

No. 874,952.

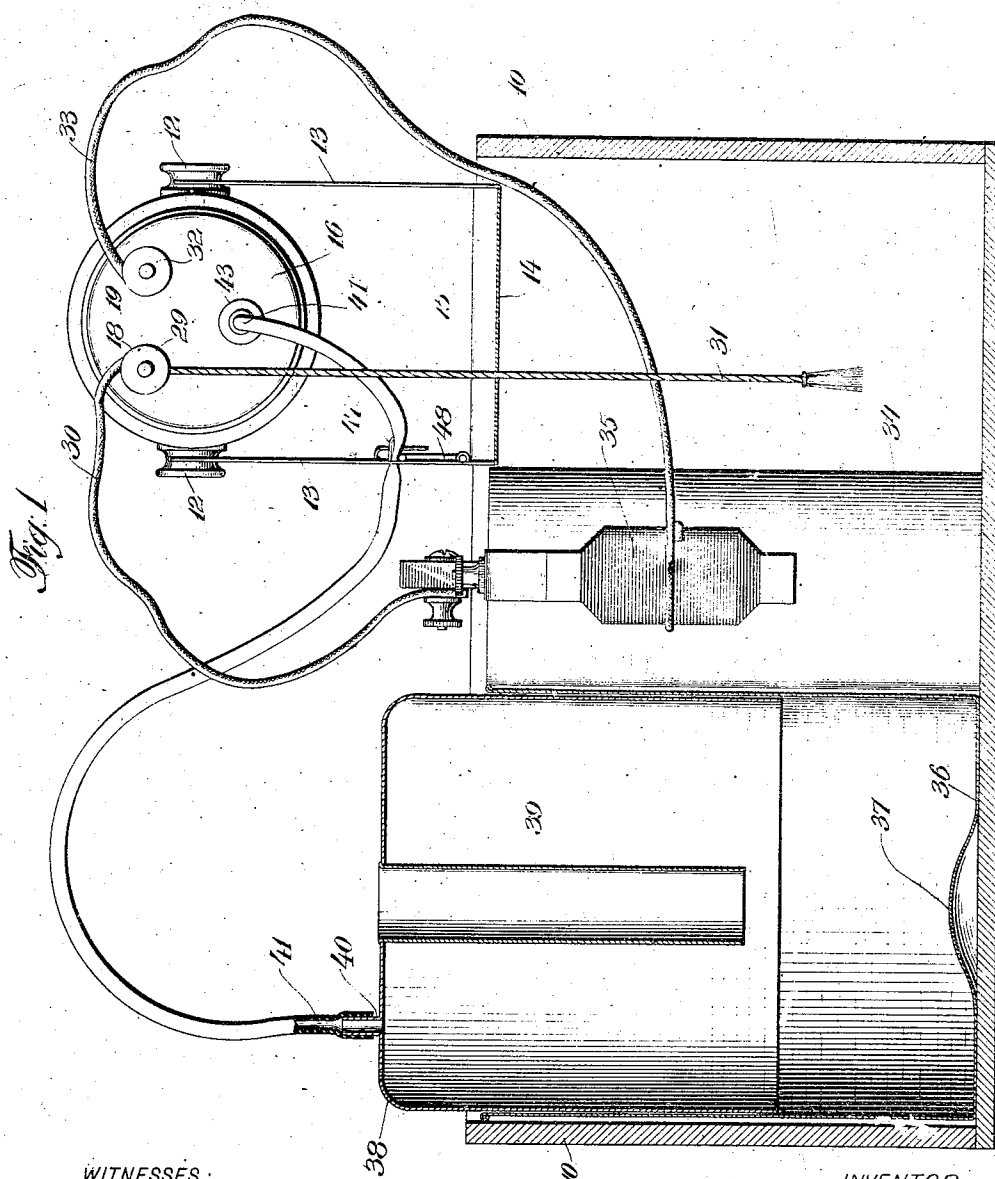
PATENTED-DEC. 31, 1907.

W. S. FRANKLIN.  
GAS GUN.

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APPLICATION FILED FEB. 19, 1907.

2 SHEETS—SHEET 1.



WITNESSES:

John E. Prager  
Lillie Cass

INVENTOR

William S. Franklin,  
BY  
Prindle and Williamson,  
ATTORNEYS.

