

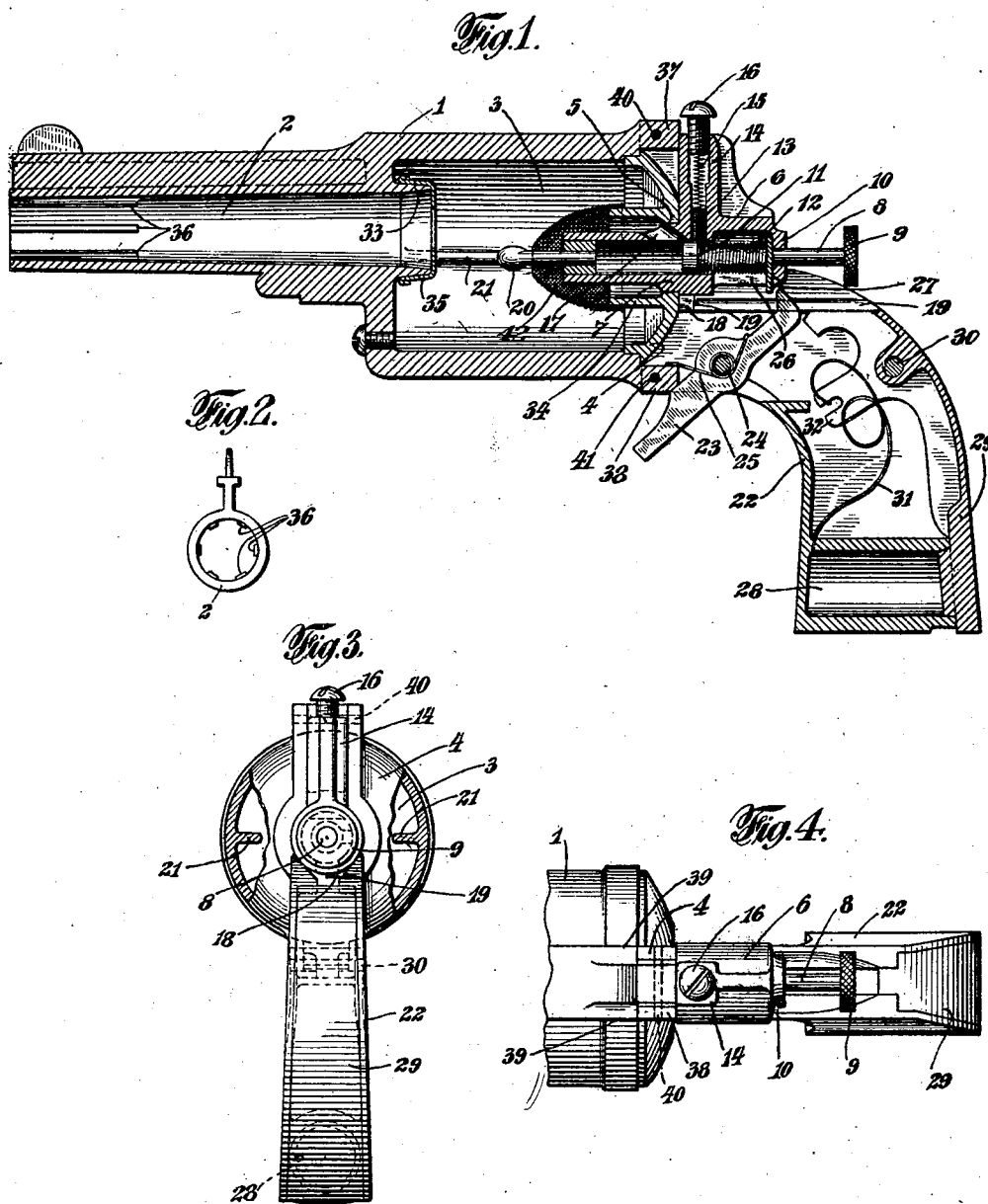
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TOY FIREARM

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TOY FIREARM.

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The invention relates to a firearm operated by igniting a gaseous mixture in an explosion chamber, for example by depositing calcium carbide in a water-containing chamber to generate acetylene gas, which, together with the air in such chamber, forms an explosive mixture which may be ignited or fired to produce a loud report. Such a firearm, however, if of small size, is not dangerous to the operator, and is simple in operation, thus rendering it particularly adapted to serve as a toy.

