

May 9, 1933.

E. H. SMITH

1,908,070

GUN

Filed Jan. 30, 1931

3 Sheets-Sheet 1

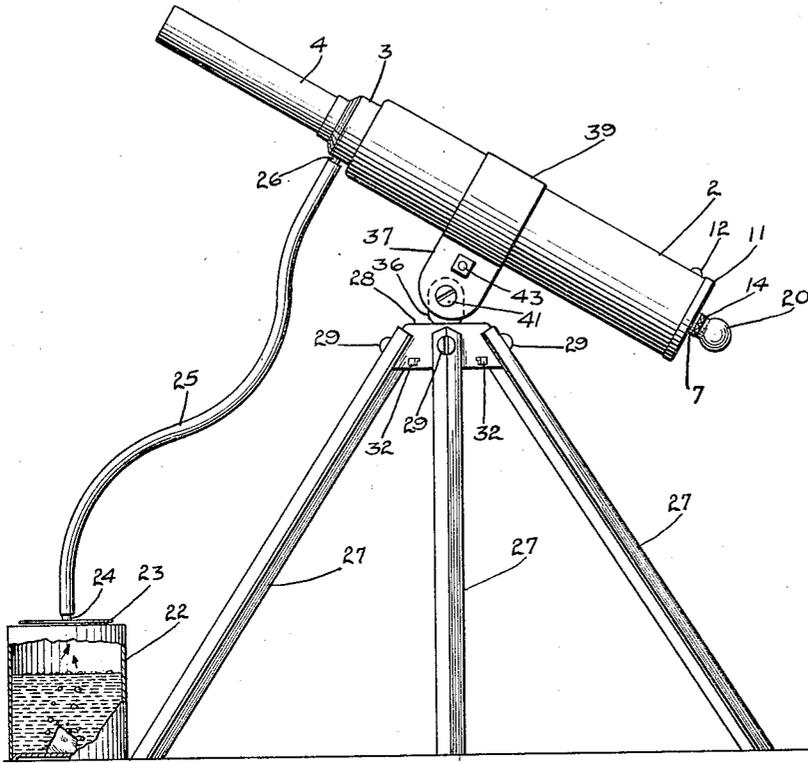


Fig. 1

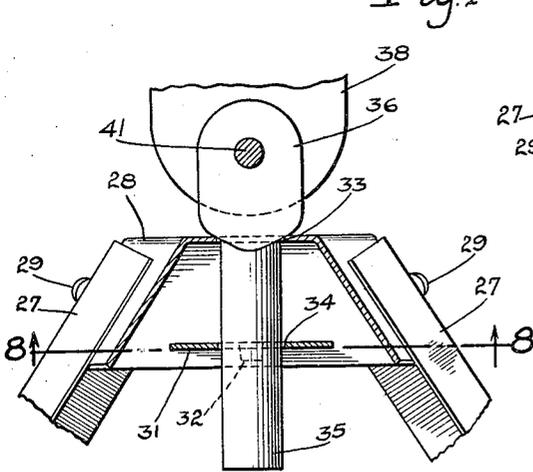


Fig. 7

