June 29, 1948. J. R. HAMPSON 2,444,197

EXPLOSIVE BOMBS FOR USE AS AERIAL BOMBS AND LAND MINES

Filed June 2, 1944

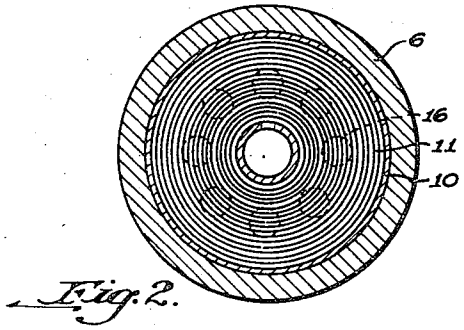


Fig. 2.

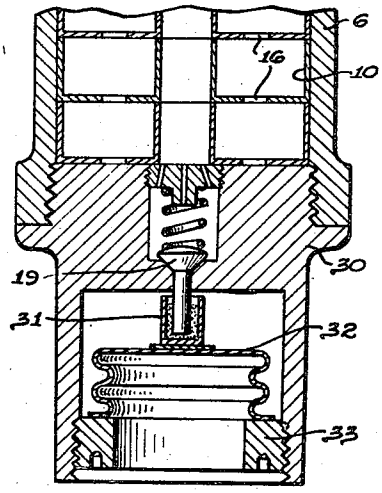


Fig. 4.

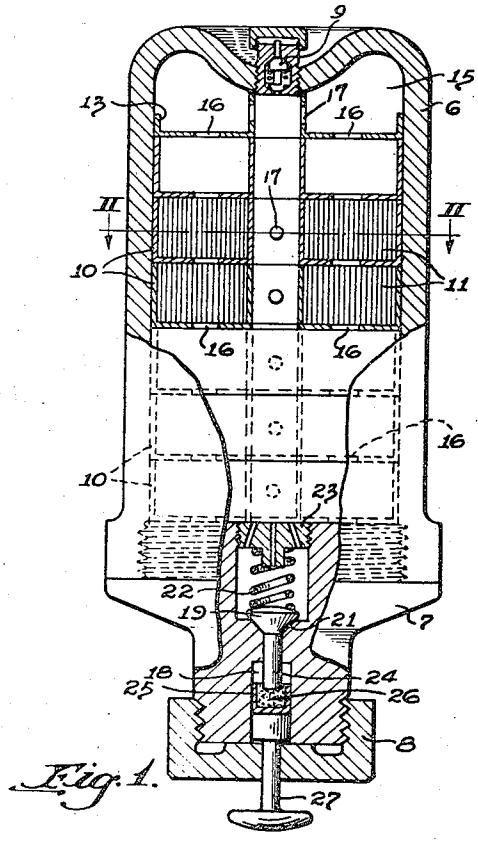


Fig. 1.

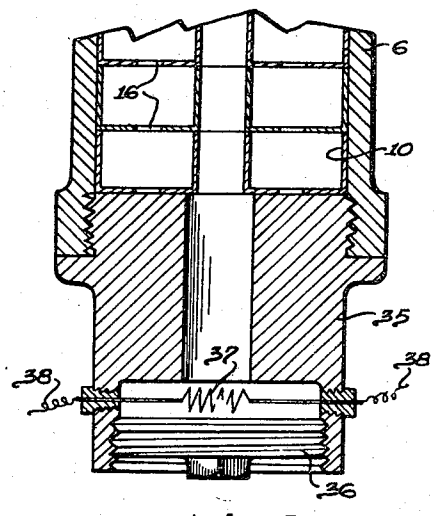


Fig. 5.

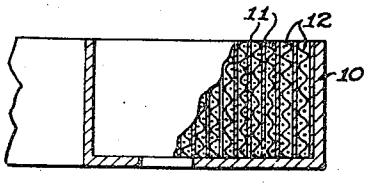


Fig. 3.

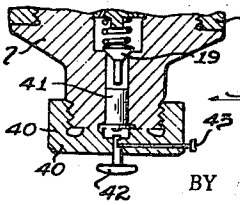


Fig. 6.

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EXPLOSIVE BOMB FOR USE AS AERIAL BOMB AND LAND MINE

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5 Claims. (Cl. 102—2)

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The invention relates to high-explosive bombs, and has for one of its objects the provision of a bomb of such construction that it will have greater explosive force than do bombs as heretofore constructed.

