

Aug. 19, 1947.

L. J. WITTE ET AL

2,425,975

DEVICE FOR MAKING SOUND EFFECTS

Filed April 5, 1944

2 Sheets-Sheet 1

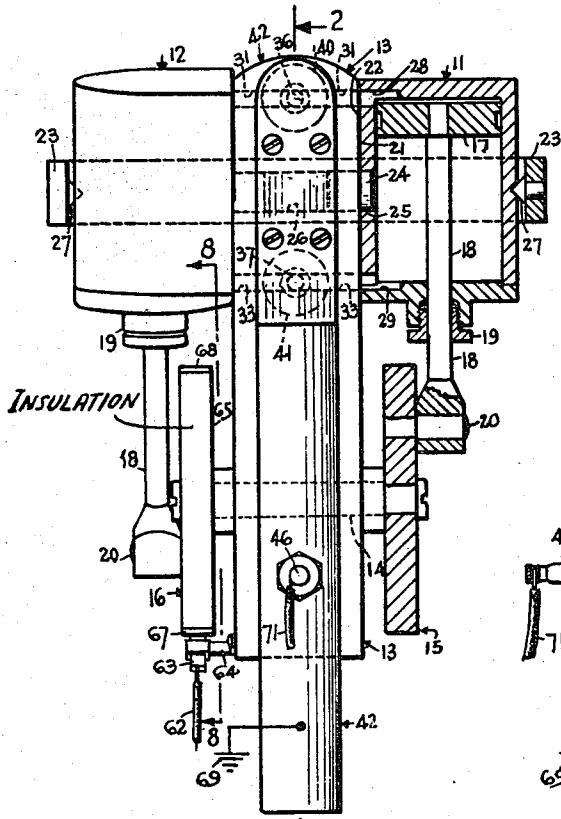


FIG 1

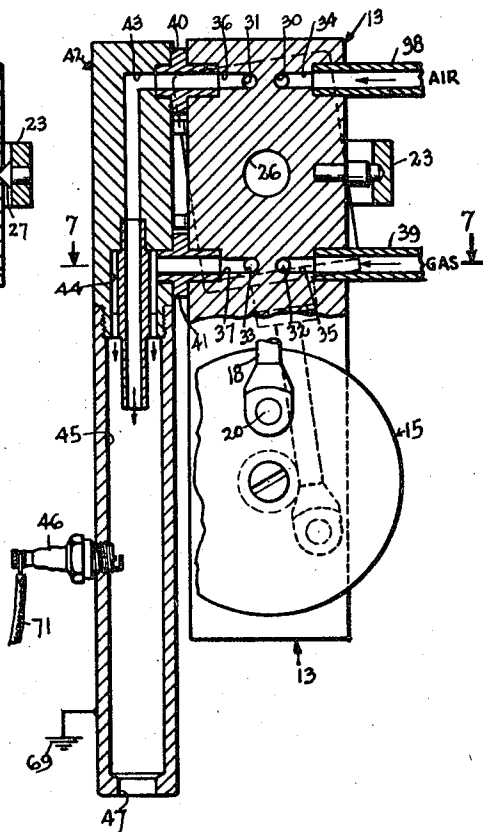


FIG 2

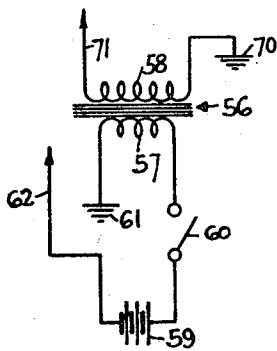


FIG 3

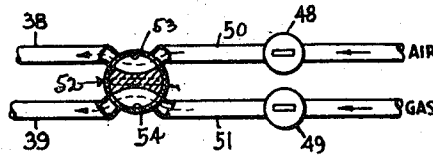


FIG 4

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2 Sheets-Sheet 2

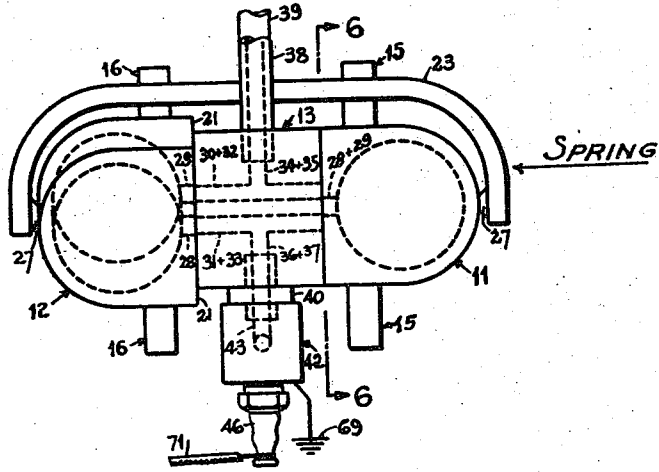


FIG 5

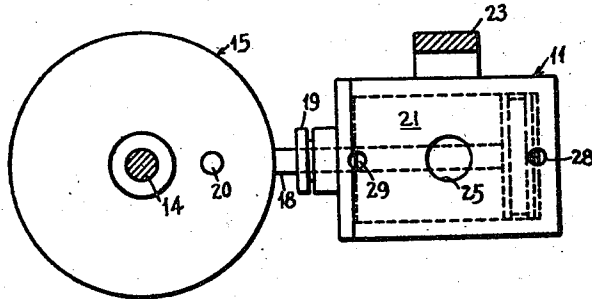


FIG 6

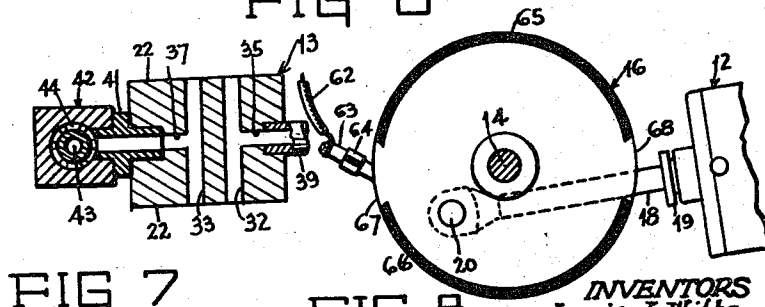


FIG 7

FIG 8

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# UNITED STATES PATENT OFFICE

2,425,975

## DEVICE FOR MAKING SOUND EFFECTS

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Application April 5, 1944, Serial No. 529,686

9 Claims. (Cl. 177-7)

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This invention relates to the art of sound effects and deals particularly with a device adapted to produce a sound effect which can be used to imitate machine guns, airplanes, motors, or any other device wherein an intermittent, sharp staccato noise is required.

The invention to be hereinafter described has been developed in connection with the motion picture industry, but it will become obvious to those skilled in the art that the device may be used in other industries, such as radio programs, theatres, etc., wherein sound effects of the above nature may be needed.

The principal object of the invention is to provide a piece of apparatus that will produce a repeating, sharp, staccato report simulating a machine gun. Another and an important object is to provide a device of the above character which combines with the report a coordinated flash which