Feb. 28, 1967

B. KARIN ET AL

3,306,199

MUNITIONS FOR TARGETS

Filed Oct. 5, 1964

4 Sheets-Sheet 1

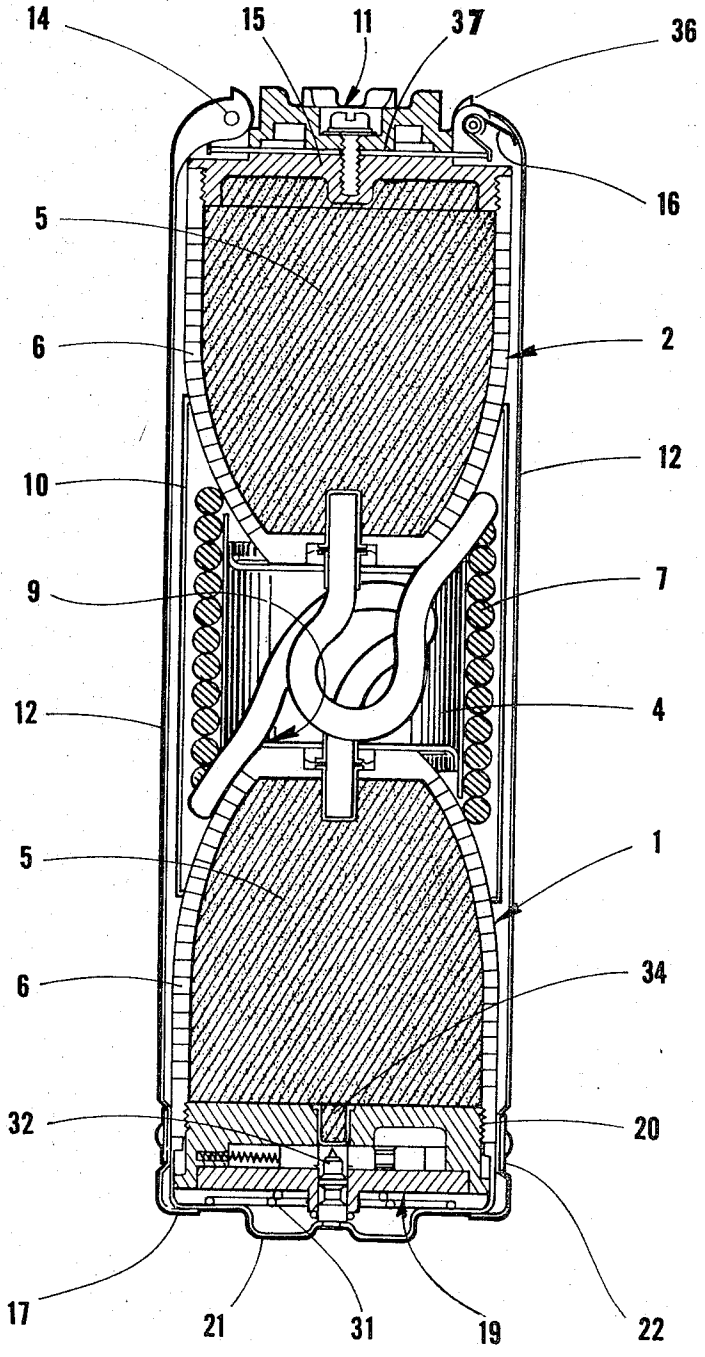


Fig. 1.

