against gas leakage, upon firing the gas mixture in said firing chamber.

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