gives a realistic visual as well as an auditory imitation of an actual report from the barrel of a gun. Still another object is to provide a device of the character described wherein the combustible gas and the compressed air which are mixed to produce a combustible mixture are utilized to propel a small engine which by its own motion meters the gas and the air in the proper proportions to provide a highly combustible mixture. A further object is to provide a piece of apparatus as described wherein the same engine which measures the gas is utilized to operate a make and break ignition system similar to an automobile system for producing an intermittent firing of the mixture. A still further object is to provide a small piece of apparatus for the purpose described which may be built into the space provided by the jacket on a standard machine gun. In this way the whole device may be incorporated in the machine gun without changing the outward appearance. Other objects and advantages will become apparent as the description proceeds in conjunction with the drawings in which:

Figure 1 is a plan view partly in section of our device;

Figure 2 is a sectional view partly in section taken on line 2-2 of Figure 1;

Figure 3 is a schematic diagram showing the electrical circuit used in conjunction with our invention;

Figure 4 is a schematic arrangement of the valves used in controlling the gases supplied to our invention;

Figure 5 is an inverted rear end view of our invention;

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Figure 6 is a view taken on line 6-6 of Figure 5;

Figure 7 is a sectional view taken on line 7-7 of Figure 2; and

Figure 8 is a view taken on line 8-8 of Figure 1.