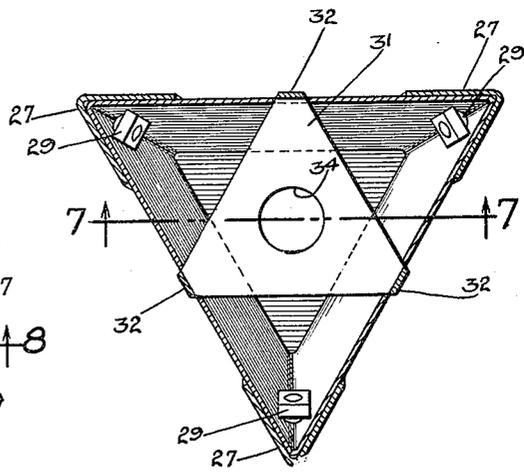


Fig. 8

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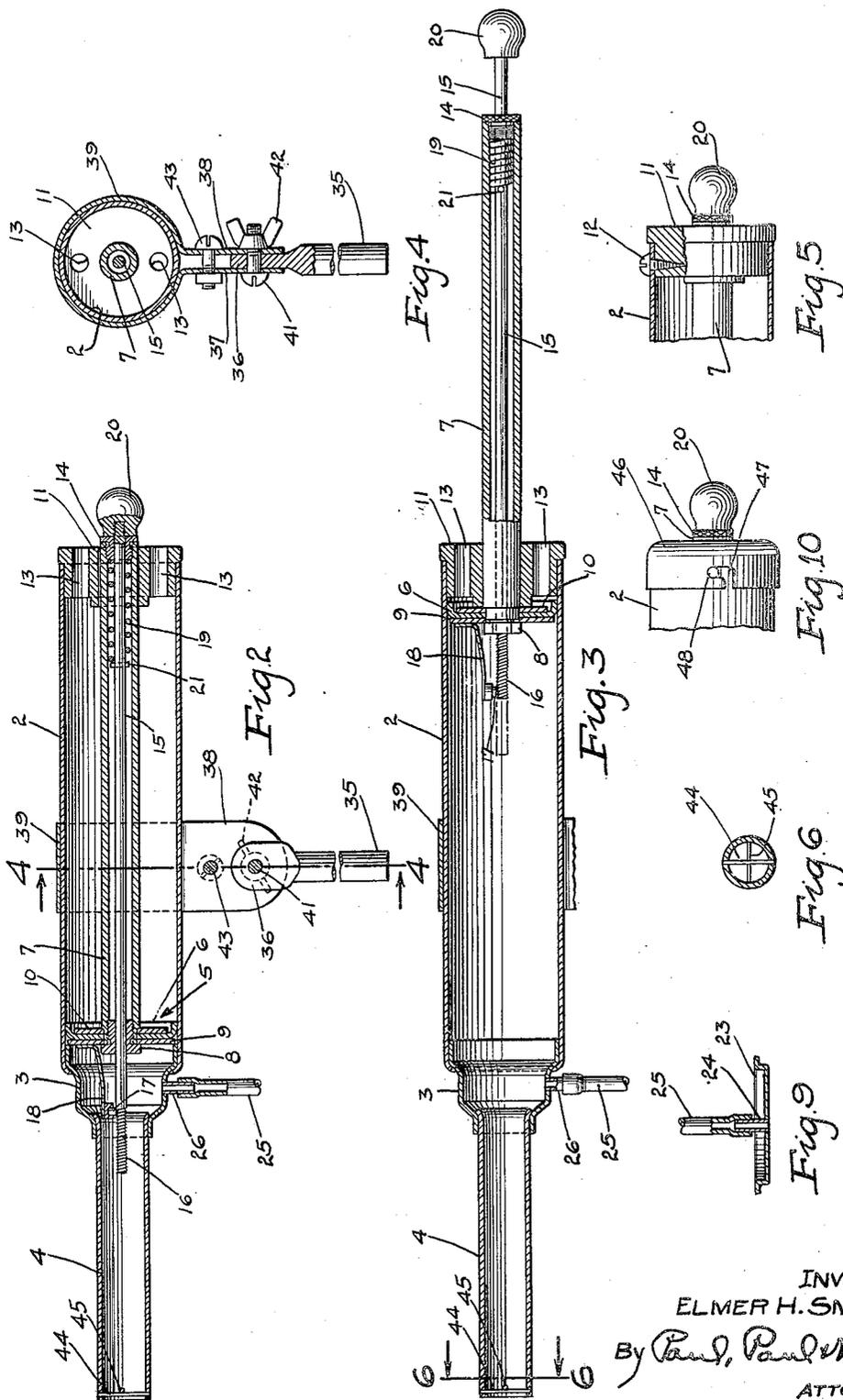
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3 Sheets—Sheet 2



