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2,489,610

AERIAL BOMB

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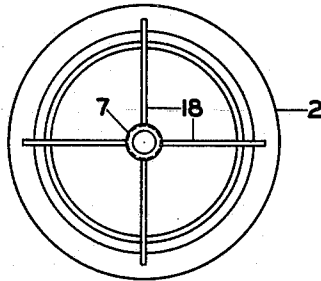


FIG. 2

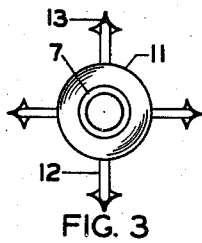


FIG. 3

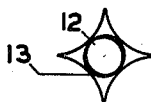


FIG. 4A

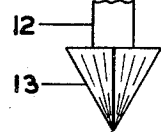


FIG. 4

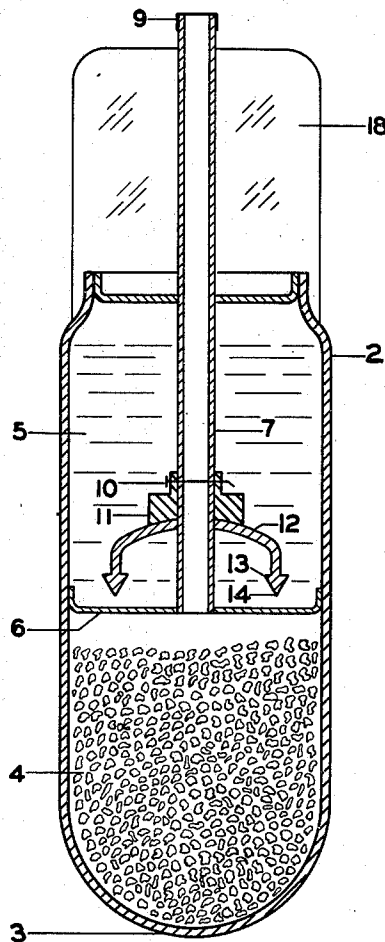


FIG. 1

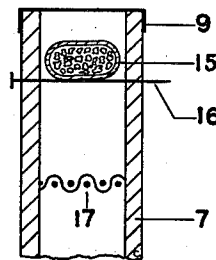


FIG. 5

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AERIAL BOMB

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The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

This invention relates to an aerial bomb and more particularly to a bomb adapted to be dropped upon or adjacent to an area and which upon impact will release gases, vapors or smokes, or will ignite and burn for long periods.

Broadly, the invention comprises a bomb body containing a plurality of physically separated compounds of such nature that a chemical or physical reaction takes place upon physical contact of the compounds. Upon impact of the bomb, communication is established between the compounds whereby a reaction occurs and the desired burning is initiated, or the gas, vapor or smoke is generated.

Another object of the invention is to provide a drop bomb having adjacent chambers containing different compounds, with means actuated by the sudden deceleration of the bomb upon impact to open communication between the chambers, and to initiate mixture of the compounds.

A further object is to provide means for piercing the partition separating the two chambers upon impact, thereby bringing together the two reacting substances to generate the desired reacting product.

A further object is to provide substances in the two adjacent chambers which will mix and react on impact of the bomb to form a toxic vapor.

A further object is to provide substances in the two adjacent chambers which will mix and react on impact of the bomb to form an inflammable vapor, with means also actuated by impact for igniting said inflammable vapor.

Various other objects of this invention will in part become apparent and in part be hereinafter stated, as the description of the invention proceeds, reference being had to the following description and accompanying drawing, wherein

Figure 1 is a vertical section taken on a plane passing through the center of the bomb;

Figure 2 is a top plan view thereof;

Figure 3 is a plan view in detail of the weighted piercing mechanism;

Figure 4 is an elevation of one piercing prong, and 4a, a plan thereof;

Figure 5 is a modification of the uppermost portion of the venting tube shown in Figure 1, where it is desired to ignite the gases passing out through the upper end of the venting tube.

Similar numerals refer to similar parts throughout the several views.

