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(54) **Bomb arming delay arrangement.**

(57) An arrangement (2) for the delayed arming of a bomb comprises: a body (4) having in flow series a plurality of passages (6, 9, 12) and chambers (8, 10, 18), the first passage (6) in the series being arranged to receive a pneumatic arm signal, and the passages and the chambers being so dimensioned as to delay for a predetermined time the production in the last chamber (18) of the pneumatic arm signal received at the first passage; and arming means (16, 22-32) responsive to the pneumatic arm signal produced in the last chamber for arming the bomb.

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TITLE

BOMB ARMING DELAY ARRANGEMENT

FIELD OF INVENTION

This invention relates to arrangements for the delayed arming of bombs.

BACKGROUND OF INVENTION

Typically, in airborne bomb delivery a bomb is equipped with an impact fuze and in order to allow a safe separation between the bomb and the aircraft from which it is delivered, the bomb is equipped with a "hold-off" delay timer which delays the arming of the bomb fuze for a predetermined time after the bomb leaves the aircraft.

Conventionally, timing of the hold-off delay is performed by electronic or mechanical means. Electronic timers suffer from the disadvantage that they require an additional power source to operate and mechanical timers (e.g. clockwork mechanisms), although requiring no additional power source, are a compromise between cheapness and reliability.

It is an object of the present invention to provide an arrangement for the delayed arming of a bomb in which the above-mentioned disadvantages may be overcome, or at least alleviated.

BRIEF SUMMARY OF INVENTION

In accordance with the invention an arrangement for the delayed arming of a bomb comprises: a body having in

flow series a first passage for receiving a pneumatic arm signal, and at least one chamber, the first passage and the chamber being so dimensioned as to delay for a predetermined time the production in the chamber of the pneumatic arm signal received at the first passage; and arming means responsive to the pneumatic arm signal in the chamber for arming the bomb.

BRIEF DESCRIPTION OF DRAWINGS

One bomb arming delay arrangement in accordance with the invention will now be described, by way of example only, with reference to the accompanying drawing which shows a cross-sectional view of the arrangement.

DETAILED DESCRIPTION OF EXAMPLE OF INVENTION

Referring to the drawing, the arrangement 2 includes a body 4. The body defines within it, in flow series, a first passage 6, a first chamber 8, a second passage 9, a second chamber 10 and a third passage 12. The passage 12 is connected to a third chamber 14 defined within the body 4. The chamber 14 is divided by a movable diaphragm 16 into a first portion 18 which communicates with the third passage 12 and a second portion 20.

The diaphragm 16 has fixed thereto a piston 22 which extends out of the chamber 14. The end of the piston 22 remote from the chamber 14 acts on one end of a lever 24 which is biased towards the piston 22 by a compression spring 26. The lever is attached at its middle to a pivot 28. The end of the lever 24 remote from the piston 22 is provided with a formation 30 in which an actuating member 32 locates.

In use the body 4 is housed within a bomb and the first passage 6 is connected to a forward facing pitot tube 34 in an exterior wall 36 of the bomb, and the second portion 20 of the chamber 14 is connected to the exterior of the bomb via a fourth passage 38.

When the bomb is launched the second portion 20 of the chamber 14 assumes the ambient static pressure outside of the bomb, and the total pressure (i.e. static and dynamic) sensed by the pitot tube 34 is applied to the first passage 6. The increased total pressure, due to the bomb's passage through the air, acts as a pneumatic signal that the bomb should be armed. However, a "hold-off" time between the arm signal being applied to the passage 6 and the bomb actually becoming armed is provided in the following way.

When the arm signal (increased pressure) is applied to the passage 6, the full pressure is not instantaneously applied to one side of the diaphragm 16 but takes a time to rise to its full value as the first chamber 8, the second chamber 10 and the first portion 18 of the third chamber 14 become fully pressurised. It will be appreciated that the hold-off time provided by this "filling up" is determined by the volumes of the chambers and the cross-sectional areas of the connecting passages.

When the pressure in the first portion 18 of the chamber 14 rises above the static pressure in the second portion 20 of the chamber by an amount sufficient to overcome the force of the spring 26, the diaphragm 16 moves to the right as shown in the drawing. The piston 22 then acts on the lever 24 to cause it to pivot and move the actuating member 32 from a first position (shown in dotted line in the drawing) in which the bomb is unarmed, to a second position (shown in full line in the drawing)

in which the bomb is armed.

It will be appreciated that the hold-off time may be set to any desired value by dimensioning the volumes of the chambers 8 and 10 and the first portion 18 of the chamber 14 and the cross-sectional areas of the connecting passages accordingly. It will also be appreciated that if desired more or fewer chambers and connecting passages of appropriate dimensions may be used to achieve a required hold-off delay.

It will be further appreciated that since the second portion 20 of the chamber 14 assumes the ambient static pressure outside of the bomb the moving force on the diaphragm 16 is determined only by the dynamic pressure created by the bomb's motion and so is independent of the ambient static pressure outside of the bomb. Therefore the hold-off time is not affected by the altitude at which the bomb is released.

It will also be appreciated that the arrangement described above requires no additional power source, since the energy required for providing the hold-off delay and the energy required for arming the bomb are both derived from the bomb's motion.

CLAIMS

1. An arrangement (2) for the delayed arming of a bomb, characterized by

a body (4) having in flow series

a first passage (6) for receiving a pneumatic arm signal, and

at least one chamber (8, 10, 18), the first passage and the chamber being so dimensioned as to delay for a predetermined time the production in the chamber of the pneumatic arm signal received at the first passage; and

arming means (16, 22-32) responsive to the pneumatic arm signal in the chamber (18) for arming the bomb.

2. An arrangement according to claim 1 wherein the body has a plurality of interconnected chambers (8, 10, 18).

3. An arrangement according to claim 1 or 2 wherein the arming means (16, 22-32) is pneumatically operated.

4. An arrangement according to claim 3 wherein the arming means comprises a diaphragm (16) arranged to be moved by the arm signal and an arming member (32) arranged to be moved in response to movement of the diaphragm to arm the bomb.

5. An arrangement according to claim 4 for use where the arm signal is the total pressure experienced by the bomb and wherein one side of the diaphragm is exposed to the chamber (18) and the other side (20) of the diaphragm is arranged to be exposed to the static pressure experienced by the bomb.

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