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SAFETY DEVICE FOR AERIAL BOMBS

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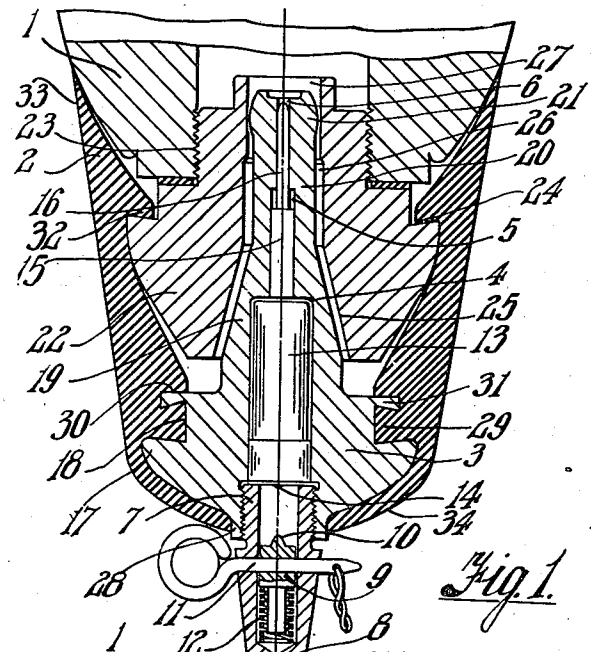


Fig. 1.

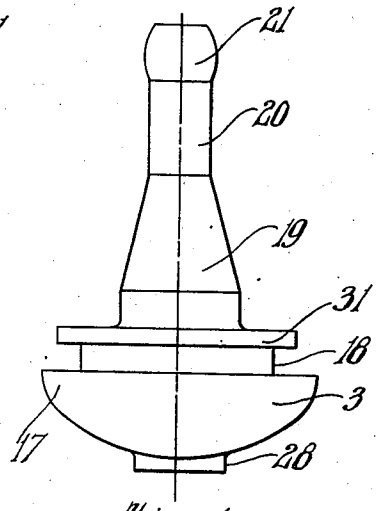


Fig. 4.

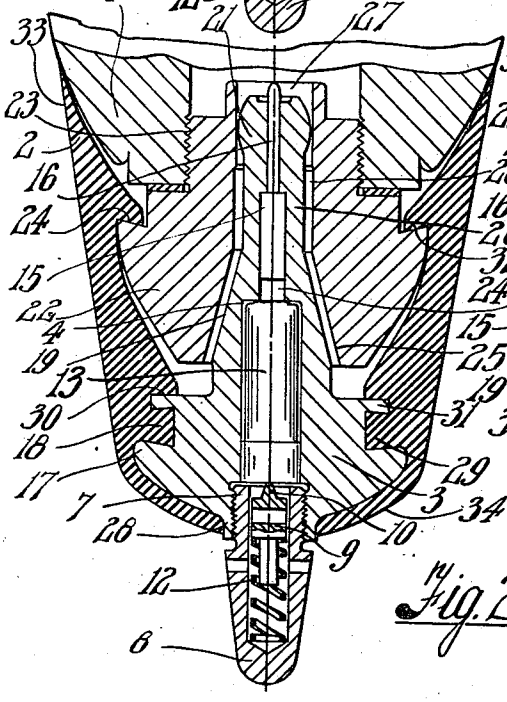


Fig. 2.

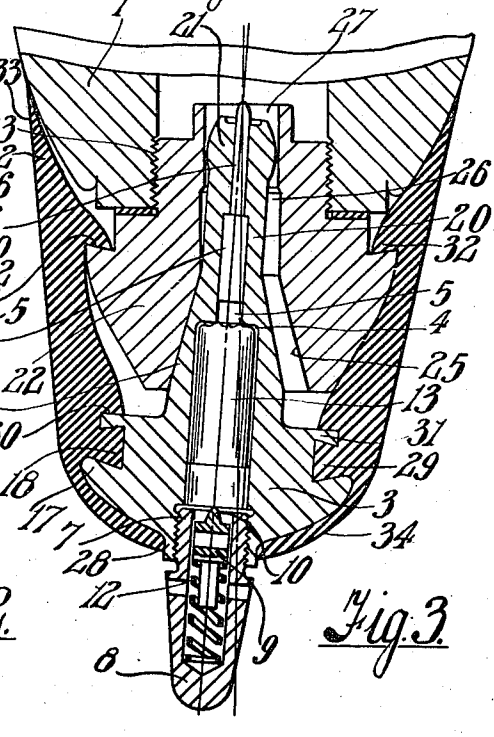


Fig. 3.

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SAFETY DEVICE FOR AERIAL BOMBS

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In Great Britain January 16, 1940

19 Claims. (Cl. 102—76)

This invention relates to aerial bombs and has for its object to provide an improved construction or arrangement embodying a safety device which is designed to prevent premature detonation both before and immediately after release, the said safety device forming part of detonating mechanism which is preferably mounted resiliently in such manner as to ensure detonation on impact with an objective almost irrespectively of the angle at which the bomb strikes such objective.

