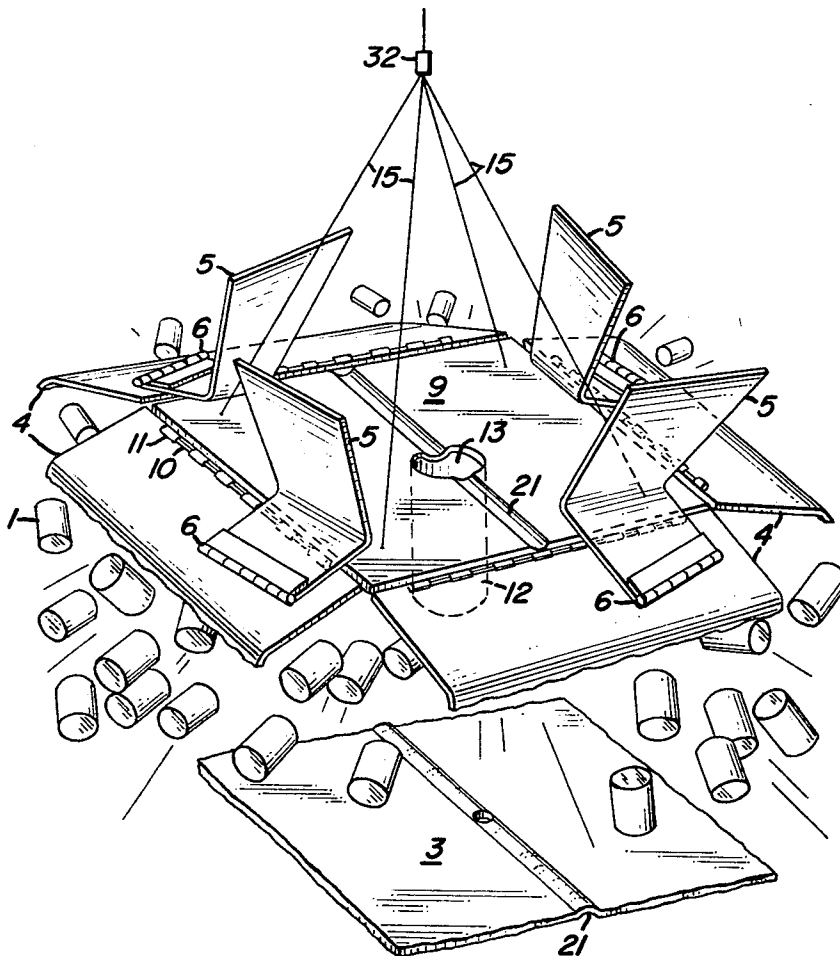


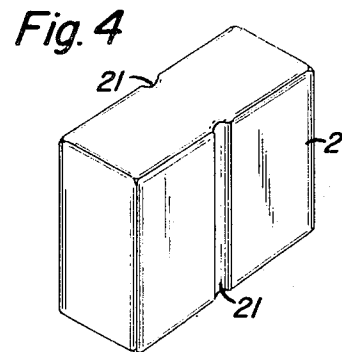
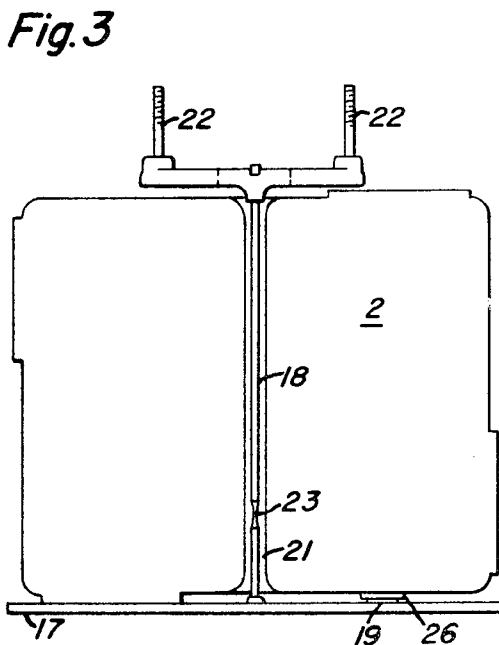
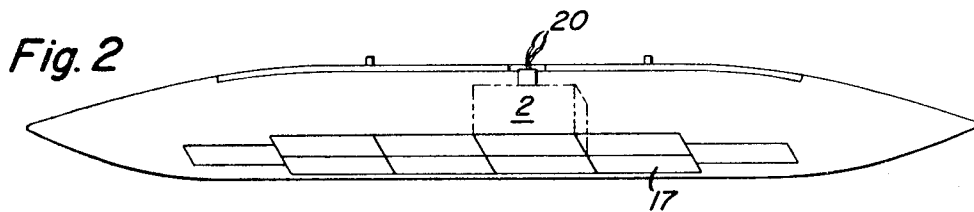
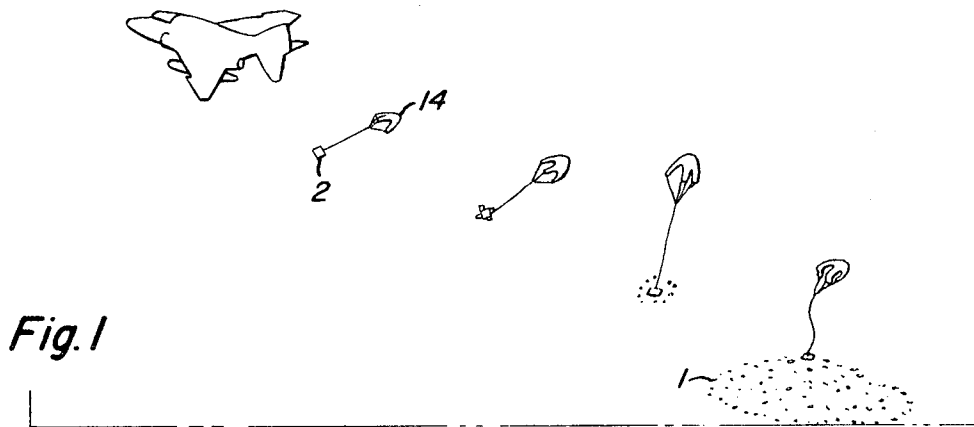
[72] Inventors Abraham Flatau
Joppa;
Donald N. Olson, Lutherville; Miles C.
Miller, Joppa, all of, Md.
[21] Appl. No. 847,907
[22] Filed Aug. 6, 1969
[45] Patented June 15, 1971
[73] Assignee The United States of America as
represented by the Secretary of the Army

[56] References Cited
UNITED STATES PATENTS
2,317,256 4/1943 De Kurowski..... 102/4
3,093,072 6/1963 Pigman..... 102/7.2
3,276,367 10/1966 Edwards..... 102/7.2
Primary Examiner—Samuel W. Engle
Attorneys—Harry M. Saragovitz, Edward J. Kelly, Herbert
Berl and Bernard J. Ohlendorf

[54] SPIN LAUNCH RECTANGULAR-TYPE CANISTER
12 Claims, 14 Drawing Figs.
[52] U.S. Cl. 102/4,
102/7.2
[51] Int. Cl. F42b 25/02
[50] Field of Search 102/1, 4,
7.2, 35, 35.4

ABSTRACT: An aircraft dispersion munition and method for dispersing submunitions over a large area and with a ground pattern that is uniform and predictable; the munition utilizing canted vanes to produce a sufficiently high rotational value of the falling munition to spin launch a plurality of submunitions by means of centrifugal force and high tangential velocity, after the bottom and sides of the munition have been removed during fall. A parachute is ejected during the fall of the munition to stabilize the falling and rotating munition.