Briefly stated, our invention amounts to utilizing the well known arrangement of a piston and cylinder for measuring gas which is to be mixed for explosive purposes. In our invention we employ one or more cylinders having reciprocal pistons therein and arrange the cylinder or cylinders in a well known manner whereby they become an engine and rotate a crank shaft having a fly wheel thereon. All of this construction is well known in the art. However, we utilize the arrangement to produce a new and unusual result.

In the drawing, and particularly in Figures 1 and 5, it can be seen that our invention comprises two cylinders 11 and 12 and that these cylinders are mounted on the side of a block generally designated 13. Also mounted in the block 13 is a shaft 14 having on its outer ends disks 15 and 16 which serve as fly wheels and also as means of connecting a crank arm to the shaft 14.

It is to be understood in the ensuing description that although we have shown two cylinders 11 and 12 we will nevertheless describe but one cylinder, since the construction of the two cylinders is identical and the description of one will serve for both. In this case we will describe cylinder 11.

Referring more particularly to Figure 1, it will be noted that cylinder 11 has a piston 17 reciprocally mounted therein. Connected to the piston 17 is a connecting rod 18 which passes out of one end of the cylinder through a packing gland 19. The outer end of the rod 18 is pivotally connected to the disk 15 at an eccentric point by a pin 20. Under this arrangement it is evident that the reciprocation of the piston 17 will rotate the wheel 15.

As before stated, the cylinders 11 and 12 are pivotally mounted on the side of the block 13. The structure for this purpose consists in making the cylinders with a flat face 21 which slidably fits against a flat face 22 on the block 13. These two faces are held in contact by pressing the cylinders against the block by means of a spring member 23 which normally exerts a pressure that holds the cylinders in place on the block. The cylinders are pivotally mounted on the block by a pin 24 fitting into a socket 25 in the flat face of the cylinder, said pin extending into a hole

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26 in the block 13. It will also be noted that the end of the member 23 is provided with a point 27 to provide easy rotation of the cylinder on the pivot 24. It will be observed that the cylinder 11 is provided with ports 28 and 29 on opposite ends of the cylinder. These ports are for the purpose of admitting gas into the cylinder on opposite sides of the piston 17. Under the arrangement shown here, we propose to admit air into the cylinder through the port 28 and gas through the port 29. For this purpose the block 13 is provided with a series of ports and passages which will now be described.

Referring to Figure 2, wherein the block 13 is shown partly in section, it will be noted that the block is provided with passages 30, 31, 32, and 33, together with passages 34, 35, 36, and 37, which communicate in the following manner: The passage 34 communicates with the passage 30; the passage 35 communicates with the passage 32; the passage 36 communicates with the passage 31; and the passage 37 communicates with the passage 33. As shown in this view, the passage 34 is connected to a compressed air supply, not shown, by means of a pipe 38, while the passage 35 is connected to a gas supply, not shown, by means of a pipe 39. These two connections may be reversed if desired, the only requirements being in this case that air is supplied to one end of the cylinder and gas to the other. On the other side of the block, the passage 36 is provided with a fitting 40 and the passage 37 is provided with a similar fitting 41. The purpose of these two fittings is to mount a member generally designated 42, which is provided with a passage 43 that communicates with the passage 36 through the fitting 40. The fitting 41 in the passage 37 communicates with an annular chamber 44 in the member 42, which in turn connects with a mixing and firing chamber 45. The aforementioned passage 43 likewise enters the same chamber, wherein the air which passes through the passage is mixed with the gas which passes through the chamber 44. The chamber 45 is provided with a spark plug 46 for igniting and exploding the gas therein. As the gas ignites, it explodes with a detonating effect and the flame is discharged through the opening 47, which in practice would be placed near the muzzle of the gun so that the flame would flare into the open, similar to an actual gun discharge.

