United States Patent

[11] 3,611,931

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[73] Assignee **The United States of America as represented by the Secretary of the Navy**

[54] **SEQUENTIAL BURST AIR DROP CLUSTER**
4 Claims, 9 Drawing Figs.

[52] **U.S. Cl.** **102/7.2,** 102/6, 102/37.6
[51] **Int. Cl.** **F42b 25/16**
[50] **Field of Search** 102/6, 7.2, 34.4, 37.6, 35.6, 5, 38, 40, 49.3; 89/8

[56] **References Cited**

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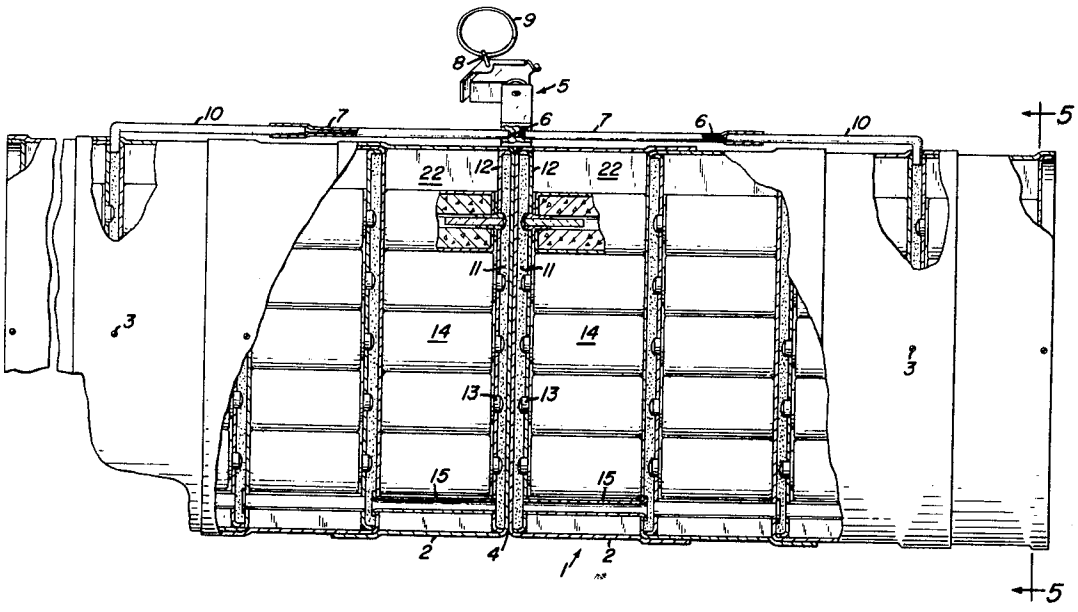
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ABSTRACT: A means and method for low-altitude dispersing of submunitions from a sequential burst air drop munition.