Another object is to provide a bomb wherein the explosive charge will flash or burn more quickly than in bombs of other forms.

Another object is to provide a bomb wherein oxygen may be compressed to such a degree that it will materially assist in rupture of the bomb casing upon ignition in a mixture of the oxygen and carbon, and which compression will facilitate the combustion of the carbon.

Another object is to provide a bomb of the character referred to that can readily be adapted for explosion under impact, or used as a depth bomb or as a land mine.

Still another object is to provide a bomb whose parts can be assembled and the bomb shipped safely, without danger of explosions, and thereafter rendered active and ready for use simply through the introduction therein of oxygen gas.

A further object of my invention is to provide an improved means for igniting an explosive charge in an oxygen-filled bomb.

Some of the forms which my invention may take are shown in the accompanying drawing wherein Figure 1 is a longitudinal sectional view of a bomb; Fig. 2 is a view taken on the line II—II of Fig. 1; Fig. 3 is an enlarged sectional view of one of the trays of Fig. 1, with combustible material contained therein; Fig. 4 shows a modification of the structure of Fig. 1, adapted for use as a depth bomb; Fig. 5 is another modification, showing a manner in which the bomb may be electrically exploded, and Fig. 6 shows the use of an explosive cartridge for producing an initial flash of the combustible material.

Referring first to Figs. 1 to 3, the bomb comprises a steel casing 6 that is heavy enough to withstand an interior pressure of perhaps 2000 lbs. per square inch and which will be disrupted upon ignition of the explosive charge contained therein. The bomb casing has a nose portion 7 in screw threaded engagement therewith, the nose 7 in turn being provided with a cap 8.

The base of the bomb is provided with a valve 9 through which air may be exhausted from the casing and oxygen under pressure introduced therein. A series of trays 10 are placed in superposed relation within the casing, these trays being of thin sheet metal or other material, for supporting coils 11 that are contained in the trays.

The coils or rolls contain the carbonaceous material which will combine with oxygen gas in the casing, for combustion and rupture of the bomb. The carbon is of any suitable form and volume which when combined with oxygen in the casing will form CO_2. The carbon may suitably be of charcoal or coke in a finely divided condition impregnated into and coated upon cheese cloth, a binder such as sugar being employed to retain the carbon particles or dust in place. Other substances such as finely ground aluminum and pulverized iron oxide or potassium nitrate may be incorporated with the carbon, to vary the volume and the time of explosion.

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Foraminous spacing elements 12, in the form of corrugated wire mesh of ribbon-like form are wound with the ribbon to space apart the ribbon turns and thereby permit free access of oxygen to all surfaces of ribbon 11, thereby providing for more instantaneous combustion of the carbon than would be the case then if the flame had to penetrate even a loosely piled volume of carbon dust.

A spacer ring 13 is provided at the base of the casing, to hold the trays in spaced relation thereto, so that the flame which is produced in the central passageway 14, through contact of the grease with the oxygen, will spread into the space 15 at the base of the bomb and thence downwardly through holes 16 and 17 in the bottoms and sides of the trays and through the spaces between the turns of the various coils 11.

The nose 7 of the bomb has a pocket 18 formed therein and communication between the chamber of the bomb case and this pocket is normally sealed or cut off by a check valve 19 that is normally held against its seat 21 by a spring 22 that seats against a perforated plug 23 in the upper portion of the nose. When the valve is raised from its seat, oxygen will flow to the pocket 18.

The valve has a stem 24 that extends into the pocket 18 and into a cup 25 that is slidable in the pocket. The cup contains petroleum grease 26 and seats against a plunger 27. The plunger 27 is pushed inwardly through contact thereof with the ground when the bomb falls. This inward movement forces the valve 19 from its seat, and spreads the grease while allowing the oxygen in the chamber 15 to flow down into contact with the grease. As soon as this oxygen under high pressure reaches the grease, it will produce a flash and the flame will spread quickly throughout the bomb casing and into the spaces between the ribbon turns to thereby produce an instantaneous combustion or flash that will explode the bomb casing.

The oxygen is placed under a high pressure so that it will not only cause ignition through contact with the grease, but will more quickly combine with the carbon. The pressure may suitably be from 100 lbs. per square inch to 2000 lbs. per square inch. At the higher pressure, the disruptive force of the oxygen itself will assist in substantially increasing the destructiveness of the bomb. It will be understood that the oxygen pressures may be much less than 1000 lbs., particularly when thinner walled bombs are used. A pressure of about only 100 lbs. to 150 lbs. per square inch will result in a flash upon contact of the oxygen with the grease.