According to the invention the improved aerial bomb is characterised by the inclusion in the nose portion thereof of two detonating devices, the one being adapted to operate on release of the bomb to cause explosion of a propellant charge to position the striking means of the second detonating device in readiness to explode the main bursting charge on impact of the bomb with an objective.

In the preferred form of the invention the said detonating devices are mounted in a housing which is positioned as a unit in the nose portion of the bomb and held in position therein by an India rubber cap constructed to interlock with the said housing and with the bomb casing.

Reference will now be made to the accompanying drawing which illustrates by way of example a construction according to the invention and in which:

Fig. 1 is a sectional elevation of the nose portion of an aerial bomb with the parts in the safety positions,

Fig. 2 is a view similar to Fig. 1 showing the striker mechanism released,

Fig. 3 is a view similar to Fig. 2 showing another position of the striker mechanism, and

Fig. 4 is a detail view showing the movable housing for the striker mechanism.

Referring to the drawing, the bomb 1 which may be of any usual construction is fitted with a nose cap 2 of India rubber or of a readily deformable metal which engages a metal housing 3 whose axis normally coincides with the axis of the bomb. The interior of the housing 3 comprises three cylindrical passages 4, 5 and 6 formed in continuous alignment and the outer and largest passage 4 terminates at its outer end in a socket adapted to receive a screw threaded base 7 of a cap 8 which contains a plunger 9 having an inwardly directed striker pin 10 which is normally held retracted in the position shown in Fig. 1 by a safety pin 11 adapted to be withdrawn automatically or by hand on release of the bomb, the said safety pin holding the striker pin 10 in a position wherein its actuating spring 12 is compressed.

Within the passage 4 is disposed a cartridge 13 containing a time fuze and a propellant charge and having at its outer end a percussion cap 14 adapted to be detonated by the striker pin 10. The inner end of the passage 4 is normally closed by the cylindrical shank 15 of a striker pin 16 designed to cause explosion of the main bursting charge, the shank 15 and pin 16 being disposed in the inner passages 5 and 6. The shank and pin are made initially of slightly greater diameter than the passages 5 and 6 respectively into which they are forced by the use of relatively great mechanical pressure. This pin 16 constitutes a safety device as only the explosion of the propellant charge in the cartridge 13 can force it from the passage 6 into the position shown in Fig. 2 where the pin becomes potentially operative to detonate the bursting charge when the bomb strikes an objective.

The metal housing 3 is formed with a mushroom shaped head 17 below which is an annular groove 18 having an inwardly flared cross section. Below this groove, the diameter of the housing is substantially reduced and the inner portion includes a tapered section 19, a short cylindrical section 20 and a partially spherical end 21, (see Fig. 4). The inner portions 19—21 of the housing 3 all lie within a socket 22 screw threaded at 23 into the body of the bomb, the exterior of this socket being outwardly tapered from an annular shoulder 24. The interior of the socket 22 is shaped to conform substantially to the shape of the inner portion of the housing 3, the socket having a tapered passage 25 and a cylindrical passage 26 continuous therewith, both passages being of sufficient diameter, as shown in Figs. 1 and 2, to enable the housing 3 to occupy positions wherein its axis is inclined to the axis of the bomb. Movement to these positions is facilitated by forming the innermost portion 27 of the interior of the socket as a cylindrical passage adequately spaced from the rounded inner end 21 of the housing 3.

This india rubber cap 2 is stretched into position over the end of the bomb, a central aperture in its outer end fitting around a boss 28 on the outer end of the housing 3. The india rubber cap is held in place by forming its inner surface to interlock at a number of places with the housing 3 and socket 22. For this purpose the interior of the cap 2 is formed with an annular flange 29 shaped to fit the groove 18 and with a shoulder 30 which engages behind a shoulder

31 on the housing 3, the inclined surfaces thus engaged causing a positive mechanical interlock between the india rubber of the cap 2 and the metallic housing 3 which is intensified by the expansion of the india rubber after it has been forced into the interlocking engagement. The skirt portion of the india rubber cap is shaped to engage the outer surface of the socket 22 towards its part of greatest diameter and interlocking with this element is effected by forming the cap 2 with an internal annular shoulder 32 which engages behind the annular shoulder 24 on the socket, the rear surface of this shoulder being inclined relatively to the axis of the bomb. The extreme outer portion of the cup 2 is tapered to a sharp edge at 33 which rests upon the body 1 of the bomb.

The arrangement above described enables the whole of the striker mechanism to be assembled within the housing 3 which can then be inserted as a unit in the condition shown in Fig. 1 and in a state of complete safety. When the bomb is released and the safety pin 11 is withdrawn, the striker pin 10 under the action of the spring 12 immediately assumes the position shown in Fig. 2 the cap 14 being detonated and the fuze within the cartridge 13 ignited. This fuze is preferably designed to give a few seconds delay before the propellant charge is exploded so as to avoid accidents due to one bomb striking another immediately after discharge from an aircraft. The subsequent explosion of the propellant charge in the cartridge 13 forces the shank 15 inwardly of the passage 5 so that the striker pin 16 is projected into the position shown in Fig. 2 wherein it is potentially operative to detonate the bursting charge immediately upon impact with an objective.