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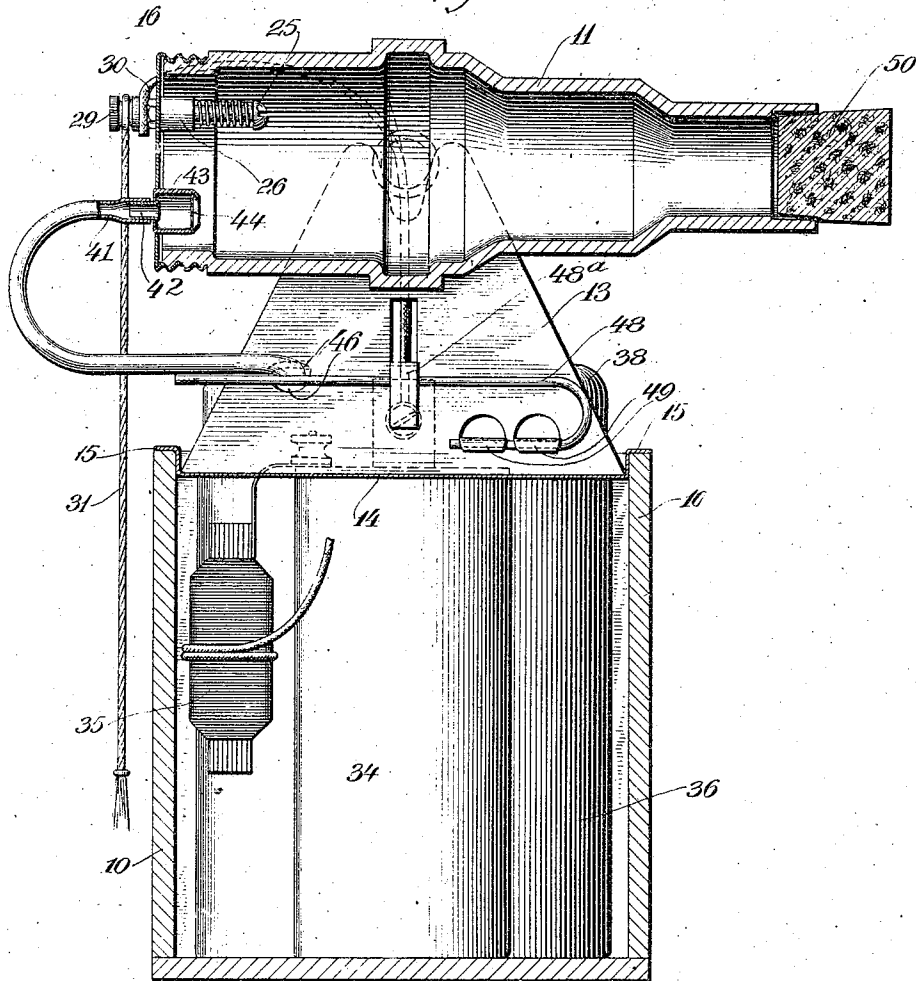
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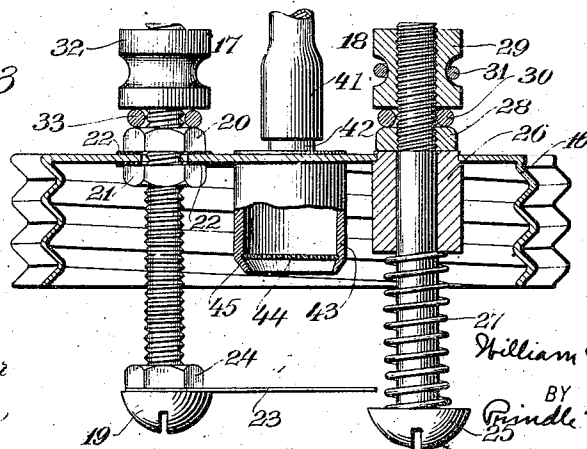
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2 SHEETS--SHEET 2.

Fig:2



*Fig. 3*



*WITNESSES*

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Lillie Cass

INVENTOR

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BY

Grindle & Williamson,  
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# UNITED STATES PATENT OFFICE.

WILLIAM SUDDARDS FRANKLIN, OF BETHLEHEM, PENNSYLVANIA.

## GAS-GUN.

No. 874,952.

Specification of Letters Patent.

Patented Dec. 31, 1907.

Application filed February 19, 1907. Serial No. 358,256.

*To all whom it may concern:*

Be it known that I, WILLIAM SUDDARDS FRANKLIN, of Bethelhem, in the county of Northampton and in the State of Pennsylvania, have invented a certain new and useful Improvement in Gas-Guns, and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical, sectional view, in the direction of the length of the gun, of a gas gun apparatus embodying my invention; Fig. 2 is a similar view in a direction transverse to the plane of Fig. 1; and Fig. 3 is a plan view, partly in section, of the breech plate, gas nozzle, and spark-forming parts of the gun.

The object of my invention has been to provide a toy gun in which a mixture of acetylene and air is lighted by electricity, which gun, while being cheap in construction, shall be efficient and certain in its operation; and to such ends my invention consists in the gas gun hereinafter specified.