For safety in handling and shipping, the oxygen need not be introduced into the bomb until it is about ready for use in the field. In that case, the parts as shown in the drawing can be assembled at the factory and the bombs safely handled until the oxygen under pressure has been introduced therein as above explained. Also, during shipment the cap 8 and the plunger 21 will be removed and an unperforated pipe cap substituted for the cap 8.

Referring now to Fig. 4, I show an arrangement wherein a nose 30 of somewhat different form is provided for the bomb casing 6. In this instance, the valve 19 is moved from its seat by a diaphragm or bellows 32 that is actuated by pressure such as water pressure, as when the bomb is to be used as a depth bomb. The movement of the valve from its seat will bring the oxygen and the petroleum grease in the cup 31 into contact for producing a flash, as in the case of the bomb of Fig. 1. The bellows 32 is welded or otherwise secured to a collar 33 that has screw threaded engagement with the nose 30. Adjustment of the collar will vary the depth at which the bellows will be expanded to a sufficient extent to move the valve 19 from its seat.

In Fig. 5, I show an arrangement wherein the oxygen in the casing 6 is electrically heated. In this instance, a nose 35 is provided for the bomb casing 6 and has a screw plug 36 to retain the oxygen in the nose and in the case and to provide a chamber for an electrical resistance coil 37 that will become heated and produce ignition upon supply of current through conductor wires 38 that will be energized and controlled from a suitable distance. The coil 37 can be of the type commonly employed in photographer's flash lamps which require only a low voltage for producing a flash. This bomb would be particularly suitable for use as a land mine or in blasting.

Referring now to Fig. 6, I show a cap 40 on the nose of the bomb, to retain a small explosive cartridge 41 in place, and which also carries a plunger 42 which, upon impact of the bomb will explode the cartridge, to lift the valve 19. The cartridge flash may in itself be sufficient to start combustion of the oxygen and the loose carbon, but petroleum grease also may be placed in the pocket below the valve. A pin 43 releasably holds the plunger 42, to prevent it falling out, and permit temporary removal of the plunger for safety.

I claim as my invention:

1. A bomb comprising a hollow body forming a charge-containing chamber, a charge of oxygen gas in the chamber, loosely arranged explosive particles in the chamber, that will be burned quickly upon ignition, and means for igniting the particles and the oxygen, the said particles being

contained on loosely coiled ribbons placed on axially-spaced perforated trays.

2. A bomb comprising a hollow body having a charge-containing chamber therein and a pocket that is normally sealed off from the said chamber by a sealing element, a compresed charge of oxygen gas in the chamber, loosely-arranged explosive particles in the chamber, that will be burned quickly upon ignition, igniting material in the pocket, and a diaphragm on the bomb, actuated by external pressure and having connection with the sealing element between the pocket and the chamber, whereby upon a predetermined change in fluid pressure exteriorly of the bomb, the diaphragm will be actuated to break the seal between the pocket and the chamber.

3. A bomb comprising a hollow body having a charge-containing chamber therein and a pocket that is normally sealed off from the said chamber by a movable element, a compressed charge of oxygen gas in the chamber, loosely-arranged explosive particles in the chamber, that are permeated by the oxygen and will be burned quickly upon ignition of the particles and the oxygen, petroleum grease in the pocket, and a percussion cartridge arranged to be exploded through impact of the bomb, for moving the said element to thereby establish communication between the pocket and the chamber.

4. A bomb comprising a hollow body having a charge-containing chamber, and a pocket therein, a tube extending centrally of the chamber and having lateral openings, loosely coiled ribbons surrounding the tube and consisting mainly of carbon particles, the said chamber and tube being filled with a compressed charge of oxygen gas, igniting material in the pocket, and means for establishing communication between the tube and the pocket and initiating burning of the carbon and the oxygen, the said material being in the form of petroleum grease and the said means comprising a plunger movable under impact.

5. A bomb comprising a hollow body having a charge-containing chamber therein and a pocket that is normally sealed off from the said chamber, a compressed charge of oxygen gas in the chamber, loosely-arranged explosive particles in the chamber, that are permeated by the oxygen and will be burned quickly upon ignition of the oxygen, petroleum grease in the pocket, and means for automatically establishing communication betwen the pocket and the chamber after release of the bomb.

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