One object is to provide a firearm of the above nature, the several component parts of which are so constructed and related that the firearm may take the form of a pistol which will operate satisfactorily.

Another object is to construct the firearm in such manner as to facilitate the operations of charging and discharging the same particularly with regard to the insertion of the necessary chemicals into the explosion chamber, and the actuation of the igniter mechanism.

The invention also aims to prevent the water carried in the explosion chamber, from running out, or leaking into undesired parts of the firearm where it would interfere with the proper operation thereof, particularly when the firearm is held in different positions.

Another object is to provide such a firearm in which an efficient mixture will be obtained between the gases which are to be ignited in the explosion chamber.

The invention also aims to provide the accurate firing of a projectile from a firearm of the above-mentioned character.

Further objects and advantages of the invention will be in part obvious and in part specifically pointed out in the description hereinafter contained, which, taken in connection with the accompanying drawings, discloses a preferred embodiment of the invention; such embodiment, however, is to be considered merely as illustrative of its principle. In the drawings:

Fig. 1 is a central vertical section of a pistol constructed in accordance with the invention.

Fig. 2 is an end view of the muzzle of such pistol.

Fig. 3 is an end view looking toward the stock and breech portions of the pistol.

Fig. 4 is a plan view of the breech and stock portions of the firearm.

The illustrated embodiment of the invention includes a barrel member 1, having a bore 2 leading to the muzzle of the firearm, and a chamber 3 communicating with said bore, the chamber being for the purpose of containing gases to be exploded by an igniter mechanism later to be described. For example, the lower part of the chamber 3 may act as a receptacle for water, into which is deposited calcium carbide, and the operation of the firearm is such that a fresh supply of oxygen will be admitted to the chamber 3 after each explosion, whereby if fresh calcium carbide be deposited in the water an explosive mixture of oxygen and acetylene will be formed.

In the present instance the rear end of the explosion chamber 3 is closed by a wall 4, having a cylindrical opening 5 therein adapted to receive a breech block 6 which serves several purposes. The breech block is provided with a cylindrical portion 7, which fits within the opening 5 previously described in such manner that the breech block can be turned angularly, or bodily withdrawn from operative position when desired. The cylindrical part 7 of the breech block is also made hollow to receive an igniter plunger 8 which projects rearwardly beyond the breech block and may be provided with an operating knob 9. An exterior extension 10 on the breech block provides a rear bearing for the igniter plunger 8, which plunger may have an enlarged bearing portion 11 fitting within the hollow cylindrical part 7 of the breech block. In assembling the above parts, the igniter plunger may be inserted from the forward end of the cylindrical part 7 until it projects through the extension 10 on the breech block, after which the knob 9 may be attached to the plunger. The annular teeth 12 on the plunger engage a block 13 of pyrophoric metal slidably mounted within an ear 14 on the breech block, and urged toward the plunger 8 by means of a spring 15. A screw 16 may be provided to adjust the spring 15 and permit access to the igniter block 13 when necessary. With an igniter construction of the above character, forward motion of the plunger 8 will cause teeth 12 thereon to scrape against the igniter block 13 and project sparks through an opening 17 in the cylindrical part 7 into the explosion chamber 3. To facilitate the proper action of the igniter mechanism, the teeth 12 preferably

are of a shape similar to that illustrated in Fig. 1, to provide chisel-like cutting edges which scrape across the face of the block 13. The igniter plunger 8 may be rotatably mounted in position, whereby new cutting edges may be presented to the block 13 by turning knob 9.

The breech block may be provided with a locking lug 18 (Fig. 3) which engages a recess 19 when the ear 14 is in the vertical position indicated in Figs. 1 and 3. Thus if the breech block be turned anti-clockwise as viewed in Fig. 3 approximately a quarter of a turn the lug 19 will be released and the breech block may be bodily withdrawn from operative position. It will be noted that the ear 14 and the exterior extension 10 on the breech block provide gripping portions which assist in grasping the breech block to move it as above described.

Although the firearm may be charged in any suitable manner, I prefer to provide a charging device such as the spoon 20 (Fig. 1) on the breech block, so positioned that when the latter is inserted into the opening 5 with the ear 14 in substantially horizontal position, the spoon will retain a charge of calcium carbide or the like, but when the ear 14 is turned upwardly to the position shown in Figs. 1 and 3 the spoon 20 will be tilted to deposit the charge into the water contained in the explosion chamber 3.

