

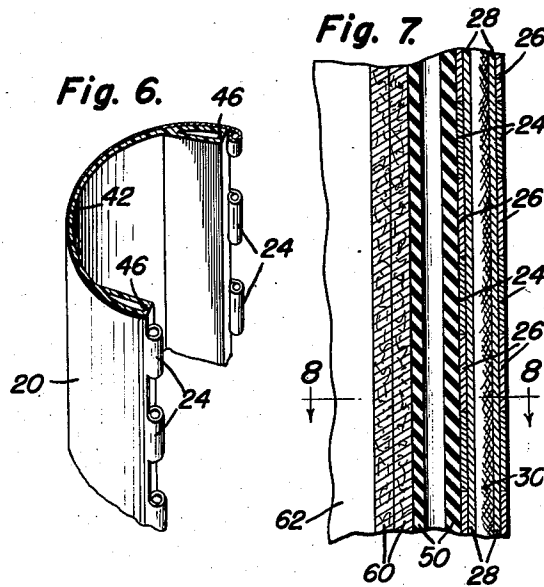
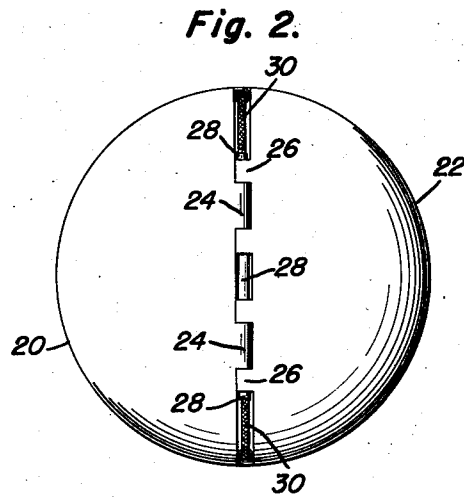
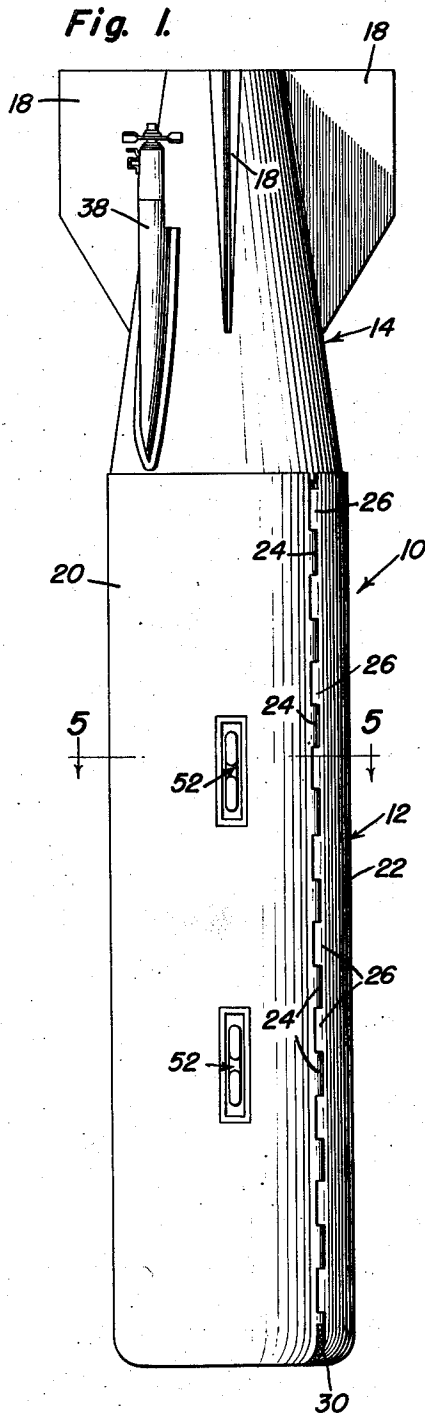
Oct. 15, 1957

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CLUSTER BOMB

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3 Sheets-Sheet 1



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Fig. 3.