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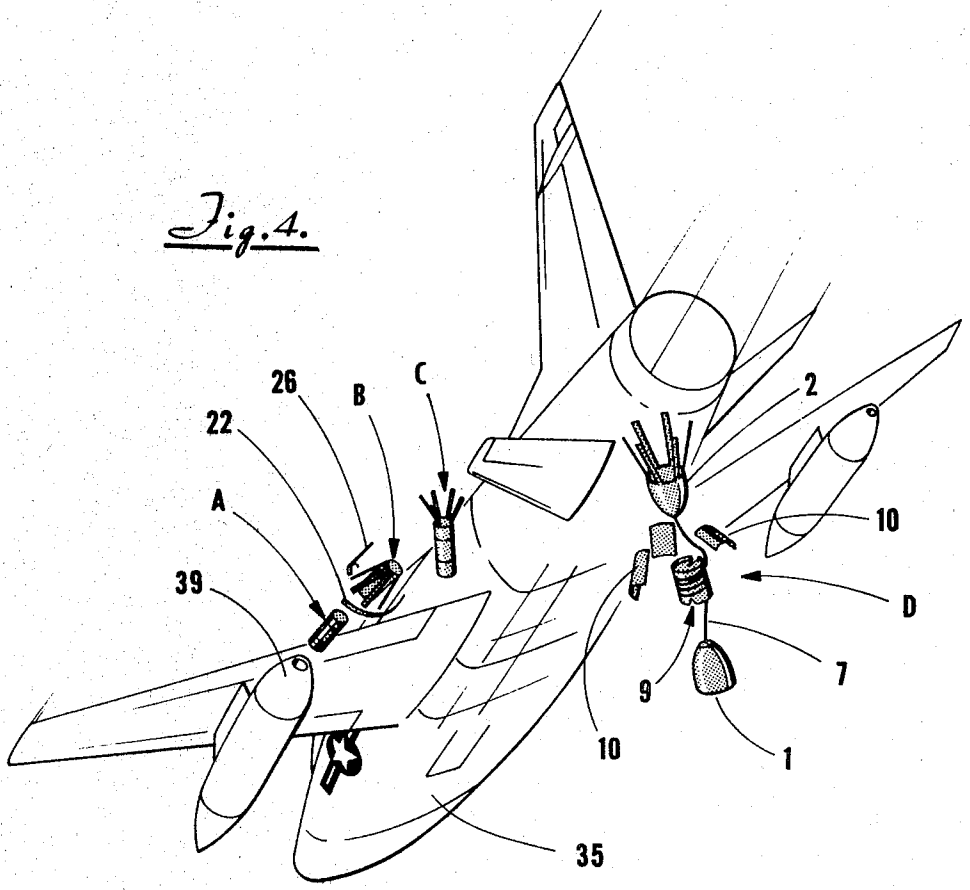
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Fig. 4.



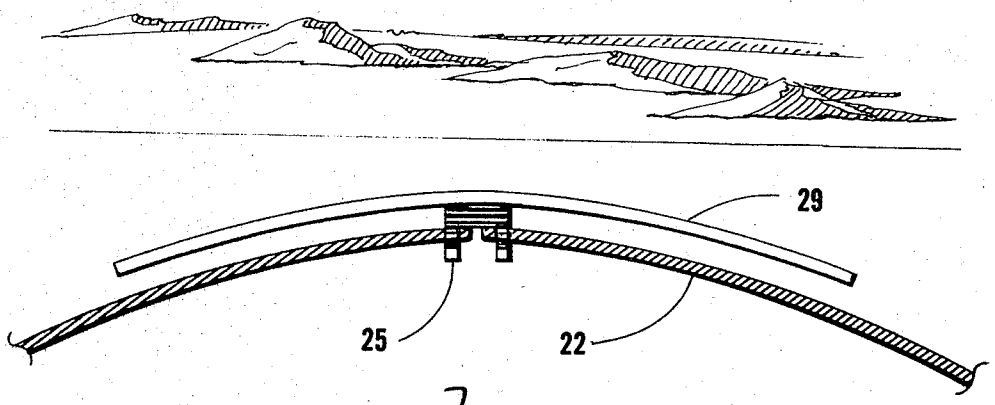


Fig. 2.