Thus the firearm may be ventilated after each explosion, by the removal of the breech block which will permit air to enter through opening 5, and as the breech block is locked in position upon the insertion of a new charge, the acetylene produced in the lower part of the chamber 3 will mix with the fresh supply of oxygen. Preferably the chamber 3 is provided with suitable baffle members, such as the ribs 21, running along its sides to promote the proper mixture of acetylene and oxygen. In a firearm of the above type, the acetylene tends to rise up in the central part of the chamber and cause the air to be displaced in a downward direction on both sides thereof, but the baffle members will serve to deflect the air from the sides of the chamber towards the rising column of acetylene in its centre, thus causing a thorough mixture to be obtained.

In the present embodiment of the invention the firearm takes the form of a pistol having a stock member 22 secured to the barrel member 1 in such relation that the igniter plunger 8 may be operated by the hand of the user while grasping the stock. As shown, a trigger 23 is pivoted on a stud 24 carried by the stock, the trigger being urged toward retracted position by a spring 25, and so positioned that the igniter plunger 8 will be moved forward when the trigger is pulled. As shown, a slot 26 is provided on the under side of extension 10 on the breech block, and

the upper end of the trigger engages behind a bearing plate 27 carried by the igniter plunger. Thus the trigger cannot be pulled unless the breech block is properly locked in position, since slot 26 will not be in line with the trigger in other positions of the breech block, and conversely the breech block cannot be turned to locked position unless the trigger is fully retracted.

The stock 22 is preferably recessed to provide an ammunition box 28, which normally is closed by a cover 29, forming the back of the stock but which may be opened when desired to fill spoon 20. As shown, the cover 29 is pivoted on a stud 30 and is held closed by a spring 31 engaging an interior forked projection 32 on the cover; but if the cover 29 be opened sufficiently to move projection 32 beyond the line between stud 30 and the bottom end of the spring, the cover will be opened with a snap action and held fully open until spoon 20 has been charged. Since the charging of the firearm involves the use of both hands, one to hold the stock 22 and the other to manipulate the breech block, it is particularly desirable to provide a cover for the ammunition box, which may be readily opened and closed.

I prefer to construct the firearm in such manner that it may be held in various positions without draining the water out of the explosion chamber 3. In the present instance, a flange 33 is provided in the chamber 3 and around the bore 2 of the pistol so that if the latter is held muzzle down, the flange will prevent a certain amount of water from running out. This flange 33 may be of such dimensions as to cause the proper amount of water to be contained in chamber 3 when the water is renewed; for example, if the supply of water is renewed through breech opening 5 with the muzzle pointed downwardly, the excess water will run out through the bore 2 after the chamber has been filled up to the level of the flange 33. It is also preferred to protect the ignition mechanism from leakage of water out of chamber 3, which may be accomplished for example by providing a further flange 34 around the opening 17, or the adjacent parts of the igniter mechanism; if the firearm be held muzzle up, the flange 34 will prevent the egress of water into the igniter mechanism. As shown, the flange 34 is of greater height than the flange 33 to insure that the supply of water permitted by the flange 33 will not overflow flange 34.

The flange 33 may also be used to support a baffle plate 35 to provide an opening between the explosion chamber 3 and the bore 2 of the proper size; particularly when the firearm is operated without a projectile, it is found that the explosion is most effective if the column of air in front of the explosion chamber be carefully proportioned to

the dimensions of the chamber. A baffle plate 35 may easily be selected by experiment to provide the most efficient opening for the above purposes.

5 In cases where the firearm is used with a projectile, I prefer to provide a small clearance between the muzzle of the gun and the projectile in such manner that the exploded gases may pass out substantially equally on
10 all sides of the projectile. In the present instance the muzzle of the gun is provided with a plurality of ridges 36 such that when a cork or the like is inserted in the muzzle the exploded gases will tend to pass out on
15 all sides of the projectile and keep it in the centre of the stream of gas. If a smooth bore be employed the gases tend to pass out at a point where the frictional resistance is smallest between the projectile and the wall
20 of the firearm so that the projectile may not be fired accurately.