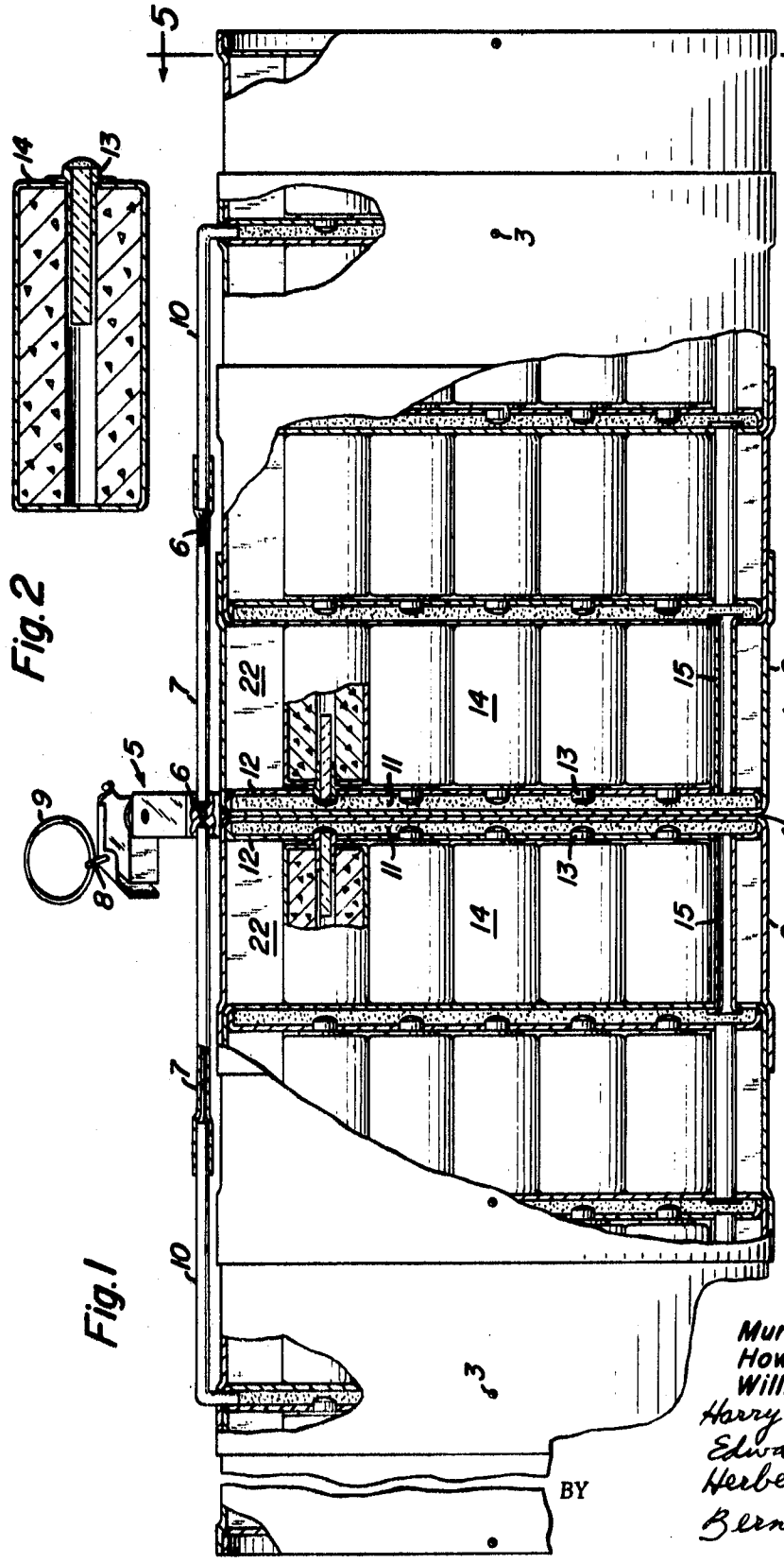


Fig. 1

Fig. 2

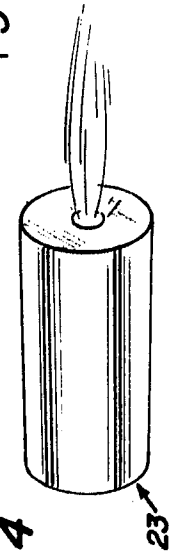


Fig. 4

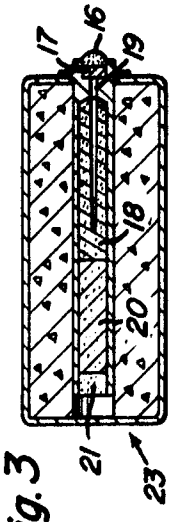


Fig. 3

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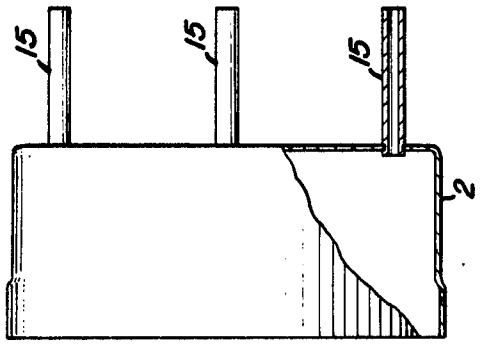