The bomb comprises a thin-walled hollow cylinder 2, having a rounded nose 3, and is separated into a lower portion 4 and an upper portion 5 by a thin, relatively easily pierced partition 6 vented preferably substantially at the center thereof. Positioned over and rising from the vented portion of partition 6 is a venting tube 7, passing preferably axially of the bomb and through the top of the bomb and opening into the atmosphere. The upper opening of the venting tube 7 is normally closed by a piece of adhesive tape 9.

Slideably mounted about the venting tube 7, but normally secured in fixed position thereto by a shear wire 10, is a relatively heavy block 11, from the bottom of which extend in spider-like arrangement downwardly curved legs 12, each terminating in a spearhead 13, having spearpoints 14, shown in detail in Figures 3, 4 and 4a.

In the modification shown in Figure 5, means are provided for igniting inflammable vapors or gases passing upward through the venting tube 7. Said igniting mechanism comprises a sealed glass tube 15, carrying phosphorus therein and normally supported by a shear-pin, 16. Secured to the tube 7, and stretching horizontally across the same is a screen 17, which is sufficiently heavy to withstand the impact of the falling glass tube 15.

Fins 18 to guide the bomb and cause nose impact are secured to the bomb 2 and tube 7.

While I have shown the venting tube substantially axially located, this is a preferred embodiment and my invention is not intended to be limited thereto. Furthermore, for convenience, I have shown the upper compartment of the bomb as containing liquid, and the lower compartment as containing solid, but I do not intend to be limited by this arrangement. It is within the scope of my invention to have solids, liquids, or gases in either or both compartments.

In operation the bomb is released from a height and falls until stopped by an obstruction such as the ground. When the fall of the bomb is so stopped, the inertia of the heavy block 11 shears the pin 10 and causes the prongs or spear points 14 to pierce the thin partition 6. Owing to the particular construction of the spearhead 13 and the spearpoints 14, the partition 6 is ripped or torn at the point where it is pierced, so that the prongs 14 occupy only a small portion of the punctures they have created, thus assuring flow of the contents of the upper compartment 5 into the lower compartment 4.

The contents of the upper compartment 5,

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slowly flowing through the tears or rips in the partition 6 into the lower compartment 4, gradually react with the contents of the lower compartment 4, causing a gradual evolution of gas into the venting tube 7. When a slight super-atmospheric pressure has been built up in the tube 7, the adhesive tape 9 is blown off from the top of the venting tube by this pressure, and the gas escapes into the air from the top of the venting tube 7. There will then be a continuous flow of gas through tube 7 and into the atmosphere until evolution of the gas in compartment 4 has ceased.

The gases thus evolved may be lachrymatory or toxic, or a mixture thereof, or may be a fog or mist to screen from observation or interfere with accurate artillery fire.

The size and number of openings pierced in partition 6 may of course be varied in accordance with the desired rate of mixing of the compounds and the resultant generation of gas. Due to the generation of gas or vapor in chamber 4, there will be no vacuum in chamber 5 as the liquid flows out, since some of the gas will pass into chamber 5.

The bomb is so designed that it will not plunge so deeply into the ground that the upper end of tube 7 will be closed. Even if the bomb falls on soft earth, the crater made will be sufficiently large in diameter that tube 7 will not be blocked.

One tactical use of this bomb is for locating targets for night bombing. One pilot familiar with the country and location of the target will fly over and drop a series of bombs of the burning type. These bombs can be dropped in a line leading to the target, to thus guide following pilots. Also, the guiding pilot may drop another line of bombs so that the intersection of the two lines defines the exact target.

Where an inflammable gas is being generated and it is desired to ignite it, I use the modification shown in Figure 5. Upon impact of the bomb with the earth or other object, the inertia of the glass tube 15 breaks the shear-pin 16 and the glass tube falls on to the screen 17, where the glass is broken and the phosphorus, being released, is ignited by reason of the column of air initially in tube 7. The ignited phosphorus then ignites the inflammable gas flowing upward past it.

As an example of generating a toxic gas I put magnesium arsenide in the lower compartment 4 and dilute sulfuric acid in the upper compartment 5. Upon contact the two reagents will react to generate arsine.

As an example of generating a combustible gas I put calcium carbide in the lower compartment and water in the upper compartment. Upon contact the two reagents will react to generate acetylene which may be ignited by the burning phosphorus, which has been ignited as described in the above discussion of the operation of the modification described in Figure 5.