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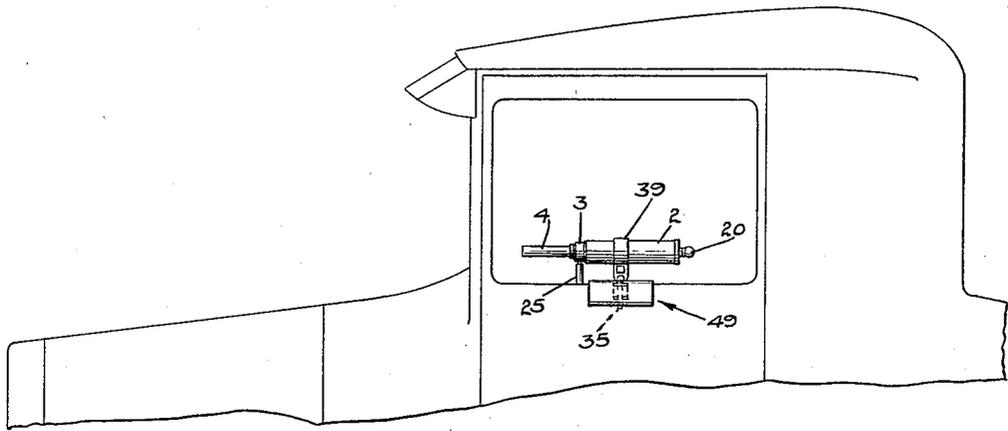
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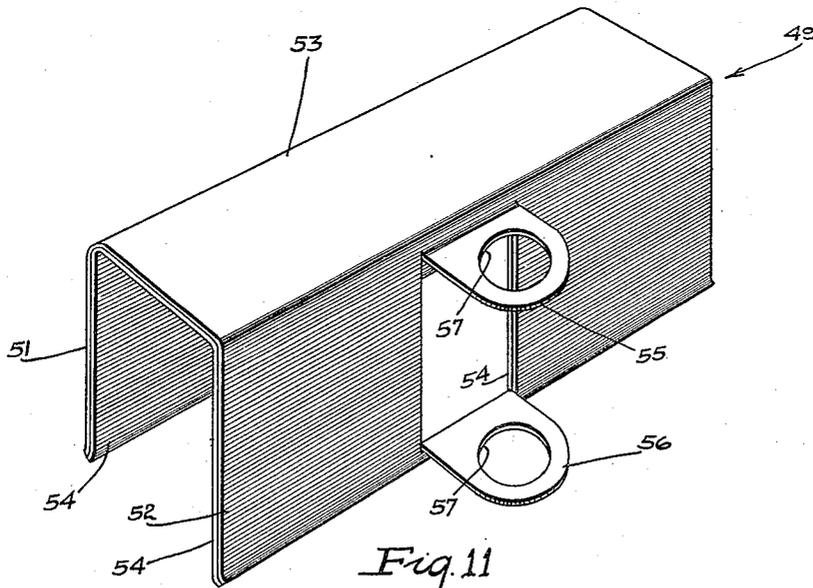
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*Fig. 12*



*Fig. 11*

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# UNITED STATES PATENT OFFICE

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## GUN

Application filed January 30, 1931. Serial No. 512,279.

This invention relates to new and useful improvements in guns and more particularly to a gun adapted to make a loud report.

An object of the invention is to provide a gun including a casing having a chamber therein communicating with a container adapted to contain an explosive agent such, for example, as acetylene, said chamber having a plunger mounted therein, whereby a mixture of acetylene and air may be drawn into the chamber and ignited to produce a loud detonation.

A further object is to provide a toy gun comprising a casing having a barrel provided at one end thereof and a generator being adapted to be mounted independently of said casing and having a conduit connecting it with a chamber provided within said casing, and a plunger being mounted within said chamber and adapted to be manipulated to direct a portion of gas from said generator into the chamber, and also whereby a portion of air may be drawn into the chamber through said barrel and mixed with said gas to provide an explosive mixture, and an ignition means being provided for igniting said mixture to cause the detonation thereof.

A further object is to provide a toy gun capable of developing a very loud detonation, and one which may be operated with safety by children, and which will be economical in use.

The primary object of the invention therefore is to provide an improved gun capable of producing a very loud report, adapted for use as a safe toy gun, and which may also be used as a saluting gun.

