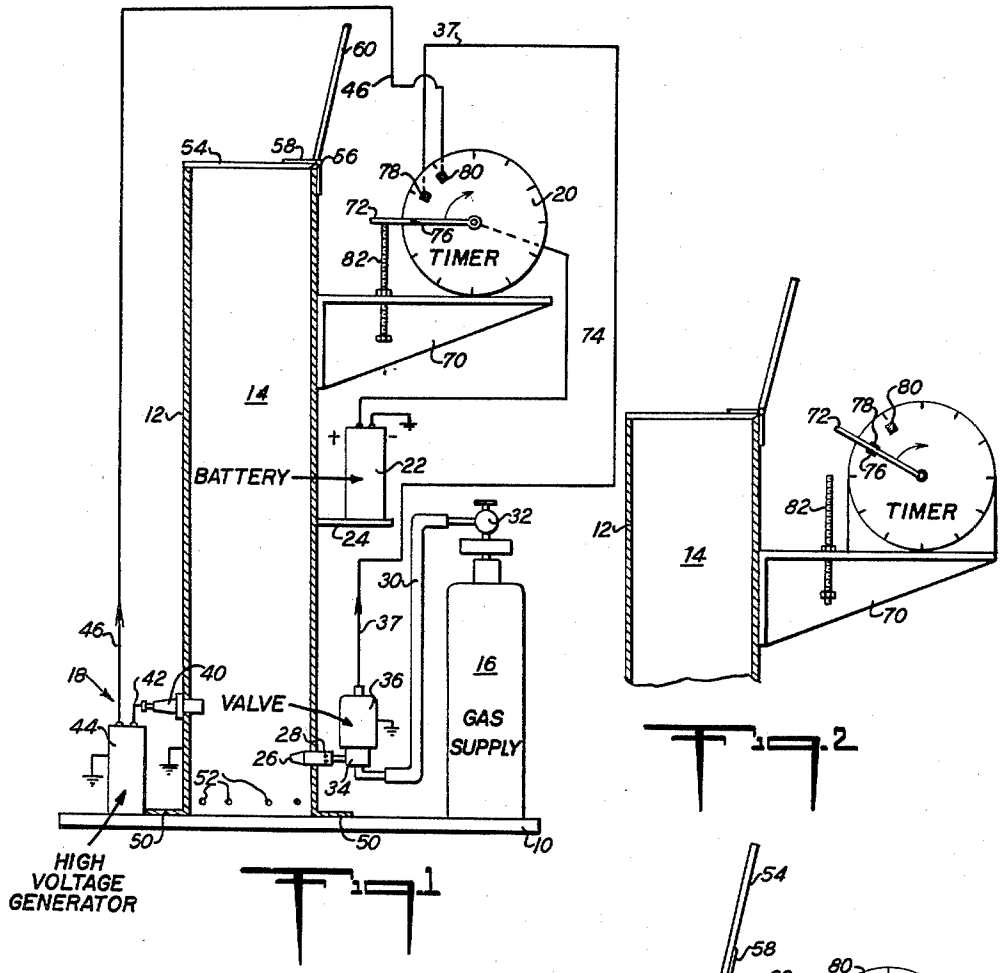
Dec. 15, 1959 R. J. MAROTTA 2,917,736

PEST CONTROL DEVICE

Filed Sept. 19, 1956 2 Sheets-Sheet 1




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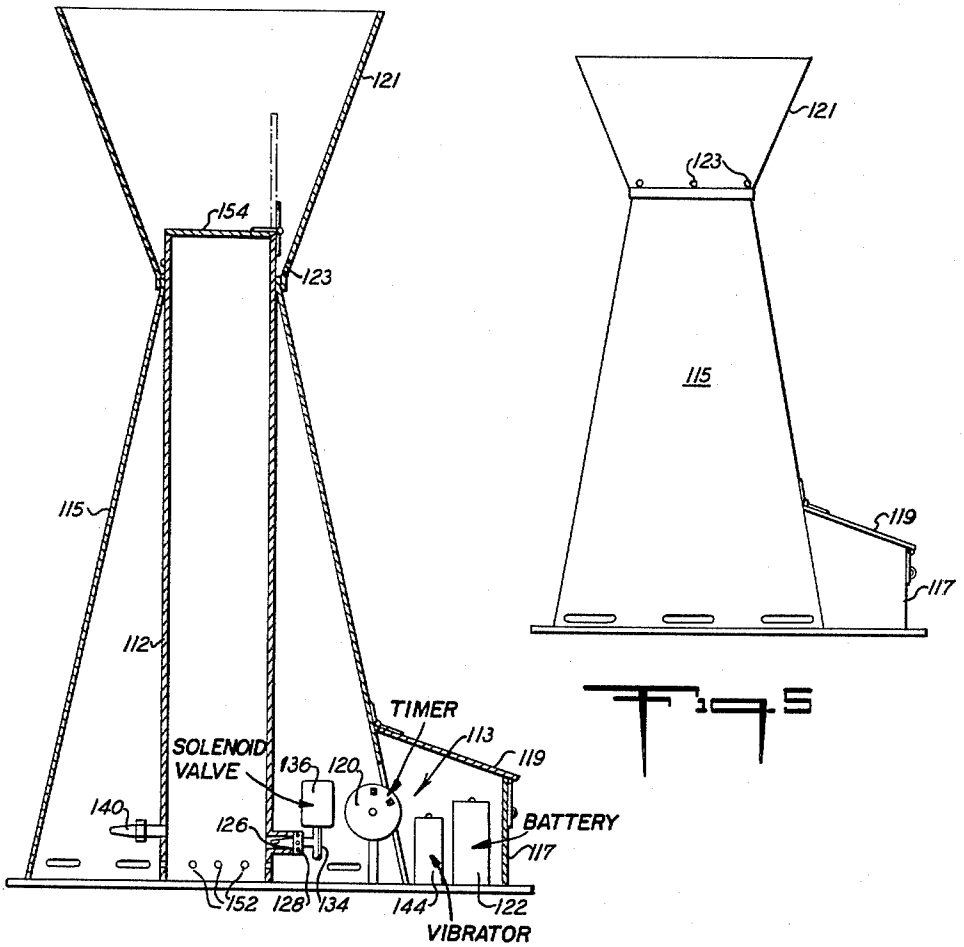



FIG. 6




FIG. 5

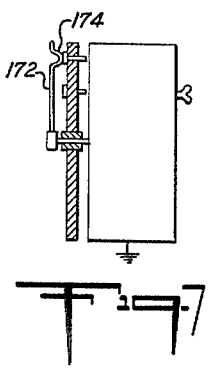



FIG. 7

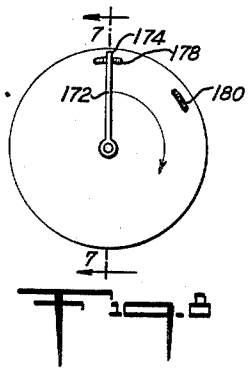



FIG. 8

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2,917,736

# PEST CONTROL DEVICE

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5 Claims. (Cl. 340—386)

This invention relates to a device for startling pests and more particularly to a device in which an explosive gaseous mixture is ignited at regular intervals for simulating the explosion of shotgun shells or the like.

While the invention is directed particularly to pest control, it is realized that the invention may have other applications where explosions at regular intervals are desired and that such other devices will fall within the scope of the accompanying claims.

In many farming areas, crops suffer from a tremendous number of pests, particularly birds, which strip the soil of the seed practically as soon as it is sown and which eat a large portion of the grain and the like from the plants before they are harvested. It has been the practice in some areas to send unskilled labor out into the fields to fire shotgun shells at regular intervals in order to startle the pests and prevent them from devouring the crops. Obviously the practice described has a serious economic disadvantage in that it is not only costly to pay a laborer a full day's wages merely to fire shotgun shells, but additionally the shotgun shells themselves are quite expensive, since one man must shoot over $50 worth per day to keep the pests under control.

The present invention is designed to eliminate this uneconomical procedure and consists, in its broadest aspects, of a device for exploding a combustible mixture periodically and at regular intervals. The device is practically fully automatic and may be placed in the fields without supervision to remain for a considerable period of time.

The device is completely portable and utilizes a mechanical timing mechanism mounted on the unit for insuring regular periodic explosions. In one embodiment, the timing device is arranged to be automatically re-set after each explosion. In another embodiment the timing mechanism is arranged to be operable over an extended period on a single winding of the clock-works.

It is an object of the invention to provide a portable self-contained unit which will at regular intervals, fully automatically, explode a combustible mixture.

It is another object of the invention to provide a device of the type described in which the interval between explosions may be varied at the will of the operator.