Fig. 8

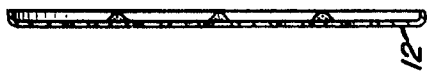


Fig. 7

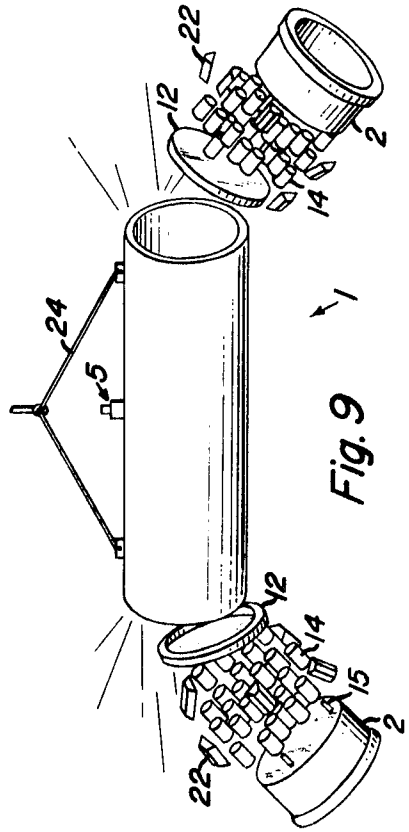


Fig. 9

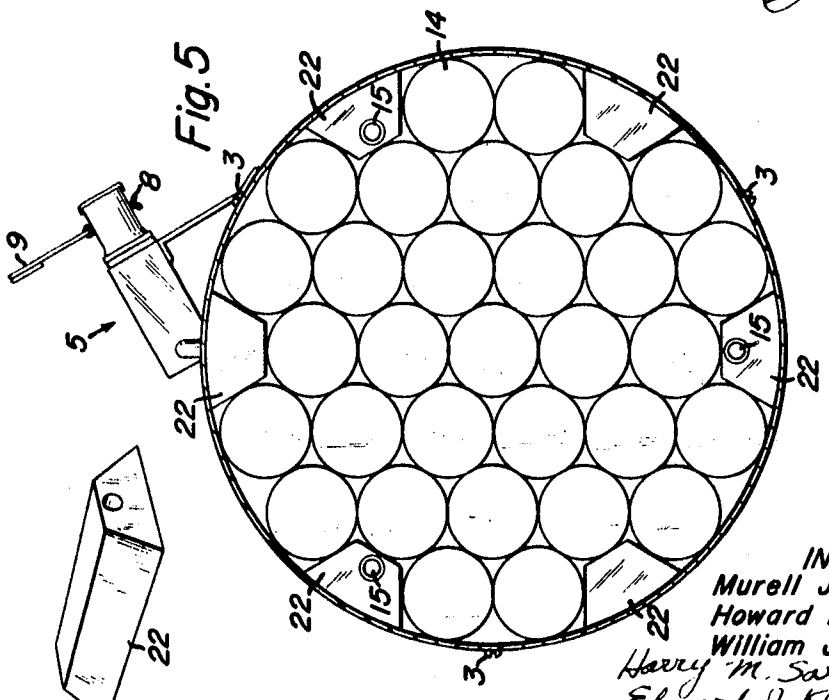


Fig. 5

Fig. 6

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SEQUENTIAL BURST AIR DROP CLUSTER

DEDICATORY CLAUSE

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

Our invention relates to a sequential burst air drop munition for low-altitude dispersing of submunitions.

Prior art means and techniques necessitated high-energy charges to expel the submunitions, required submunitions of heavy and strong construction to minimize damage to the submunitions due to the high-energy expelling charge, and the submunitions were not sufficiently dispersed. Our invention was conceived and reduced to practice to solve these problems and to satisfy the long felt need for an effective and efficient sequential burst air drop munition for low-altitude dispersing of submunitions.

Our munition can be utilized as an antipersonnel weapon to deliver either lethal or incapacitating agents, the incapacitating agents to include lacrimating agents, or as a weapon to destroy military material by delivery of an explosive or incendiary composition to a target area. When used with a lacrimating agent, our munition can also be utilized for domestic riot control or other dispersion of disorder.

A principal object of our invention is to provide a munition for low-altitude dispersing of submunitions which does not require a high-energy charge to expel the submunitions.

Another object of our invention is to provide a munition which does not require submunitions having a strong and heavy construction.

A further object of our invention is to provide a munition which effectively and efficiently disperses submunitions over an area of sufficient coverage.

Other objects will be obvious from or will appear in the specification hereinafter set forth.

FIG. 1 is a view of our munition combination.

FIG. 2 is a view of one embodiment of the submunition of our invention.

FIG. 3 is a view of a rocket-type embodiment of our submunition.

FIG. 4 is an exterior view of the embodiment shown in FIG. 3.

FIG. 5 is a view showing our munition with submunitions, as shown in FIGS. 2 and 3, assembled therein.

FIG. 6 is a view of a spacer means utilized to hold the submunitions compactly within our munition.

FIG. 7 is a view of a pusher plate designed to hold the submunitions within a module means.

FIG. 8 is a view of the module means designed to contain the submunitions within our munition.

FIG. 9 is a view showing the dispersion of the submunitions from our munition.

Our invention and FIGS. 1 to 9 will now be described in detail as follows.

Our munition shown at 1 in FIG. 1 consists of a series of modules 2, shown in FIG. 8, nested within each other and held in the nested position by shear screws 3, as shown in FIGS. 1 and 5. Modules 2 are arranged to two opposing sections, as shown in FIG. 1; the two sections being spot welded together at seam 4. A conventional grenade-type activating mechanism 5 is fixedly mounted on top of munition 1, as shown in FIGS. 1, 5, and 9, to activate two strands of conventional quick match fuse 6 located within aluminum tubing 7; the aluminum tubing 7 being in two sections and each section opening with activating mechanism 5, as shown in FIG. 1. To activate mechanism 5, cotter pin 8, as shown in FIGS. 1 and 5, is removed by pulling ring 9 to release a striker means to detonate a primer means in the conventional manner to produce a spark to ignite fuse 6. An electric squib means can also be used to ignite fuse 6. Fuse 6 extends within aluminum tubing 7 from activating mechanism 5 through plastic tubing 10 to a column of black powder 11; the black powder being located between the bottom of each module 2 and a pusher