Features of the invention reside in the general construction of the gun including the casing and the barrel, and the proportioning of these parts, which are such that when the plunger is operated, the proper proportions of acetylene and air may be drawn into the chamber to provide a highly explosive charge; in the construction of the plunger and the ignition means supported thereon; in the construction of the generator and its connection with the explosive chamber of the gun; in the construction of the tripod or support upon which the gun is mounted; in the

provision of means whereby the gun may be supported upon the sill of an automobile window; and in the general construction of the gun, tripod and generator as a whole, which is such as to provide a very simple and inexpensive apparatus which may be manufactured at a very small cost.

Other objects of the invention will appear from the following description and accompanying drawings and will be pointed out in the annexed claims.

In the accompanying drawings, there has been disclosed a structure designed to carry out the various objects of the invention, but it is to be understood that the invention is not confined to the exact features shown as various changes may be made within the scope of the claims which follow.

In the drawings,

Figure 1 is a view illustrating the gun mounted upon its support and also showing the generator connected therewith;

Figure 2 is a longitudinal sectional view of the barrel showing the plunger in its normal position;

Figure 3 is a similar view showing the plunger manipulated to cause an explosive charge to be drawn into the chamber;

Figure 4 is a cross sectional view on the line 4-4 of Figure 2, showing the means for movably supporting the gun upon its support;

Figure 5 is a detail sectional view of one end of the gun to show the means for securing the head or closure to the end of the casing;

Figure 6 is a cross sectional view on the line 6-6 of Figure 3;

Figure 7 is an enlarged detail sectional view on the line 7-7 of Figure 8;

Figure 8 is a horizontal sectional view on the line 8-8 of Figure 7;

Figure 9 is a detail sectional view showing the connection between the flexible conduit and the cover or closure for the generator;

Figure 10 is a detail view showing a modified form of a cap or closure for the end of the casing;

Figure 11 is a perspective view showing a bracket whereby the gun may be supported

upon the window sill of an automobile; and Figure 12 is a view showing the gun mounted on an automobile window.

5 The novel gun featured in this invention is shown comprising a casing 2 provided at one end with a head 3, the diameter of which is relatively less than that of the casing 2. A barrel 4 is suitably secured to the head 3 and is substantially axially aligned with the casing 2.

10 A plunger 5 is mounted within the chamber defined by the casing 2, and comprises a suitable cup packing 6, shown secured to one end of a tubular rod 7 by means of a threaded plug 8 received in threaded engagement with the end of the rod 7, and discs 9 and 10 between which the packing 6 is clamped by the plug 8. The opposite end of the rod 7 is slidably supported in a closure or cap 11 inserted in the end of the casing 2 and secured thereto by such means as screws 12, shown in Figure 5. Suitable air passages 13 are provided in the cap 11 to permit air to circulate freely therethrough when the plunger is manipulated. The outer end of the tubular rod 7 is provided with a threaded plug 14 having an aperture therein.

20 The ignition means consists of a rod 15, having one end slidably supported in the plug 14 and its opposite end similarly supported in the plug 8. The inner end portion 16 of this rod is provided with a plurality of fine teeth which, in appearance, look very much like the teeth of a file. These teeth are adapted to engage a flint 17 supported in a flexible holder 18 suitably secured to the disk 9, as shown in Figures 2 and 3. A suitable spring 19 is coiled about the rod 15 and has one end seated against the plug 14 and its opposite end against a small pin 21 secured in the rod 15. This spring constantly urges the rod 15 in a direction towards the barrel 4 and normally retains the rod 15 in the position shown in Figure 2. The rod is provided with a suitable finger grip 20.

25 An important feature of this invention resides in the construction of a gun capable of using acetylene or a similar gas as an explosive agent and whereby said gas may be generated in a generator mounted independently of the gun. As illustrated in Figure 1, a small generator 22 constructed in very much the same manner as an ordinary paint can, is provided which has a cover 23 adapted to be secured thereto by friction. A nipple 24 is provided on the cover 23 adapted to be inserted in one end of a conduit 25, preferably of flexible material such as rubber. The opposite end of the conduit is attached to a nipple 26 provided on the head 3 of the casing 2. The conduit 25 is preferably sufficiently long to permit the generator 22 to be positioned upon the floor adjacent to the support upon which the gun is supported and which will subsequently be described.