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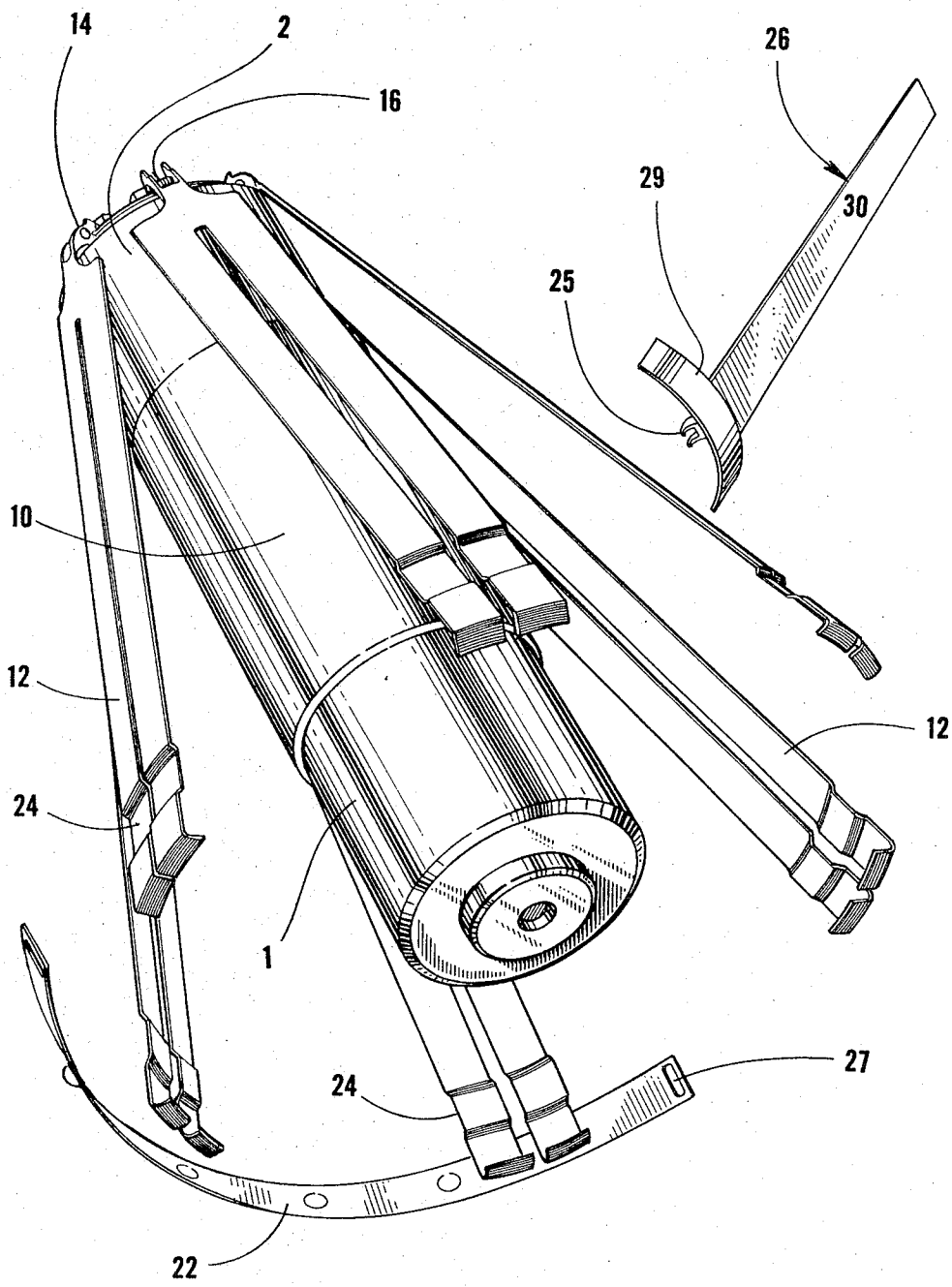


Fig. 3.

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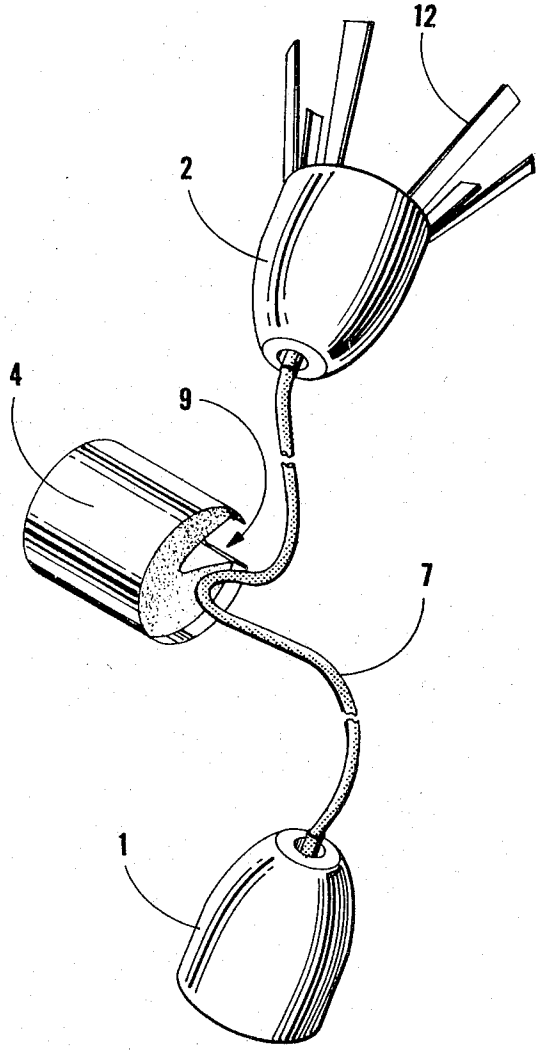


Fig. 5.