These and other objects will become more readily apparent from a consideration of the following detailed description of the invention taken in conjunction with the accompanying drawings in which:

Fig. 1 is an elevational view partly in section showing the complete assembly;

Figs. 2, 3 and 4 are fragmentary elevational views partly in section showing the operation of one embodiment of the timing mechanism;

Fig. 5 is an elevational view of an alternative embodiment of the invention;

Fig. 6 is a cross-sectional view taken through the center of Fig. 5;

Fig. 7 is a cross-sectional view along line 7—7 of Fig. 8, and

Fig. 8 is an elevational view of an alternative timer.



In Fig. 1 the assembly is shown mounted on a platform 10. The major components are a tube 12 which forms a combustion chamber 14; a tank 16 of combustible gas such as acetylene or butane; and igniter 18 and a timing mechanism 20. A direct current 6 volt storage battery 22 is mounted on a platform 24 fixed to the tube 12 and supplies the whole system with the power for its operation.

*Combustible mixture supply*

The combustible gas is supplied to the combustion chamber 14 through a nozzle 26. The nozzle is provided with holes 28 opening to the atmosphere for the admission of primary air which is entrained by the incoming explosive gas and forms the explosive mixture. The gas is supplied from the tank 16 through a conduit 30, the rate of flow being regulated by a valve 32 attached to the tank.

The periodic supply of explosive gas to the combustion chamber is admitted by way of a valve 34 mounted adjacent the nozzle 26. The valve is operated by a solenoid 36 controlled by the timer 20 through conductor 37 in a manner to be described.

*Igniter*

The device utilized for igniting the explosive mixture is subject to considerable variation. In this embodiment, however, there is shown a spark plug 40 connected by a high tension lead 42 to a high voltage source 44. The high voltage source 44 is a vibrator actuated coil supplied through a conductor 46 from the battery 22 through the timer 20. When the circuit to the igniter is closed by the timer, a continuous spark occurs at the spark plug electrodes to ignite the explosive mixture.

*Combustion chamber construction*

The combustion chamber 14 is constructed from a tube 12 which may be of any suitable cross-sectional configuration such as rectangular, circular or the like. The bottom of the tube is flanged at 50 and the flanges 50 are used to fix the tube firmly to the platform 10 by means of screws, bolts or the like.

The lower portion of the tube 12 is provided with holes 52 of about ¼ inch diameter for admitting secondary air to the combustion chamber and as breather holes for assisting in the expulsion of burned gases.

The other end of the tube is provided with a closure lid 54 which is pivotally mounted at 56 and is spring biased to closed position by a spring 58. An abutment extension 60 is fixed mounted to the lid and operates the timing mechanism of this embodiment.

*Timing mechanism*

The timing mechanism is mounted on a platform 70 at the upper portion of the tube 12 adjacent the closure 54. It consists of a spring wound clock mechanism which is wound by a lever 72 being rotated counter clockwise and which, when unwinding, rotates lever 72 in a clockwise direction.

The lever 72 is electrically connected through a conductor 74 to the battery 22. The lever 72 is provided with a brush at 76 which wipes a first contact 78 connected to the solenoid 36 through conductor 37, and a second contact 80 which is connected to the igniter 18. When the timer moves in a clockwise direction it first closes contact 78 permitting a combustible mixture of the explosive gas and the primary air to be admitted into the combustion chamber and subsequently closes the contact 80 to cause the firing of spark plug 40.

An adjustable stop 82 is mounted on the platform 70 and is engaged by the lever 72.

The operation of the unit and its control by the timer is illustrated in Figs. 1, 2, 3 and 4.

When operation is to be initiated, the lever 72 is set in the position shown in Fig. 1 and the lid 54 is closed. The spring operated clock mechanism starts the rotation of lever 72 until it reaches the position shown in Fig. 2 closing the contact to the solenoid operated valve 36 and 34. The explosive gas with entrained primary air from holes 28 is then admitted through nozzle 26. The valve is closed after the lever 76 moves past contact 78. Alternatively it would be possible to have a simple metering arrangement which would admit a fixed charge of gas when the solenoid 36 is actuated and would not be dependent upon the movement of the lever arm 72 for regulating the amount of explosive gas charge.

When the arm moves to contact 80, the igniter is operated firing the spark plug 40 and exploding the mixture. The explosion of the mixture blows the lid off the top of the tube 12 in a clockwise direction so that the abutment extension 60 of the lid engages the lever 72. The momentum of the lid driven by the explosion forces the lever 72 to the position shown in Fig. 4. The spring 58 returns the lid to the position shown in Fig. 1. Thus the mechanism is re-set and the operation will begin again automatically.

The interval of time between explosions can be increased by lowering the position of the end of stop 82.