This invention is not limited to the specific details set forth in the foregoing examples which should be construed as illustrative and not by way of limitation. It is desired that only such limitations be imposed as are indicated in the appended claims, since various modifications will occur to those skilled in the art.

I claim:

1. In an aerial bomb a body adapted to contain chemicals which when exposed to one another react to generate an inflammable gas, a partition within said body normally retaining the chemicals separated, a gas passage extending from the par-

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tion and terminating exteriorly of the bomb body for conducting the gas generated by the reacting chemicals to the atmosphere, an ignition device arranged in the passage and operable upon impact of the bomb with an object to ignite the generated gas as it escapes through said passage, puncturing means shiftable lengthwise of the passage and constrained thereby in its movement into puncturing contact with said partition to expose the chemicals to one another, and means normally retaining the puncturing means in fixed position remote from the partition and operable upon impact of the bomb to release said puncturing means.

2. In an aerial bomb, a body provided with a partition and adapted to contain inflammable gas—producing chemicals normally separated from one another by said partition, a tube for conveying the generated gas to the atmosphere extending from the partition and terminating exteriorly of the bomb, a puncturing instrumentality slidable on the tube and movable therealong into piercing contact with the partition for establishing contact between the chemicals upon impact of the bomb with an object, and ignition means confined within the tube for igniting the gas as it escapes through the tube.

3. In an aerial bomb, a body adapted to contain inflammable gas-producing chemicals and provided with a partition for normally maintaining such chemicals incommunicate, a gas passage in the form of a tube extending through the bomb body from the partition and at one end opening into the body at one side of the partition and at an opposed end opening exteriorly of the body, a puncturing instrumentality normally stationary on the tube and slidable upon impact of the bomb with an object along the tube for puncturing the partition to admit the chemical at one side of the partition to contact the chemical at the opposite side of said partition, and spontaneously combustible material confined in the tube for igniting the generated gas as the latter escapes through the passage provided by the tube.

4. In an aerial bomb, chemicals susceptible of generating an inflammable gas upon contact of one chemical with the other, a partition wall normally retaining the chemicals separated from one another and adapted to be punctured for admitting the chemical at one side of the partition to contact the chemical at the opposite side of said partition, a passage for the generated gas terminating exteriorly of the bomb, a partition-puncturing instrumentality associated with said passage and constrained thereby to shift in the direction of the partition for puncturing the latter, and an ignition device located within the passage; said puncturing instrumentality and ignition device respectively operable upon impact of the bomb with an object to respectively puncture the partition and to ignite the generated gas as the latter escapes through said passage.

5. In an aerial bomb, a body adapted to contain chemicals which when exposed to one another react to generate a gas, a partition in the body normally maintaining the chemicals incommunicate, a gas passage extending from the partition and terminating exteriorly of the bomb body for conducting the generated gas to the atmosphere, puncturing means shiftable lengthwise of the gas passage and guided thereby in its movement toward the partition for puncturing the latter, and means normally securing the

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puncturing means in fixed position remote from the partition and operable upon impact of the bomb with an object to release said puncturing means.

6. In an aerial bomb, a body provided with a partition and adapted to contain gas-producing chemicals normally separated from one another by said partition, a tube for conveying the generated gas to the atmosphere extending from the partition and terminating exteriorly of the body, and a puncturing instrumentality slidably embracing the tube and movable therealong into piercing contact with the partition for establishing contact between the chemicals.

7. An aerial bomb of the type containing chemicals which when exposed to one another react to generate a gas, puncturable wall means, a passage for conducting the generated gas to the atmosphere, a quickly releasable wall-puncturing instrumentality operatively connected with the passage, and a frangible container having spontaneously combustible material sealed therein loosely confined within said passage.

8. In an aerial bomb, a supply of chemicals which on contact react to generate an inflammable gas, means normally retaining the chemicals isolated from one another, a unitary assem-

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bly embodying a tube for carrying off the inflammable gas, and a device supported by and movable relative to said tube to coact with the first named means for liberating and admitting to contact the said chemicals, and an igniting device confined within said tube for igniting the gas as it escapes through the tube.

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