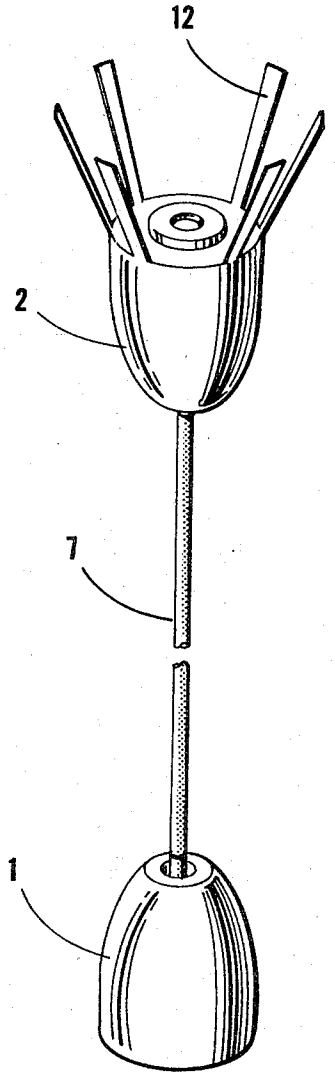


Fig. 6.

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3,306,199

MUNITIONS FOR TARGETS

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2 Claims. (Cl. 102—7.4)

The present invention relates to airborne stores, and more particularly, to an assembly of munition components adapted to deploy from a compact package.

It is an object of this invention to provide a system which may be fired, released, or otherwise delivered into a target area at a desired altitude, and which upon landing will comprise a contact-burst part and an air-burst part separated by a predetermined distance, both parts being exploded simultaneously.

Referring to the accompanying drawings, shown by way of illustration and not limitation,

FIGURE 1 is a longitudinal section view of one embodiment of our invention, showing it in assembled form.

FIGURE 2 is a right-hand end view of a portion of the outside of the assembly of FIGURE 1, showing a detail of a releasable tab.

FIGURE 3 is a perspective view of the assembly in free fall, showing the first events in the deployment thereof.

FIGURE 4 is a perspective diagram showing this embodiment in four progressive positions A, B, C, and D after being released from an airplane.

FIGURE 5 is a perspective diagram of the same embodiment as FIGURE 4, in continued deployment, showing the next stage thereof.

FIGURE 6 is a perspective diagram like FIGURE 5, showing the last stage of deployment.

Referring first to FIGURE 1 for a detailed description of one application of the present invention, a forward body **1** and an aft body **2** are provided in line with each other, but spaced apart by a cylindrical drum **4**. Each body **1** and **2** is composed of an explosive charge **5** of the desired composition at the center and a fragmenting case **6** in this example. Alternately, chemical agents could be used as the payload in either or both bodies. Between the facing ends of bodies **1** and **2**, a flexible detonating cord **7** is attached, the cord ends being operatively embedded into the charges of the respective bodies.

The detonating cord **7** has a length of about ten feet, for example, although it may be more or less. The excess cord **7** is wound around the outside of the spacer drum **4**, utilizing a wedge-shaped space **9** (further shown in FIGURES 4 and 5) in each recessed end of drum **4** to accommodate a short looped portion of cord **7** near each end thereof. If desired, the rigid drum **4** may be omitted, and the cord **7** merely coiled between the two bodies **1** and **2** in other arrangements.

A housing **10** next encompasses the wound portion of detonating cord **7** and fits against the sloping end surfaces of bodies **1** and **2**. Housing **10** is in three longitudinal segments which merely butt against each other at their sides. Four segments may be used if desired.

At the aft end of aft body **2**, a drag device **11** is installed, comprising six (for example) stabilizing vanes **12** hinged at **14** to an end plate **15** and spring-loaded in an opening direction by torsional springs **16** at the hinges. Vanes **12**, when in the closed position, lie forward along the outside of the entire assembly, and are provided with radially inward-projecting lips **17** at their forward ends.

At the forward end of forward body **1**, a contact fuze assembly **19** is provided, screwing into the forward body **1** at screw threads **20**. Arming of this fuze may be accomplished in various ways. Typically a spring-loaded outer cap **21** is held in its compressed position by the lips **17** on vanes **12**, the latter being in turn held against the

forward body **1** by a circular band **22** fitting into shallow notches **24** of each vane **12**. As further shown in FIGURES 2 and 3, the band **22** is a single piece of springy metal having the ends brought adjacent to each other in the closed band position, it being normally held closed by curved prongs **25** of a wind tab **26** fitting into slots **27** near the respective ends of the band **22**.