When the gun is to be used, the generator is partially filled with water, as shown in Figure 1, and a small piece of carbide is dropped into the water, after which the cover 23 is secured to the generator. The chemical reaction between the carbide and water forms an acetylene gas which will find its way up through the conduit 25 into the interior of the head 3. When the plunger is pulled backwards, by the operator grasping the finger grip 20, the acetylene will be drawn into the chamber defined by the casing 2 and, at the same time, air will be drawn from the atmosphere into the chamber through the barrel 4, which will intermix with the acetylene and provide a highly explosive gas. When the plunger reaches the position shown in Figure 3, the tubular rod 7 will come to rest and the ignition rod 15 may then be relatively moved within the tubular rod 7 against the tension of the spring 19 until the spring is compressed. When the operator releases his grip upon the finger grip 20, the spring 19 will thrust the rod forwardly, whereupon the teeth 16 at the other end of the rod 15 will frictionally engage the flint 17 and cause a spark to be generated which will ignite the gaseous mixture of acetylene and air and result in the detonation thereof. The operator may then move the plunger forwardly, whereupon the burnt gases within the casing will be expelled therefrom through the barrel 4, so that when the plunger is again moved backwards to the position shown in Figure 3, a fresh charge will be drawn into the chamber and the gun may again be fired.

30 For convenience, the casing 2 of the gun is movably mounted upon a suitable support in the form of a tripod, comprising a plurality of legs 27 suitably secured to a head 28 by such means as screws 29. The legs 27 and head 28 are formed from comparatively light sheet material, whereby they may be manufactured at a very small cost by means of a suitable punch press. A reinforcing plate or member 31, here shown, of triangular formation, is provided in the lower portion of the head 28 and has projections 32 adapted to be received in small slits provided in the depending walls of the head 28, as shown in Figure 8. These projections are bent downwardly, as shown in Figure 1, to prevent spreading of the walls.

35 Alined apertures 33 and 34 are provided in the upper wall of the head 28 and reinforcing member 31, respectively, adapted to receive a shaft 35 having a flat head 36 adapted to be clamped between the end portions 37 and 38 of a clamping member 39. This clamping member encircles the casing 2, as shown in Figures 1 and 2. A suitable bolt 41 provided with a wing nut 42, traverses alined apertures in the end portions 37 and 38 of the clamping member, and the head 36, and provides means for securing the casing to the

pivot in adjusted angular position. A bolt 43 secures the clamping member to the casing as will readily be understood by reference to Figure 4. By mounting the gun as above described, it may be manipulated upon its support in a manner similar to a machine gun, the flexible conduit 25 connecting the casing with the generator permitting the casing to be moved relatively thereto.

The head 3 and barrel 4 are so proportioned that when the plunger is drawn backwards to load the gun, volumes of air and acetylene are drawn into the gun in the proper proportions to produce an explosive mixture within the chamber defined by the casing 2. By using acetylene mixed with air as an explosive, there is no appreciable pressure developed within the gun when the latter is fired, and the recoil is almost negligible. It is also to be understood that because of the rapid explosion of the air and acetylene, the operator may hold his hand comparatively close to the mouth of the barrel without danger of receiving a burn.

The plunger, in addition to providing means for loading the gun, also acts as a purger to expel the burnt gases from the explosion chamber. In actual performance, I have found that by placing a small lump of carbide about the size of a small walnut in the water within the generator 22, enough acetylene will be generated to produce approximately thirty-five detonations. There is no danger connected with the generation of acetylene in the generator 22 disclosed in this invention because the small quantity of carbide delivered into the water in the generator does not produce enough acetylene to form an inflammable mixture within a large chamber, such as a room, and an explosion outside of the gun is practically impossible. Furthermore, if the cover 23 is removed from the generator 22, and the gases emanating therefrom are ignited, they will burn in the form of a dull smoky flame which can be quickly put out, either by blowing or by replacing the cover on the generator.