The present embodiment of the invention is exceedingly simple, involving but two
25 main parts for the pistol proper, namely, the barrel member 1 and the stock member 22. These parts may be suitably secured together, for example, by providing projections 37 and 38 at the top and bottom of the barrel member engaging between corre-
30 sponding shoulders 39 on the stock. Pins 40 and 41 may then be passed through the corresponding projections and shoulders. Thus by removing the pins 40 and 41 the
35 two parts of the firearm may be disconnected, end wall 4 of the exploding chamber 3 in the present instance being formed integrally with the stock member 22.

I also prefer to employ a screen between the igniting mechanism and the explosion
40 chamber, to prevent water splashing into the igniter when sudden movements are imparted to the firearm. In the present instance this shield is in the form of a screen of conical shaped wire mesh which fits over
45 the inner portion of the breech block. This screen serves to catch drops of water which otherwise might splash into the igniter mechanism, but when the gas within the screen is ignited it does not interfere with
50 the spreading of the explosion to the remainder of the explosion chamber, and in fact serves to distribute the ignition in all directions from the central portion of the chamber into which the spark is projected.

55 While a specific embodiment of the invention has been disclosed, it will be obvious that many changes may be made therein without departing from the spirit of the invention as defined in the following claims.

60 I claim:

1. A toy firearm comprising a barrel member having an explosion chamber therein, means for admitting oxygen to said chamber, and means for generating within said
65 chamber a gas which when mixed with the

oxygen therein, forms an explosive mixture, a stock of the pistol type secured to the said barrel member, a trigger member adjacent said stock and an igniting mechanism for said explosion chamber operable by said
70 trigger member.

2. A toy firearm comprising a barrel member having a gas chamber therein, a stock of the piston type secured to said barrel member, means whereby explosive gas
75 may be produced in said chamber, a pyrophoric metal igniting mechanism for said chamber, and a trigger member adjacent said stock in position to produce relative motion between the elements of said igniting mecha-
80 nism.

3. The combination set forth in claim 2, wherein said igniting mechanism includes a reciprocable plunger and said trigger is pivoted in position to actuate said plunger.
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4. A toy firearm comprising a barrel member having a liquid-containing explosion chamber therein, a stock of the pistol type secured to the barrel member, a removable breech block associated with said explosion
90 chamber and carrying a charging device adapted to deposit gas-forming material into said chamber, a pyrophoric metal igniting mechanism carried by said breech block and a trigger member adjacent said stock and
95 positioned to operate said igniting mechanism.

5. In a toy firearm a liquid-containing explosion chamber having an opening in a wall of such chamber, a removable breech block fitting in such opening, a pyrophoric metal igniting mechanism carried by said breech block, said breech block having an exterior projecting portion adapted to serve as a gripping member, and providing a
100 bearing for the movable element of said igniting mechanism.

6. A toy firearm comprising a liquid-containing explosion chamber having an opening in one wall of such chamber, a removable breech block fitting in said opening and comprising a hollow member supporting a charging device at its inner end, and a pyrophoric metal igniting mechanism carried by such breech block comprising a plunger slidably mounted therein, and a pyrophoric metal member pressed against said plunger.
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7. In a toy firearm a removable breech block comprising a hollow member having an igniting plunger slidably mounted therein, said plunger having a rough surface adapted to engage a pyrophoric metal member and having bearing portions on opposite sides of such roughened portion which are respectively larger and smaller than such
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125 roughened portion.

8. A toy firearm comprising a barrel member having an explosion chamber therein, a removable breech block having a cylindrical part projecting through an opening in one
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wall of such chamber and rotatably supporting the said breech block therein, and a cooperating lug and recess upon said breech block and an adjacent portion of the firearm adapted to lock the breech block in place by turning the latter when seated in said opening.

9. A toy firearm comprising a member having an explosion chamber therein, a stock of the pistol type secured to the said barrel member, a removable breech block associated with said chamber and carrying a charging device adapted to supply gas-forming material thereto, a pyrophoric metal igniting mechanism carried by said breech block comprising an igniting plunger reciprocally carried by said breech block, a trigger member pivoted adjacent said stock, said breech block having a slot adjacent the path of movement of the trigger through which the latter may be moved to engage and actuate said plunger.

10. In a toy firearm a liquid-containing explosion chamber, means for admitting oxygen to such chamber, means for supplying gas-forming material thereto, and a baffle member within said chamber adapted to promote the mixing in the chamber of the oxygen and the gas generated therein.