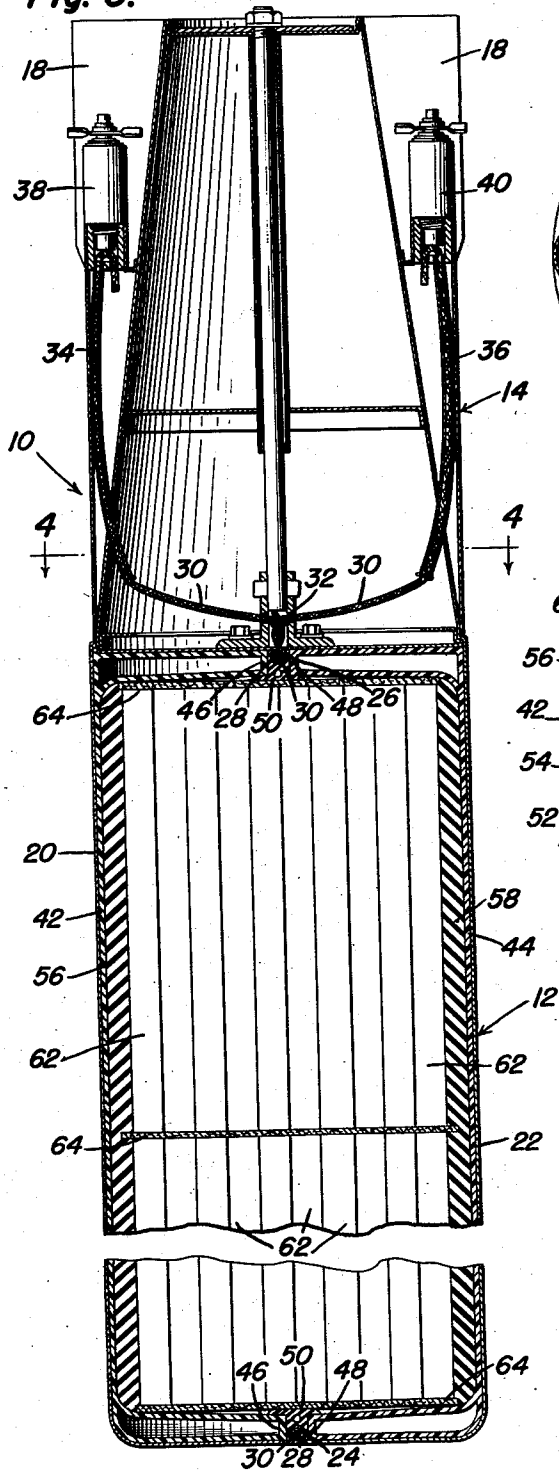


Fig. 4.

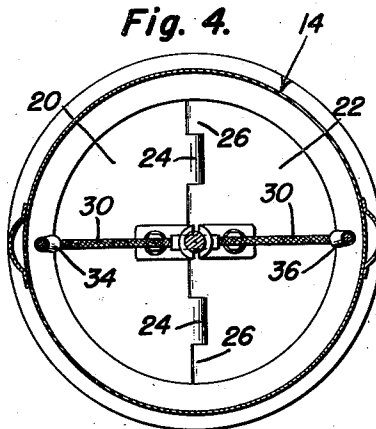


Fig. 5.

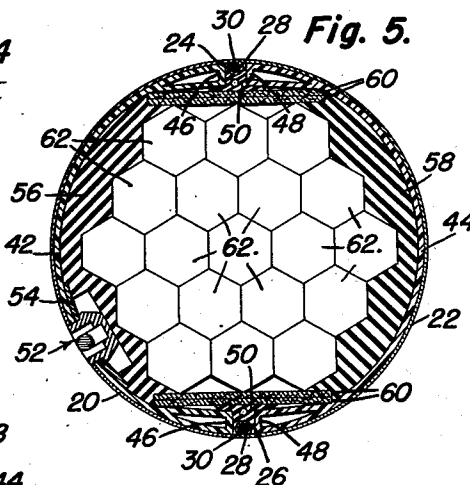
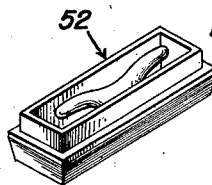


Fig. 9.