Wind tab **26** has a short curved end piece **29** overlying the joint of the band **22**, and a long lever arm **30** folding aft along the assembly in a flush or nearly flush relation with the outside thereof and extending substantially to the aft end.

Inside the fuze assembly **19**, a coil spring **31**, firing pin **32**, detonator relay **34**, and the like, forming a standard fuze assembly, complete the major portions of this invention. A contact fuze could also operate if located at the rear end of forward body **1**.

The present application illustrates this invention used in a bomb, for instance. As shown in FIGURE 4, an airplane **35** may drop or eject the assembly described herein. Initially, the unit is merely held in a rack or pod **39** with a slight force applied on the wind tab **26** to hold it in place along the surface. In position A, the assembly has just left the airplane and is in the condition shown in FIGURE 1, ready to deploy. In position B, the wind has caught under the arm **30** of wind tab **26** and lifted the same to rotate its prongs **25** out of the slots **27** in band **22**, which has then sprung out to release the vanes **12**. This is also similar to the position of parts shown in FIGURE 3. Tab **26** and band **22** separate away from the bomb, and cap **21** of fuze assembly **19** is pushed outwardly by coil springs **31** to arm the fuze device.

Vanes **12** spring open to the rear quickly, where they become locked by virtue of cam steps **36** catching over the circumference of a spring disk **37**, and the unit appears substantially as in position C of FIGURE 4. Note that the vanes **12** are spread out slightly from a fully trailed position, to act as a drag on the aft body **2**.

The segments of housing **10** can now drop away, as shown in position D, and the detonating cord **7** starts to unwrap. The forward body **1** is falling ahead, causing tension in cord **7** to further unwrap it from drum **4**, in FIGURE 5. Drum **4** is thus separated from the assembly, which now becomes fully deployed as in FIGURE 6. The unfolding and separating actions occur rapidly, and the deployed bomb assembly proceeds to the ground.

As it strikes the first object in landing, the contact actuates firing pin **32**, and this immediately sets off the charge of the contact-burst forward body **1**, the detonating cord **7**, and the charge of the air-burst aft body **2**. Only a few microseconds delay is experienced in this series operation. The air-burst action is thus achieved at a definite height determined by the length of detonating cord **7**, without electrical circuits, power supplies, mechanisms, or external remote controls of any kind.

It is possible to obtain the same operation without a specific separate assembly of air-drag vanes, by designing the aft body **2** to have built-in size, surface, or shape factors which give it greater air resistance than the forward body **1**.

It will be noted that the various components of this invention are well known in themselves, i.e., the fuze, explosive bodies, detonating cord, and aerodynamic drag device are typical of standard conventional devices. Their arrangement and adaptation in the present combination is to facilitate deployment of the new invention, a combination air and ground burst munition. It is also readily noticed that the same or similar arrangements can be used in other applications, such as in rockets or mortars for instance, or in non-explosive applications such as the landing or distributing of supplies, leaflets and the like from the forward and/or aft container bodies.

While in order to comply with the statute, the invention has been described in language more or less specific as to structural features, it is to be understood that the invention is not limited to the specific features shown, but that the means and construction herein disclosed comprise one particular form of putting the invention into effect, and the invention is therefore claimed in any of its forms or modifications within the legitimate and valid scope of the appended claims.

What is claimed is:

1. A munition or the like comprising a contact-burst body, an air-burst body, a length of flexible detonating cord connected between said bodies, said air-burst body incorporating aerodynamic drag means, said bodies being generally cylindrical with a decreasing taper at the rear of said contact-burst body and at the front of said air-burst body, spacer means mounted between said two bodies, said cord being coiled between said bodies when in a stowed condition, a cylindrical housing having a plurality of longitudinal segments fit together edge-to-edge and surrounding said coiled cord, the outside diameter of said housing being susbtantially the same as said bodies, said drag means attached to the rear of said air-burst body and having a plurality of vanes foldable forward over said bodies and conforming to the outer shape of said bodies as stowed, and wind-actuated release means surrounding said vanes to normally hold the entire two-body munition assembly in a compact condition as stowed.

2. A munition or the like comprising a contact-burst body, an air-burst body, a length of flexible detonating cord connected between said bodies, aerodynamic drag vanes pivotally attached to the rear of said air-burst body and foldable forward over both said bodies, said vanes having retaining lips at their outer ends fitting against the forward end of said contact-burst body to normally hold said bodies in a compact assembly prior to use, and including releasable means normally holding said drag vanes in the aforesaid assembly position.

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