The heat developed by the reaction between the carbide and the water in the generator 22 is very little, and from actual experience I have found that the generator does not become more than luke warm. The small quantity of carbide used in the generator each time it is charged soon becomes ineffective as it generates acetylene, even though the gun is not being used. If the gun is not being used, the acetylene forming within the generator will pass upwardly through the conduit 25 and escape through the barrel to the atmosphere. If the operator accidentally over-charges the generator with carbide to the extent that the conduit 25 is not large enough to convey the generated acetylene, the cover 23 of the generator may be blown off, but not with sufficient force to cause injury.

Fresh carbide is, of course, kept in a separate can in a dry place and is absolutely safe under such conditions.

The gun provides the utmost in safety in devices of this character and also provides a very economical noise-making apparatus. As an additional safety measure, a pair of small cross wires or rods 44 and 45 are secured in the mouth of the barrel to prevent persons from filling the barrel with paper wads and other material for the purpose of projecting it therefrom when the gun is fired. It is also to be noted that the diameters of the discs 9 and 10 are such as to permit the cup-shaped packing 6 to flex sufficiently to permit expanding gases to escape therepast, should the operator, in some way, plug the barrel so that the gases could not escape therefrom when the gun was fired. In experimenting with this gun, I have found that by firmly holding the hand over the mouth of the barrel when the gun is fired, the expanding gases will pass by the packing 6 and escape through the passages 13 of the head 11, and the report will be muffled so as to produce a very slight noise. It will, therefore, be seen that the gun may be handled with safety, even by an inexperienced person.

Figure 10 shows a construction wherein a head 46, in the form of a cap, is provided in place of the head 11, shown in Figures 2, 3, and 5. This cap is secured to the casing 2 by means of bayonet slots 47 and pins 48.

Figures 11 and 12 illustrate a holder or support for the gun, whereby it may be demountably attached to the window sill of an automobile. This holder comprises a U-shaped metallic member 49 having spaced walls 51 and 52 adapted to straddle the window sill. The walls 51 and 52 and the upper wall 53 of the member are preferably lined with a suitable material 54 such as felt, to prevent the holder from scratching or marring the finish of the window sill.

Lugs 55 and 56 are struck out of the metal constituting the wall 52, and these lugs are provided with suitably aligned apertures 57 adapted to receive the pivot pin 35 shown in Figure 4. When using the holder 49, the gun may be supported as shown in Figure 12, and fired from the window of the automobile. When thus supported, the generator 22 may be supported upon the floor of the automobile or in any other convenient location, it being understood, of course, that the conduit 25 is of the proper length to connect the generator with the head 3 of the gun.

I claim as my invention:

1. A gun including a casing provided with a barrel, said casing having a chamber therein, an acetylene generator connected with said chamber, means mounted for reciprocal movement within said casing whereby portions of acetylene and air may be drawn into said chamber to provide an explosive gas, and

means connected with said reciprocal means for igniting said gas to cause the detonation thereof.

2. A gun including a casing having a chamber therein, a plunger movable within said chamber, a barrel connected with one end of the casing and communicating with said chamber, an acetylene generator adapted to be supported independently of said casing and barrel, a conduit connecting said generator with said chamber, means whereby said plunger may be operated to deliver portions of acetylene and air into the chamber to provide an explosive charge, and means on said plunger operating means whereby said charge may be ignited to cause the detonation thereof.

3. A gun including a casing having a chamber therein, a plunger within said chamber provided with an operating rod projecting from one end of the casing, means whereby when said plunger is moved in one direction, an explosive charge may be drawn into said chamber, and means carried by said plunger whereby said explosive charge may be ignited to cause the detonation thereof.

4. A gun including a casing having a chamber therein, a plunger within said chamber provided with an operating rod projecting from one end of the casing, means whereby when said plunger is moved in one direction, an explosive charge may be drawn into said chamber, means carried by said plunger whereby said explosive charge may be ignited to cause the detonation thereof, and said plunger purging said chamber, when moved in the opposite direction.