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Fig. 10.

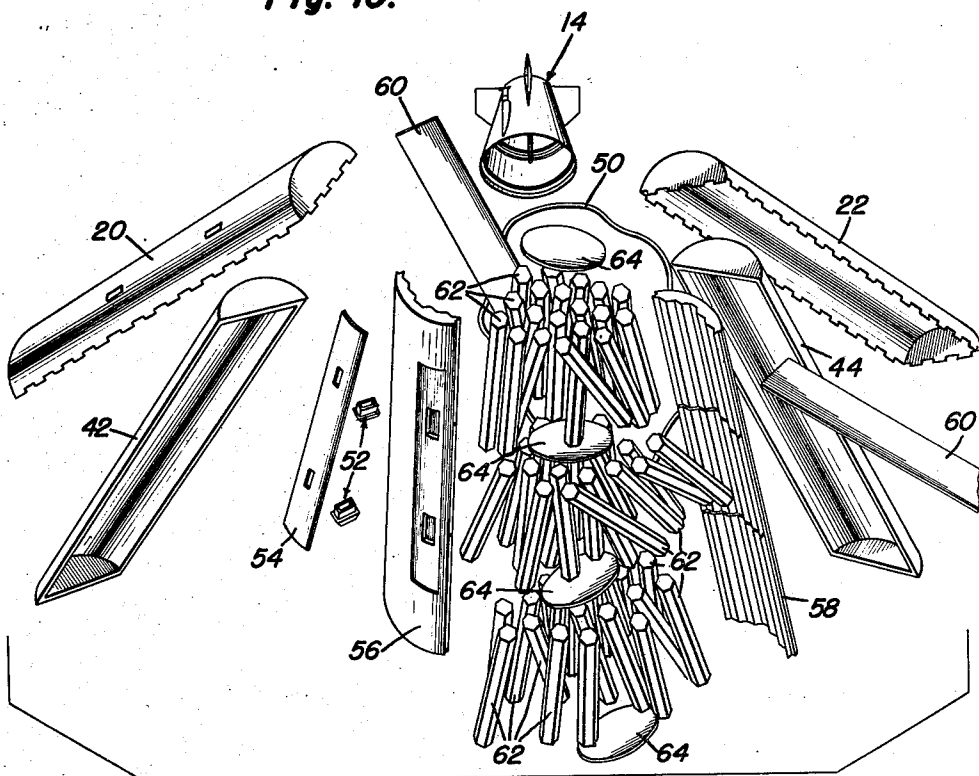
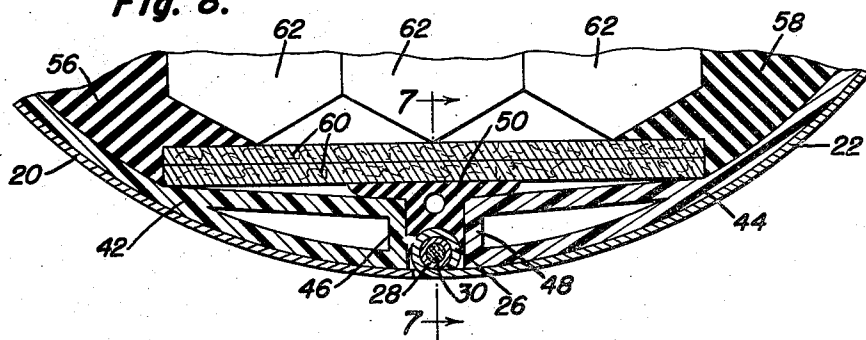


Fig. 8.