plate 12, shown in FIGS. 1 and 7. Ignition of powder 11 causes pressure buildup which causes plate 12 of each end module 2 to force the module from munition 1 after the simultaneous shearing of screws 3, as shown in FIG. 9. A fuse holder 13 containing a composition of 95 percent black powder and 5 percent gum arabic mounted within each submunition 14 is mounted within holes in pusher plate 12, as shown in FIG. 1, and the powder within the fuse holder is ignited by black powder column 11. Any type of fusing within submunition 14 can be used depending on the payload within the submunition; that is whether it is an incendiary composition, explosive composition, lethal agent, or incapacitating agent; the submunition being a conventional type such as disclosed in U.S. Pat. No. 3,269,313. Lethal and incapacitating agents necessitate using such agents with an explosive means to disseminate the agent. Upon explosion outward of the end modules, plastic tubing 10 pulls free, because it is merely removably mounted within aluminum tubing 7 and module 2. When the modules 2 are outside of munition 1, pusher plate 12 merely falls away from the module and the submunitions 14 fall free, as shown in FIG. 9. A conventional delay powder train, located within each of three conduits 15 and located between modules, is ignited by powder 11 from each end; the delay train sequentially igniting each column 11 in turn toward the center of munition 1 and each corresponding module at each end of munition 1 is in turn expelled simultaneously in pairs from the munition. The principle of opposing end functioning of the modules prevents adverse effects on the dispersion pattern due to the action of the expelling burst on the free-fall flight of the munition and provides better control of the submunition dispersion pattern. While FIG. 5 shows 31 submunitions 14 mounted within each module and spaced by spacer means 22 and FIG. 1 shows eight modules 2 within munition 1, the numbers of each of these structures can be adjusted to suit a given application. Alternative to using a submunition as shown in FIG. 2, a rocket-type munition as shown at 23 in FIGS. 3 and 4 can be utilized. The rocket-type munition, as shown in FIG. 3, consists of a conventional starter powder composition 16 to be ignited by powder column 11, a conventional delay powder composition 17 to ignite a conventional propellant composition 18, nozzle means 19 to emit a gas stream and propel the submunition, a conventional delay powder composition 20, and payload 21; the payload being an explosive composition, and incendiary composition, lethal or incapacitating agent, or any combination thereof as desired for a given application. Munition 1 can be delivered to a target area by any conventional means, such as attached beneath an aircraft by sling 24, as shown in FIG. 9.

We wish it to be understood that we do not desire to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

We claim:

1. A system for delivery of a plurality of submunitions to a target comprising a plurality of module means, each module means having an open end and a closed end and each module means being fixedly joined at the closed end to an adjacent module means closed end; a plurality of submunition means within the module means; an expulsion means adjacent to each module means, said expulsion means being adapted to expel each module means from the system; and an activating means adapted to activate the system, said system having an equal number of module means nested within the open end of each joined module, a quantity of explosive; adapted to expel the module from the system located in the bottom of each module, a plate means adapted to act as a cover means to contain the explosive; in column configuration within the bottom of the module means and to act as a pusher plate to expel the module from the system due to pressure buildup following ignition of the explosive, each module held nested by shear screws adapted to be sheared by a predetermined pressure buildup following ignition of the explosive.

2. The system of claim 1 wherein the plate means contains means; of holes to mount a fuse holder means therein, each said fuse holder means being integral with a submunition, each said fuse holder containing a powder composition consisting of 95 percent black powder and 5 percent gum arabic.

3. The system of claim 2 wherein the submunition comprises a container means ; a starter powder composition located within one end of the container means, said starter composition being adapted to be ignited by the black powder column; a first delay powder composition adjacent to and integral with the starter composition, said first delay composition being adapted to be ignited by the starter composition; a section containing propellant composition adjacent to the delay composition, said propellant composition section having a hollow section within the center of the propellant section, said propellant composition being adapted to be ignited by the first delay composition; a nozzle means located between the first delay composition and the propellant hollow section, said nozzle means being adapted to provide thrust as a result of emitted gas from the submunition, said thrust being adapted to propel the submunition; a second delay powder composition located adjacent to and integral with the propellant composition, said second delay composition being adapted to be ignited by the propellant composition and to activate a payload means; and a payload means, said payload being selected from lethal agent composition having an explosive composition mixed therewith, incapacitating agent composition having an explosive composition mixed therewith, an explosive composition, and an incendiary composition.

4. The system of claim 1 wherein a quick match means adapted to ignite the explosive column in each end module is located between and integral with an activating means and the explosive column, said activating means being selected from a primer means and electric squib means, and a fuse train connects the explosive column within each module.