An alternative embodiment is shown in Figs. 5 to 8.

There the tube 112 and the operating parts indicated at 113 are surrounded by a housing 115 including a compartment 117 having a latch locked lid 119 containing the storage battery 122 and the vibrator 144.

A sheet metal amplifier cone 121 surrounds the upper opening of the tube to increase the noise created by the explosion.

A spring biased lid 154 closes the tube 112 but in this embodiment, the abutment extension is not required.

Admission of the explosive gas is through nozzle 126 having primary air admitting holes 128 and regulated by a solenoid 136 which actuates a valve located at 134.

Small holes 152 are provided for the admission of secondary air in the bottom of the tube 112. Small holes 123 are provided in the cone 121 to permit water to drain from the cone.

An igniting spark plug 140 is connected to the vibrator coil 144 and from there through the timer 120 to storage battery 122 by connections not shown.

The timing mechanism shown in Figs. 7 and 8 is simply a clock mechanism which will operate over an extended period with one winding. In the preferred embodiment, for example, an eight day clock is utilized so that the device can operate continuously through a week without any attention. Operation is substantially the same as described in connection with the embodiment of Fig. 1 except that there is no provision for re-setting or adjustment of the interval between explosions.

The clock-works drives a contact arm 172 clockwise with one revolution every 60 seconds, for example. The arm 172 has a brush 174 which engages a contact 178 to the solenoid 136 and subsequently a contact 180 to the vibrator 144. The engagement of these contacts by the brush, closes the associated circuits for the admission of gas and subsequent firing of the mixture as described in the first embodiment.

It can be seen that in either embodiment, the device can be carried out to the fields, set in operation, and then remain unattended for an extended period of time of a day or more, without anyone in attendance. In use, a plurality of such self-contained units could be disposed at corners of a 20-acre plot, for example, and arranged to fire, each at 4 minute intervals but rotationally so that one would fire every minute working around the 20-acre plot.

In a general manner, while I have, in the above description, disclosed what I deem to be practical and efficient embodiments of my invention, it should be well understood that I do not wish to be limited thereto as there might be changes made in the arrangement, disposition and form of the parts without departing from the principle of the present invention as comprehended within the scope of the accompanying claims.



I claim:

1. A device for startling pests comprising, a container for an explosive gas, means forming a gas explosion chamber, a valve controlled conduit connected to said container for supplying an explosive mixture to said chamber, a solenoid operatively connected to said valve, an ignition system for firing the mixture in said chamber, a source of electric power, and a timing device for sequentially connecting said solenoid then said ignition system to said power source to control periodic admission of said mixture to said chamber and subsequent ignition of said mixture.

2. A device for startling pests comprising, a tube forming a gas explosion chamber, a pivotally mounted closure at one end of said tube, valve means for supplying an explosive mixture to said chamber, an ignition system for firing the mixture in said chamber, a timing device for controlling periodic admission of said mixture to said chamber and subsequent ignition of said mixture, a lever attached to said timing device for resetting said device, and an abutment extension on said closure engageable with said lever for operating said lever upon explosion of said mixture.

3. A device for startling pests comprising, means forming a gas explosion chamber, valve means for supplying a mixture of a combustible gas and primary air to said chamber, means forming openings in the bottom of said chamber for the admission of secondary air, an ignition system for firing the mixture in said chamber, and a timing device for controlling periodic admission of said mixture to said chamber and subsequent ignition of said mixture.

4. A portable self contained unit for startling pests comprising, a platform, means forming a gas explosion chamber, mounted on said platform, a supply of combustible gas mounted on said platform, valve means for supplying an explosive mixture of primary air and said gas to said chamber, an ignition system for firing the mixture in said chamber, and a timing device for controlling periodic admission of said mixture to said chamber and subsequent ignition of said mixture, said timing device comprising a spring operated clock mechanism, and means operable by the explosion of said mixture for rewinding and resetting said timing device, whereby said unit will operate continuously until the supply of combustible gas is exhausted.

5. A device for startling pests comprising, a container for an explosive gas, means forming a gas explosion chamber, a valve controlled conduit connected to said container for supplying an explosive gas to said chamber, said conduit having holes therein for entraining air as said gas flows through said conduit, a solenoid operatively connected to said valve, a source of electric power, an ignition system for firing the mixture in said chamber, a timing device for sequentially connecting said solenoid then said ignition system to said power source to control periodic admission of said mixture to said chamber and subsequent ignition of said gas, and means forming holes in the lower portion of said chamber for the admission of secondary air.

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