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CLUSTER BOMB

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6 Claims. (Cl. 102—7.2)

(Granted under Title 35, U. S. Code (1952), sec. 266)

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

This invention relates to bombs of the type wherein a plurality of small bombs are assembled into a single unit which is adapted to be carried and dropped from aircraft as a single unit, and which upon being detonated in mid air is broken into a plurality of small bombs which are dispersed over a wide area.

It is an object of this invention to provide an airborne-type cluster bomb casing which is adapted to receive child bombs of different shapes and size without requiring any appreciable adaptation of the bomb casing. It is the purpose of this object to eliminate an unfavorable condition which has existed in this art heretofore. In the past, it has been the practice to design the bomb casing around a cluster of child bombs of a particular shape and size. This practice necessitated the design, fabrication and stock piling of bomb casings of various sizes and shapes to accommodate the variously shaped clusters of child bombs.

It is another object of this invention to provide a casing for airborne-type cluster bombs wherein rupture of the casing and dispersal of the child bombs is efficiently and effectively achieved.

It is a specific object of this invention to provide an airborne-type cluster bomb which includes a multi-purpose casing into which child bombs of various shapes and sizes can be clustered, and wherein the casing is particularly adapted to be ruptured with ease and the contents thereof dispersed over a wide area.

These and other objects of the invention will become apparent from the following description and claims, and from the accompanying drawings wherein:

Fig. 1 is a side elevation view of the bomb.

Fig. 2 is an end elevation view of the bomb taken from the nose end.

Fig. 3 is a longitudinal, sectional view of the bomb.

Fig. 4 is a sectional view taken on line 4—4 of Fig. 3.

Fig. 5 is a sectional view taken on line 5—5 of Fig. 1.

Fig. 6 is a perspective view of one half of the bomb casing with portions broken away.

Fig. 7 is a sectional view taken on line 7—7 of Fig. 8.

Fig. 8 is a sectional view taken on line 8—8 of Fig. 7.

Fig. 9 is a perspective view of one of the clamps.

Fig. 10 is a perspective view of the bomb showing the parts thereof in position a moment after the bomb has been detonated.

Referring to Fig. 1, the bomb is designated generally by reference numeral 10 and comprises body portion 12 and tail portion 14. This invention is primarily concerned with body portion 12 which constitutes a casing for a cluster of child bombs, and which therefore will be described in great detail. The tail portion 14 includes conventional fuzes 38 and 40, and conventional tail fins 18.

The body portion 12 generally comprises a cylindrical, outer jacket, a cylindrical housing and a somewhat cylindrical cluster adapter. The outer jacket comprises

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two semi-cylindrical metal containers 20 and 22 that are closed at both of their ends (see Fig. 10). The contacting edges of containers 20 and 22 have complementary, piano-type hinges 24 and 26 respectively formed thereon. In the plane in which the containers contact each other, each contacting edge is generally rectangular, therefore a substantially continuous, rectangular hinge is formed. A hinge pin burster tube 28 is inserted into each side of the rectangular passageway in the rectangular hinge formed by aligned hinges 24 and 26. Conventional explosive detonating cord 30 is inserted through the hinge pin burster tubes 28, and extends completely around the body of the jacket, continuously along both sides and ends thereof. The two ends of detonating cord 30 are joined at the rear of body portion 12 (see Fig. 3) in the area where tail portion 14 meets said body portion, and are tied in a girth hitch knot 32 at this point. Portions of ends 30 extend rearwardly beyond the hitch knot 32. One of said portions passes through fuze adapter 34 to fuze 38, to which it is operatively attached and the other portion passes through fuze adapter 36 and is operatively attached to fuze 40.