11. In a toy firearm an explosion chamber, the lower portion of which is adapted to serve as a water receptacle, means for admitting oxygen to said chamber, means for supplying a gas-forming material to said chamber, and ribs extending along the sides of the chamber above the lower portion thereof adapted to deflect the gas formed therein into intimate contact with the oxygen.

12. A toy firearm comprising a barrel member having a liquid-containing explosion chamber therein, and a bore communicating with such chamber, and means for confining liquid in said explosion chamber when the firearm is tilted to substantially vertical position.

13. A toy firearm comprising a barrel member having a liquid-containing explosion chamber therein, a bore communicating with such chamber, and means for confining liquid in said explosion chamber when the firearm is tilted to different angles, said means comprising a flange in said chamber extending around the bore.

14. A toy firearm comprising a liquid-containing explosion chamber, means for charging the same, an igniting mechanism therefor, and means for obstructing the flow of liquid from said chamber into said igniting mechanism when the firearm is tilted to substantially vertical position.

15. A toy firearm comprising a barrel member having a liquid-containing explosion chamber therein, a bore communicating with one end of such chamber, an igniting

mechanism mounted in the opposite end thereof, and flanges in said chamber extending around said bore and said igniting mechanism adapted to obstruct the flow of liquid from said chamber when the firearm is tilted to different angles.

16. The combination set forth in claim 15, wherein the flange associated with said igniting mechanism is of greater height.

17. A toy firearm comprising a barrel member having an explosion chamber therein and a bore leading from said chamber to the muzzle of the firearm, and means to support a projectile in the muzzle of the gun while permitting the escape of gas substantially uniformly on all sides between the projectile and the muzzle.

18. A toy firearm comprising a barrel member having an explosion chamber therein and a bore leading from said chamber to the muzzle of the firearm, and means to support a projectile in the muzzle of the gun while permitting the escape of gas substantially uniformly on all sides between the projectile and the muzzle, said means comprising a plurality of ridges in the muzzle of the gun.

19. A toy firearm comprising a barrel member having a gas chamber therein, means for admitting oxygen to said chamber, means for generating within said chamber a gas which, when mixed with the oxygen therein, forms an explosive gas, a stock of the pistol type secured to the barrel member, and means operable by the hand when grasping the stock in the usual manner for igniting the gas within said chamber.

20. A toy firearm comprising a liquid-containing explosion chamber, a removable breech block associated with said chamber, an igniting mechanism carried by such breech block, means for locking said breech block in position, and an igniter member for igniting said igniting mechanism operative only when said breech block is in locked position.

21. A toy firearm comprising a liquid-containing explosion chamber, an igniting mechanism therefor, and a screen interposed between said chamber and said igniting mechanism.

22. A toy firearm comprising a liquid-containing explosion chamber, a pyrophoric metal igniting mechanism with a passage leading therefrom to said chamber, and a perforated member shielding said passage from the liquid within the chamber.

23. A pyrophoric igniter comprising a pyrophoric metal member, a reciprocating plunger having an extended roughened surface, and means whereby said plunger may be adjusted angularly to adjust different portions to the pyrophoric metal member when the plunger is reciprocated.

24. The combination set forth in claim 23,

wherein said plunger is cylindrical and rotatably mounted, with different portions around its periphery roughened.

25. A toy firearm comprising a barrel member having an explosion chamber therein, a stock of the pistol type secured to said barrel member, a removable breech block associated with said explosion chamber, a pyrophoric metal igniting mechanism carried by said breech block and a trigger member associated with said stock for producing relative motion between parts of said pyrophoric metal igniting mechanism.

26. A toy firearm comprising a barrel member having an explosion chamber therein, a removable breech block having a cylindrical part projecting through an opening

in one wall of such chamber and rotatably supporting the said breech block therein, a reciprocable plunger slidably supported by said cylindrical part and a pyrophoric metal block pressed against said plunger.

27. A toy firearm having a liquid containing explosion chamber therein, an igniting mechanism mounted in one wall of said chamber and projecting into the chamber and an annular flange in said chamber extending around said igniting mechanism to protect the latter from the liquid when the firearm is tilted to different angles.

In testimony that I claim the foregoing, I have hereunto set my hand this 29th day of January, 1923.

JAMES H. WILY.