As the housing 3 is elastically held by the india rubber cap 2 at its outer end and is freely mounted at its inner end, it follows that it can be projected inwardly to detonate the bursting charge when in a position wherein its axis is inclined to that of the bomb as well as when in the position of axial alignment shown in Figs. 1 and 2. Consequently, if the bomb strikes an objective by way of its shoulder 34 the housing 3 will be deflected from its normal position as shown in Fig. 3 but will still be impelled inwards to cause explosion of the bursting charge.

Whilst the employment of an india rubber cap is not absolutely essential for the operation of the invention, nevertheless the yieldable nature of the india rubber will ensure that at all angles of incidence of the bomb when it strikes the ground or other objective, the striker pin 16 when once projected by its propellant charge will cause bursting of the bomb. Furthermore, when employed as described herein, the arrangement eliminates the necessity of using a shear wire or pin and also greatly reduces ricochetting.

I claim:

1. An aerial bomb including a housing carried in the nose portion of the bomb, a detonating device mounted in said housing and having means for releasing it for operation on release of the bomb, a propellant charge contained in said housing in a position to be exploded by said detonating device, a second detonating device mounted in said housing and having striking means in communication with the propellant charge and movable by the explosion of said propellant charge into a position in said housing in readiness to explode a main bursting charge in the bomb, and means supporting said housing which permit angular displacement thereof relatively to the axis of the bomb and thereby position said second detonating device for actuation to explode the bomb irrespective of its angle of incidence, within limits, upon impact with its objective.

2. An aerial bomb including a casing, a housing carried in the nose portion of the bomb casing, a detonating device mounted in said housing and having means for releasing it for operation on release of the bomb, a propellant charge contained in said housing and having means for exploding it by said detonating device, a second detonating device in said housing and having striking means disposed to be positioned by the explosion of said propellant charge in readiness to explode a main bursting charge in the bomb, and means for positioning said housing and detonating devices as a unit in spaced relationship to said casing, comprising a cap of resilient material disposed in interlocking engagement with said housing and with said bomb casing.

3. In an aerial bomb having a casing, a mechanically operated detonating device, a safety device for restraining said detonating device and operable to release said detonating device for operation, a propellant charge adapted to be ignited by said detonating device, a second detonating device having a member adapted to be projected into an operative position by said propellant charge, a housing carrying both of said detonating devices and containing said propellant charge between said detonating devices, a cap of resilient material substantially enclosing the nose portion of said bomb casing, an outer head portion on said housing, said head portion and cap having means for interlocking them, and a shank portion on said housing normally held in spaced relationship to said bomb casing by said cap.

4. In an aerial bomb, a bomb body having a nose, a housing mounted for universal movement within the nose of the bomb, a cap of resilient material surrounding the nose of said bomb, means carried by said housing to interlock with said cap, the latter yieldingly holding said housing in predetermined position with respect to said nose, a detonating device mounted in the outer end of said housing, a propellant charge disposed within said housing and adapted to be ignited by said detonating device and a second detonating device also disposed within said housing and having a member adapted to be operatively positioned by the explosion of said propellant charge.

5. An aerial bomb according to claim 4, wherein the first mentioned detonating device operates under spring action immediately upon release of the bomb to ignite a fuze which explodes the said propellant charge.

6. An aerial bomb according to claim 4, including a central boss on the housing projecting through a central aperture in said cap, a number of annular internal ribs formed on the interior of said cap and a number of recessed portions formed on the head of said housing and engaged by said ribs.

7. In an aerial bomb having a nose, a housing freely mounted in the nose of the bomb, a cap of resilient material surrounding the nose of said bomb, said housing having a head formed with means interlocking with said cap, a shank portion on said housing and normally held in spaced relationship to fixed parts within the bomb casing by said cap, a detonating device mounted in the outer end of said housing, a propellant charge disposed within said housing, and a second det-

onating device disposed within the shank portion of said housing.

8. An aerial bomb according to claim 7, wherein the shank portion of said housing comprises tapered and cylindrical sections normally uniformly spaced from correspondingly shaped surrounding surfaces forming fixed parts of the bomb.

9. An aerial bomb including a casing having a nose, a housing movably mounted in the nose of said casing, a cap of resilient material surrounding and engaged with the nose of said casing, a head on said housing having a central boss projecting through a central aperture in said cap, a number of annular internal ribs having inclined surfaces formed within said cap, a number of recessed portions formed on the head of said housing and engaged by said ribs, a shank on said housing comprising tapered and cylindrical portions normally spaced from correspondingly shaped walls in the casing, a spring operated detonating device mounted within the boss on the housing, a propellant charge disposed within the head of said housing and a second detonating device disposed within the shank portion of said housing.

10. An aerial bomb according to claim 9, wherein the said second detonating device comprises a pin forced into a socket under sufficient mechanical pressure to render it incapable of being projected into operative position to detonate the bursting charge except by the operation of the said propellant charge.

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