To explain the operation of the engine, it is necessary to refer to Figures 1, 2, 5, and 6. In the previous paragraphs it was stated that the cylinders 11 and 12 were pivotally mounted on the side of the block 13 and were held in sliding engagement therewith by the spring member 23. It was also stated that the face of the cylinder 11 was provided with ports 28 and 29. Now then, since the socket 25 on the cylinder 11 is mounted over the pivot pin 24, the ports 28 and 29 will bear against the side 22 of the block 13. During rotation of the disk wheels 15 and 16, the cylinders will assume various angular positions on the face of the block. The two extreme positions will be at the time the cylinders are intaking and are exhausting. When the crank arm is in the dotted position shown in Figure 2, one of the cylinders will assume the dotted position shown in the same figure. In this position the port 29 will communicate with the port 32, thereby admitting gas into the cylinder behind the piston 17. The pressure of the gas will naturally force the piston to travel in the cylinder until it reaches the opposite end of the cylinder, whereupon the

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port 29 then communicates with the port 33 and the port 28 at this point communicates with the port 30. This admits compressed air to the side of the cylinder opposite the gas, thus forcing the piston in the opposite direction and at the same time forcing the gas in the opposite side of the cylinder out through the port 33, where it travels through the passage 37 into the annular chamber 44 and eventually into the combustion chamber 45. Upon continued movement of the piston, the cylinder moves to the dotted line position where the port 28 communicates with the port 31, thus releasing the air into the passage 36, from where it passes into passage 43 and into the combustion chamber 45, where it is mixed with the gas therein. The cycle is repeated.

As shown in the drawings, we have illustrated two cylinders with their attendant working parts. However, it is obvious to anyone skilled in this art that one cylinder is a complete unit and may be used for the purpose described. There is an advantage in using two cylinders which becomes practical and useful, in that there is a better mixture of air and gas; also, if the two cylinders are not spaced diametrically apart on the crank shaft, the engine will have better starting characteristics.

In Figure 4 we have shown a valve arrangement for controlling the amount of air and gas fed to the cylinders. As shown, it comprises valves 48 and 49 in pipe lines 50 and 51 respectively, which supply the air and gas to the machine as shown. The two lines 50 and 51 come together in a valve 52 which, as indicated, is a duplex valve for controlling both lines simultaneously. As seen in this drawing, the valve 52 comprises a plug having passages 53 and 54 which are arranged to simultaneously pass the air and gas out of the lines 50 and 51 and may be turned to control the flow therethrough. In practice, the valves 48 and 49 are set to supply the proper amounts of gas and air. The valve 52 will then become the valve which controls the amount of each that is admitted to the engine. The purpose of the valves 48 and 49 is to provide a highly explosive mixture in the proper proportions and the purpose of the valve 52 is to control the speed of the engine and thereby the amount of explosives admitted to the explosion chamber, as well as the frequency of the explosion.

In connection with the foregoing, we provide an ignition system for intermittently electrically energizing the spark plug 46. The plug 46 functions in the well known manner. In Figures 1, 3, and 8, we have shown a system for intermittently causing an electrical discharge across the points of the plug 46. Referring to Figure 3, it will be seen that this circuit consists of a transformer generally designated 56 having primary windings 57 and secondary windings 58. In the primary circuit we incorporate a battery 59 having a switch 60 conveniently located therein. One side of the primary windings is connected by conductor 62 to a brush 63 held in a bracket 64 on the block 13. The other side is grounded as shown at 61. The brush 63 in turn engages the disk 16 which is formed with insulation members 65 and 66 spaced on the periphery thereof so as to provide contact points 67 and 68 which the brush may contact on rotation of the disk to intermittently complete the primary circuit through the equipment to a ground 69. One end of the secondary circuit goes to a ground 70, while the other end 71 goes to the spark plug 46. Under this arrangement it becomes evident that as soon

as the engine starts operating, the wheel 16 starts rotating and the contact points 67 and 68 will intermittently come under the brush 63. This will interruptedly complete the circuit through the primary side of the transformer 56 which will supply a high voltage to the spark plug 46, thereby causing a spark in the ignition chamber 45 which ignites the gas and causes the explosion. The result is a flash from the aperture 47 at the end of the chamber 45 which is synchronously coupled with the explosion since it is in effect the explosion. In actual practice, the opening 47 is placed near the muzzle of a machine gun, while the entire apparatus including the two cylinders and the block 13 is placed in the jacket of the machine gun. The only other connections necessary are the pipes 50 and 51 which go to the sources of air and gas, which have not been shown.