In carrying my invention into practice I preferably provide a box 10 which serves as a convenient receptacle to hold the parts of the apparatus in shipment, or when not in use, and which also serves as a convenient support when the apparatus is in use. The gun 11 has grooved trunnions 12 which rest in notches formed in the side-plates 13 of the gun carriage, the said side-plates being connected by a base-plate 14, which latter has flanges 15 at its ends that rest upon the sides of the box. The carriage is preferably made by punching and bending a single sheet of metal.

The gun preferably consists of a cast body whose rear end is closed by a breech-plate 16, the breech-plate being preferably formed of sheet metal and having a screw-thread formed therein by which it can be engaged by a screw-thread formed on the rear end of the gun. The parts of the gun which form the spark that ignites the mixture of air and gas to be used in the gun, and also the gas nozzle for admitting gas to the gun, are preferably attached to the breech-plate, and they can thus be readily removed from the gun for inspection in case of difficulty. The parts for forming the spark, which are shown enlarged in Fig. 3, comprise a stationary binding-post 17 and a movable binding-post 18. The stationary binding-post consists of a screw 19 that is clamped to the breech-plate

by nuts 20 and 21, the screw being insulated from the plate by washers 22. A spring 23 is clamped between the head of the screw 19 and a nut 24. This spring extends toward the binding-post 18 and into the path of movement of the head of its screw 25. The screw 25 has an unthreaded portion of its shank guided in a block 26 that is fastened in a hole in the breech-plate, and a spring 27 tends to thrust the screw into the gun. Movement into the gun is limited by a nut 28 secured on the screw. The screw 25 has a thumb-nut 29 by which it may be drawn back and forth, the thumb-nut clamping the battery-wire 30 against the nut 28. For convenience a lanyard 31 is tied to the nut 29, in order that the screw 25 may be drawn back against the stress of the spring 27. The screw 19 has a thumb-nut 32 by which the battery-wire 33 may be clamped against the nut 20. The battery-wires 30 and 33 are connected with the poles of a battery 34, one of such connections being through a spark-coil 35. When the lanyard is pulled, the head of the screw 25 bears against the spring 23, and, as such spring snaps free, a spark is produced. On releasing the lanyard, the head of the screw again passes the spring and another spark is produced.

Gas is preferably supplied to the gun in the following manner. Within the box 10 is mounted the lower cup 36 of a gas generator, the central portion of the bottom of the cup being bulged up at 37 for a purpose to be described. Within the cup 36 is an inverted upper cup 38 having a central tube 39 extending nearly but not quite to the level of the lower edge of the upper cup. A nipple 40 is secured to the top of the inverted cup, and a tube 41 extends from such nipple to the tube 42 of the gas nozzle on the breech-plate of the gun. The gas nozzle consists of a body 43 that is riveted in the breech-plate, and that has a bottom in which is riveted or otherwise secured the nipple 42. Within the mouth of the body 43 is secured a perforated plate 44, the plate being conveniently secured in place by spinning or bending over the edge 45 of the nozzle. In order to control the flow of gas through the tube 41, such tube passes through an opening 46 formed in one of the side-plates of the carriage, and the tube is pinched between a lip 47 turned up in the forming of the said opening, and a spring 48 that is secured to the side plate by lips 49 which are punched out of the said plate and

bent over it. A lip 48<sup>a</sup> may be punched out of the side-plate 13 and bent-over the spring 48 to hold it against the side-plate. The end of the spring 48 extends beyond the side-plate to form a handle.

In the operation of my gas gun, a lump of calcium carbide is dropped through the tube 39, and, striking the bulge 37, is deflected laterally from beneath the said tube, so that the gas generated will not escape up the said tube. The gas rises into the upper part of the inverted cup and raises the said cup, so that the weight of the cup puts it under pressure. When the spring 48 is depressed, gas is permitted to pass through the tube 41 to the gas nozzle, and escapes into the body of the gun. The perforations in the plate 44 cause the gas to escape in numerous small streams, and thus to thoroughly intermingle with the air in the gun. Either before or after the admission of gas to the gun, as may be desired, a cork 50 may be inserted into the mouth of the gun. The gun is now ready to be discharged. Upon pulling the lanyard, contact is first made and then broken between the spring 23 and the head of the screw 25, and thus the electric circuit is completed and then suddenly broken, and this, assisted by the action of the spark-coil, causes a sufficiently strong spark to be formed in the gun to explode the mixture of air and gas in the gun.