5. A gun including a casing having a chamber therein, a plunger within said chamber provided with an operating rod projecting from one end of the casing, means whereby when said plunger is moved in one direction, an explosive charge may be drawn into said chamber, means for igniting said charge to cause the detonation thereof, and means on said operating rod for actuating said igniting means, said plunger being adapted to purge the chamber when returned to its normal position.

6. A gun including a casing having a chamber therein, a plunger movable within said chamber, a head secured to one end of the casing, a barrel secured to said head and communicating with said chamber, an acetylene generator, a conduit connecting said generator with said head, means whereby said plunger may be operated to draw portions of acetylene and air into the chamber to provide an explosive charge, and means carried by the plunger for igniting said gas and cause the detonation thereof.

7. A gun including a casing provided at one end with a barrel, said casing having a chamber the diameter of which is relatively greater than that of said barrel, a plunger

movable in said chamber, an acetylene generator, a flexible conduit connecting said generator with said chamber, whereby when said plunger is operated in one direction, acetylene will be drawn into said chamber and, at the same time, air will be drawn into said barrel and intermixed with the acetylene to provide an explosive charge, and a device carried by the plunger adapted to generate a spark to ignite said gas to cause the detonation thereof.

8. A gun including a casing provided at one end with a head, the diameter of which is relatively smaller than the diameter of the casing, a barrel secured to said head and having a smaller diameter than the diameter of said head, a plunger movable in said chamber, an acetylene generator, a conduit connecting said generator with said head, whereby when said plunger is operated in one direction, acetylene will be drawn into said head and, at the same time, air will be drawn thereinto through said barrel, said portions of acetylene and air being mixed in said head and delivered to said chamber in the form of an explosive charge, and a device carried by the plunger adapted to generate a spark to ignite said gas to cause the detonation there.

9. A gun including a casing having a barrel secured to one end thereof and a closure provided at its opposite end, said casing having a chamber therein, a plunger mounted for reciprocal movement within said chamber and carrying an ignition means, means whereby when said plunger is operated in one direction, an explosive charge will be drawn into said chamber, and means for manually actuating said ignition means whereby the explosive charge in said chamber may be detonated.

10. A gun including a casing having a barrel secured to one end thereof and a closure provided at its opposite end, said casing having a chamber therein, a plunger mounted for reciprocal movement within said chamber and provided with a tubular operating rod slidably supported in said closure, whereby said plunger may be operated to deliver an explosive charge to said chamber, an ignition means, and means supported within said tubular operating rod adapted to actuate said ignition means to cause the detonation of said explosive charge.

11. A gun including a casing having a barrel secured to one end thereof and a closure provided at its opposite end, said casing having a chamber therein, a plunger mounted for reciprocal movement within said chamber and carrying an ignition means, means whereby when said plunger is operated in one direction, an explosive charge will be drawn into said chamber, means for actuating said ignition means whereby the explosive charge in said chamber may be

detonated, and means for supporting said casing and permitting universal movement thereof.

12. A gun including a casing having a chamber therein, a plunger movably mounted within said chamber, an acetylene generator, a conduit connecting said generator with said chamber, whereby when said plunger is operated in one direction, acetylene will be drawn into said chamber and, at the same time, air will be drawn thereinto through said barrel to provide an explosive charge, means carried by said plunger adapted to ignite said gas and cause the detonation thereof, and a support for said casing having means permitting universal movement of the gun thereon.

13. A gun including a casing having an elongated chamber therein normally open to the atmosphere at both ends, means connecting one end of said chamber with a supply of gas located remote from the chamber, means by which a suction may be created in said chamber to cause a mixture of gas and air to be drawn into the chamber, and means for igniting the gaseous mixture in said chamber.

14. A gun including a casing having a chamber therein communicating with the atmosphere, means connecting said chamber with a supply of gas located remote from the chamber, means movably mounted in said chamber by which a charge of gas and air may be drawn into the chamber, and means carried by said movable means and by which the charge in said chamber may be ignited.

In witness whereof, I have hereunto set my hand this 27th day of January, 1931.

ELMER H. SMITH.

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