A machine of the foregoing character will give a realistic imitation of a machine gun in actual operation. However, we are aware that with simple modifications, or even as the machine is disclosed herein, it will operate to produce other sound effects, such as airplanes, motor boats, etc. For this reason we do not wish to confine the invention to the single application shown and described, but intend it to cover all equivalent uses and applications of the inventive idea.

We claim:

1. A device of the character described comprising a cylinder having a piston reciprocally mounted therein, means for supplying a compressed combustible gas to said cylinder at one side of said piston, means for supplying compressed air to the opposite side of said piston to reciprocate the same, a chamber for collecting and mixing the exhaust from both sides of said piston, and means for intermittently igniting the mixture in said chamber.

2. A device of the character described comprising an engine driven by a piston reciprocating in a cylinder, means for supplying compressed air and compressed combustible gas to opposite sides respectively of said piston to reciprocate the same, means for collecting and mixing the exhausts from both sides of said piston, and means for intermittently igniting the said collected mixture.

3. A device of the character described comprising an engine having a fly wheel driven by a piston reciprocally mounted in a cylinder, means for supplying compressed air to said cylinder, means for supplying a compressed combustible gas to said cylinder to reciprocate said piston therein and rotate said fly wheel, a chamber communicating with said cylinder for collecting and mixing exhausted gases resulting from the operation of said engine, means for igniting the mixture in said chamber, and means associated with said fly wheel for intermittently energizing said igniting means.

4. A device of the character described comprising an explosion chamber having an opening to permit a flash to the atmosphere, means for supplying explosive gas to said chamber, said means including a cylinder having a piston reciprocally mounted therein with means for supplying compressed air to one side of said piston and compressed combustible gas to the other side of said piston together with means for exhausting said gases into said explosion chamber, means communicating with said explosion chamber for igniting said gases, said means including a spark plug, and means for energizing said spark plug in timed relation to the reciprocation of said piston.

5. A device of the character described comprising an explosion chamber having an opening to permit a flash to the atmosphere, means for supplying explosive gas to said chamber, said means including a cylinder having a piston reciprocally mounted therein with means for supplying compressed air to one side of said piston and compressed combustible gas to the other side of said piston together with means for exhausting said gases into said explosion chamber, and means communicating with said explosion chamber for intermittently igniting said gases.

6. A device of the character described comprising an explosion chamber having an opening to the atmosphere to permit a flash therethrough, means for supplying combustible gas to said chamber, said means including a cylinder having a piston reciprocally mounted therein with means for supplying compressed air to one side of said piston and compressed combustible gas to the other side of said piston together with means for exhausting said gases into said explosion chamber, and electrical means communicating with said explosion chamber for intermittently igniting said gases.

7. A device of the character described comprising an explosion chamber, means for supplying an explosive mixture of gas to said chamber, said means including a reciprocating engine having a cylinder with a reciprocable piston therein adapted to exhaust gases into said explosion chamber, means for supplying compressed combustible gas and compressed air to said engine to actuate the same and exhaust gas into said chamber, and means for intermittently igniting the gas in said chamber.

8. A device of the character described comprising an explosion chamber, means for supplying an explosive mixture of gas to said chamber, said means including a reciprocating engine having a cylinder with a reciprocable piston therein adapted to exhaust gases into said explosion chamber, means for supplying compressed combustible gas and compressed air to said engine to actuate the same and exhaust gas into said chamber, and means for exploding the gas in said chamber in timed relation to the reciprocation of said engine.

9. A device of the character described comprising an explosion chamber, means for supplying an explosive mixture of gas to said chamber, said means including an engine having a pair of cylinders each with a reciprocating piston therein, means for exhausting each end of each of said cylinders into said explosion chamber, means for supplying compressed air to one side of said piston, means for supplying combustible gas to the opposite side of each of said pistons to form an explosive mixture with said compressed air when exhausted into said explosion chamber, and means for intermittently igniting the mixture in said explosion chamber.

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