It will be observed that my apparatus constitutes an extremely attractive toy for the following reasons: It makes a loud noise. It is perfectly harmless. I have found that the flame from the gun will neither ignite thin tissue paper, nor burn the skin. While it does throw the cork projectile, it does not throw it with sufficient force to do any harm, and it will not throw a heavy projectile more than a very short distance. This, of course, is because the explosion is so quick that it does not have time to give energy to a projectile, and it is a quality directly the reverse of what is desired for military purposes. While acetylene is slow to diffuse itself through the air in the gun if admitted in a single stream, my gas nozzle overcomes this difficulty and causes a good mixture that readily explodes. I have found by long experience that the acetylene generator used is so safe that it is extremely unlikely that it should explode, and that, when it has exploded, the only result is to throw out the upper cup, and that without enough force to cause injury. On the other hand, I have found that with the best form of hydrogen-generator I could devise, there was serious danger of explosion, and that when an explosion occurred there was great liability to injury, both from the force of the explosion and from the necessity of using glass in the generator. The toy presents a considerable variety of interesting and instructive phe-

nomena in physics and chemistry for the instruction of the child.

While I have described what I consider to be the best embodiment of my invention, I am aware that the invention can be embodied in many different forms, and I do not desire to be limited to the specific construction which I have described.

Having thus described my invention, I claim:

1. In a toy, the combination of a gun-body having a thread on its rear end, a breech-plate having a thread adapted to engage the thread of the gun-body, a gas nozzle and an igniter apparatus carried by said breech-plate, and a gas generator connected with said nozzle.

2. In a toy, the combination of a gun-body open at both ends, a breech-plate adapted to be secured to the rear end of the gun-body, an igniter and a gas nozzle carried by said plate, and a gas generator connected with said nozzle.

3. In a toy, the combination of a gun, a gas generator, connected to said gun, a stationary binding-post on said gun and having a projection within said gun, said binding-post being connected with a battery, a second binding-post having a spring within said gun, said binding-post being also connected with said battery, one of said connections having a spark-coil therein, and means for moving said projection across the path of said spring to produce sparks in the gun for exploding the gas.

4. In a toy, the combination of a gun, a headed rod projecting into said gun and having a spring between its head and the gun, adapted to thrust the rod inward, means outside of the gun by which the rod can be drawn outward, a spring mounted within the gun in the path of said head, a battery, the poles of which said spring and headed rod are respectively connected, a spark-coil interposed in the circuit thus formed, a gas generator, and a connection between said generator and the gun for introducing gas into the gun.

5. In a toy, the combination of a gun, a gas generator connected to said gun, a binding post on said gun having a projection within the gun, and connected to a battery, a binding-post on said gun having a spring within the gun, and connected with said battery, one of said connections having a spark-coil therein, and means for causing a relative movement between said spring and said projection to produce sparking in the gun, for exploding the gas.

6. In a toy, the combination of a gun-body open at both ends, a breech-plate removably closing one end of the gun, a rod fixedly mounted in said breech-plate and projecting into the gun, a spring secured to the inner end of said rod, a headed rod extending into

the gun through a guide on said plate, a spring interposed between the head of said rod and said guide, said head being adapted to engage said first-mentioned spring, an electric circuit comprising a spark-coil connected with said rods, and means for introducing gas into the gun.

7. In a toy, the combination of a gun-body having trunnions, a gun-carriage consisting of side-plates and a base-plate formed of sheet metal, a gas generator, a tube connecting said gas generator with the interior of the gun, an opening formed in said carriage, said tube extending through said opening, and a spring adapted to pinch said tube against a side of said opening to control the flow of gas.

8. In a toy, the combination of a gun-body having trunnions, a gun-carriage consisting of side-plates and a base-plate formed of sheet metal, a gas generator, a tube connecting said gas generator with the interior of the gun, an opening formed in said carriage by punching up a lip, said tube extending through said opening, and a spring adapted to pinch said tube against said lip to control the flow of gas.

9. In a toy, the combination of a gun-body having trunnions, a gun-carriage consisting of side-plates and a base-plate formed of sheet metal, a gas generator, a tube connecting said gas generator with the interior of the gun, an opening formed in said carriage by

punching up a lip, said tube extending through said opening, and a spring adapted to pinch said tube against said lip to control the flow of gas, said spring consisting of a wire, said wire being secured to said carriage by ears punched up out of the sheet metal and bent over said wire.

10. In a toy, the combination of a gun having trunnions, a gun-carriage for supporting said gun, a gas generator connected with the gun, an electric igniter within the gun, a battery for operating said igniter, a box for containing said parts, and angled flanges on said carriage that are adapted to bear against the inner surfaces and upper edges of the sides of said box to support said gun.

11. In a toy, the combination of a gun having trunnions, a gun-carriage for supporting said gun, a gas generator, a tube connecting said generator with the interior of the gun, an electric igniter within the gun, a battery for operating said igniter, a box for containing said parts, and flanges on said carriage that are adapted to rest on the edges of said box and support said gun.

In testimony that I claim the foregoing I have hereunto set my hand.

WILLIAM SEDDARDS FRANKLIN.

Witnesses:

B. B. MEYER,  
THOS. F. KEIM.