The cylindrical jacket formed by containers 20 and 22 surrounds a cylindrical housing which comprises two semi-cylindrical parts 42 and 44 that are composed of a plastic material or its equivalent. The edge of each of these parts has a rectangular, flat ledge formed thereon (see Fig. 10). When the two parts 42 and 44 of the housing are in assembled position, the flat ledge 46 of part 42 and the flat ledge 48 of part 44 oppose and are spaced from each other (see Figs. 3, 5 and 8). The space between the ledges houses a specially designed gasket 50 and the inwardly extending hinge formed by the cooperating hinges of the containers that constitute the outer jacket. One part of the housing cooperates with a plurality of clamps 52 which are adapted to be utilized as a gripping means for moving the bomb prior to and during the act of its being deposited in the aircraft (see Figs. 1 and 5). A mounting plate 54 is associated with each clamp 52 and aids the clamps in performing their function by increasing the contact that they have with the interior of their associated housing part.

The housing surrounds the cluster adapter which comprises two elongated cluster adapter pads 56 and 58 (see Fig. 10). Pads 56 and 58 are made of a resilient material such as expanded polystyrene or its equivalent, and have substantially semi-circular outer surfaces and irregular inner surfaces. A plurality of shims 60 are positioned between adjacent, elongated sides of said adapter pads. The shims are elongated, rectangular, fiber boards that extend the length of the body portion 12 between the elongated pads. As can be clearly seen in Fig. 5, the cluster of child bombs 62 is snugly received within the resilient cluster adapter pads 56 and 58 and the shims 60. As can be seen in Figs. 3 and 10, the length of each child bomb 62 is a trifle less than one third the length of the body portion 12. To maintain the child bombs 62 snugly and prevent axial movement thereof, fiber board discs 64 are inserted on each side of each cluster of child bombs and act as shims.

The above-described bomb structure is assembled in the following manner: one of the jacket halves (container 20 or 22) is placed in a suitable holder with its open side facing up. One of the housing parts (42 or 44) is placed within said jacket half (see Fig. 6). One of the cluster adapter pads (56 or 58) is placed in the housing part. The gasket 50 is placed in position along the rectangular ledge of the housing part, and shims 60 are placed contiguous therewith on each side of the housing part, in the notch formed by the housing part and the cluster adapter pad, and extend perpendicularly above said assembly. Spacing discs 64 are placed at both ends

of the housing part, and extend perpendicularly above said assembly and transverse to shims 60. The child bombs 62 are then placed in this vessel-like assembly individually until they form clusters. Additional spacers 64 are then inserted between the ends of the bomb clusters, thereby shimming them and preventing lengthwise movement thereof. The top half of the bomb portion, which comprises the other jacket half, the other housing part and the other cluster adapter pad, is lowered into position and gently forced against the lower assembly, thereby compressing the resilient cluster adapter pads 56 and 58 and the gasket 50 until the jacket hinges 24 and 26 interlock and the openings therein are in alignment. At this point, a hinge pin burster tube 28 is inserted into each side of the rectangular passageway formed by the interlocking, aligned hinges. The detonating cord 30 is then inserted into the hinge pin, burster tubes, and extended from the middle of the rear of the body portion 12 continuously through the burster tubes on all sides of the body portion and back to the starting point where the ends of the detonating cord are tied in a girth hitch knot and extended into their respective fuze adapters and connected to their respective fuzes. To permit the detonating cord 30 to be tied at the middle of the rear of body portion 12, the hinge pin burster tube in the rearward leg of the passageway may be made of two parts. The tail portion 14 is then secured to the body portion 12 in any conventional manner (as by a friction joint or its equivalent). When desirable, for example after long exposure to the weather, the detonating cord 30 can be readily withdrawn and replaced.

The airborne cluster bomb just described operates in the following manner: it is loaded onto the aircraft by any conventional method, the previously mentioned clamps 52 being provided for this purpose. Upon being dropped from the aircraft, detonation of the bomb is controlled by the fuzes 38 and 40 which may be of any conventional type, such as an electrical or mechanical time fuze. Upon detonation of either of the fuzes 38 and 40, the detonating cord 30 explodes. The force of the explosion disintegrates the burster tube hinge pins 28 and exerts a sufficient amount of force upon the opposing ledges 46 and 48 of the housing parts 42 and 44 respectively to force said housing parts and their associated jacket halves apart and away from the child bomb clusters. The action which takes place upon detonation or momentarily thereafter is illustrated in Fig. 10 where it can be clearly seen that the portions of the bomb, which can nominally be designated as the casing, are blown or fall away from the child bomb clusters, thereby permitting said child bombs to disperse over a wide area.

Having described the structure and operation of our invention, it is now desired to point out the salient features of our invention. It is felt that there are two features of our invention which constitute distinct advances over the prior art. The first is the feature of utilizing resilient, generally preshaped, cluster adapter pads. By the use of different pads of different interior configuration the same outer jacket and cylindrical housing may be used for a large variety of different shaped and sized child bombs, which with their associated structure constitute a multi-purpose, cluster bomb casing. Because of their resilience the same pads can be used with different bombs of somewhat different shape. Moreover, the compression of the pads aids in producing a weather-tight seal. Secondly, the feature of our novel, two-part bomb casing and the means for separating the casing parts and dispersing the contents thereof.

Having described our invention in great detail, it is to be understood that it is not thereby intended to limit the invention to the precise structure shown, but it is intended to include all equivalent structure that falls within the spirit of the invention and the scope of the appended claims.

We claim:

1. A cluster bomb comprising a two part separable casing, each part comprising a semi-cylindrical jacket half, means connecting the edges of said jacket halves throughout their length to form a joint, a resilient pad in each said half formed of a substantially solid mass of compressible material having a substantially cylindrical outer surface, each said pad having an arc of less than 180°, a substantially flat shim on each side of said casing extending across said joint, a gasket compressed between each of said shims and said joint, the ends of said shims being positioned between said pads and said jacket halves; at least one cluster of bombs within said casing; said pads having inner surfaces shaped to substantially conform to said cluster, and being so proportioned as to be compressed by said casing, a tail portion adapted to cause said bomb to fall with the axis of said casing substantially vertical; said means including means for breaking said joint and separating said jacket halves a predetermined time after said bomb has been dropped.

2. A cluster bomb comprising a casing formed of at least two parts having interfitting edge portions, each edge portion having spaced aperture members, distributed along substantially its entire length, said aperture members of both parts being aligned, a hollow cylindrical burstable hinge pin passing through said aligned apertures, an explosive cord within said hinge pin extending along substantially the entire length of said interfitting edge portion; a bomb cluster within said casing; and means for exploding said cord a predetermined time after said bomb has been dropped.

3. A cluster bomb comprising a substantially cylindrical casing comprising a plurality of arcuate parts having serrated interfitting longitudinal edge portions, said edge portions comprising a continuous series of aligned longitudinally disposed aperture members, a hollow cylindrical burstable hinge pin extending through said aperture members along substantially the entire length of said casing, a detonating cord within said hinge pin and extending along substantially the entire length of said casing, a bomb cluster within said casing and means for exploding said cord a predetermined time after said bomb has been dropped.

4. A cluster bomb as defined in claim 3 wherein said serrations are substantially rectangular and wherein each of said aperture members comprises the edge portion of one of said serrations bent to a substantially cylindrical form.

5. A cluster bomb as defined in claim 1 wherein said jacket halves have serrated interfitting longitudinal edge portions, said edge portions comprising a continuous series of aligned aperture members, a tubular burstable hinge pin passing through said aligned aperture members along substantially the entire length of the casing, and a detonator cord within said hinge pin and extending along substantially the entire length of said casing.

6. A cluster bomb comprising a completely closed substantially cylindrical casing comprising a plurality of arcuate parts having serrated interfitting longitudinal and end edge portions, said edge portions forming at least one continuous joint extending longitudinally about said casing, said edge portions comprising a continuous series of aligned aperture members, burstable tubular hinge pins extending through said aperture members substantially the entire length of said casing and across each end thereof, a continuous detonating cord within said tubular hinge pins and substantially encircling said casing in a longitudinal direction, and fuse means connected to each end of said detonating cord.

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