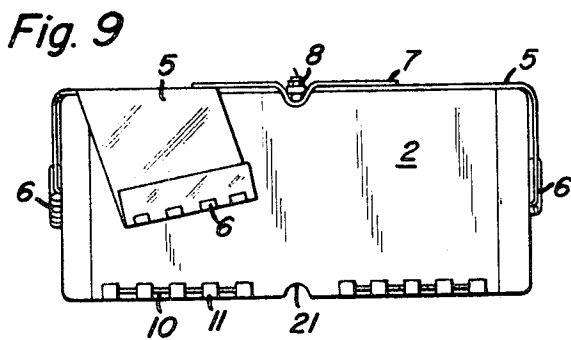
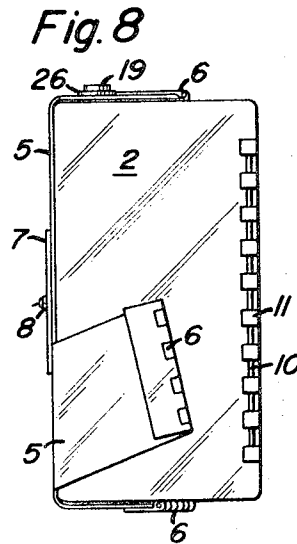
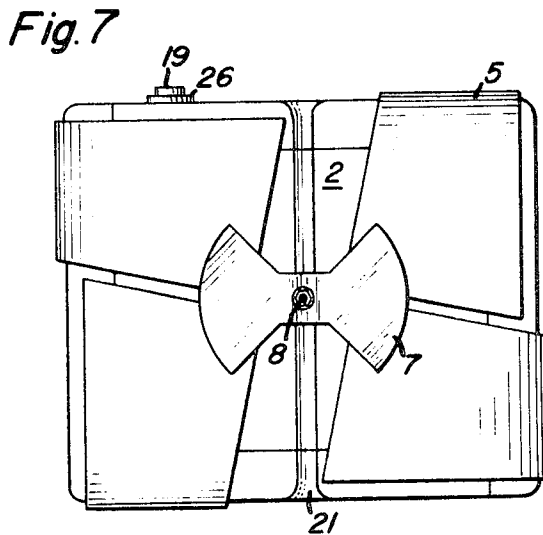
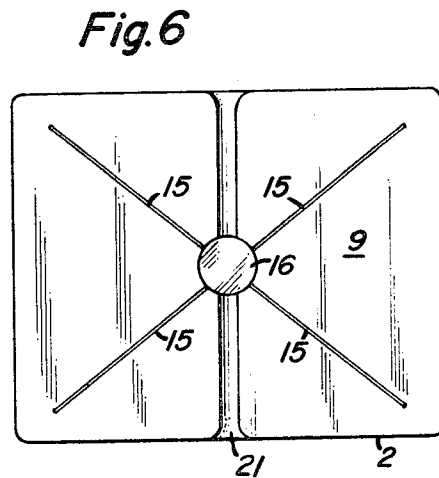
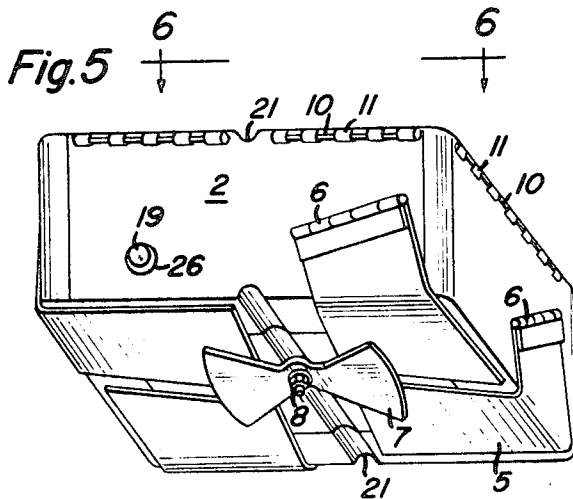
INVENTORS
 Abraham Flatau
 Donald N. Olson
 Miles C. Miller

Harry M. Saragovitz
 Edward J. Kelly
 Herbert Berl

BY

Bernard J. Ohlendorf

ATTORNEYS



BY

INVENTORS
 Abraham Flatau
 Donald N. Olson
 Miles C. Miller

Harry M. Saragovitz
Edward J. Kelly
Herbert Berl
Bernard J. Ohlendorf
 ATTORNEYS

Fig. 10

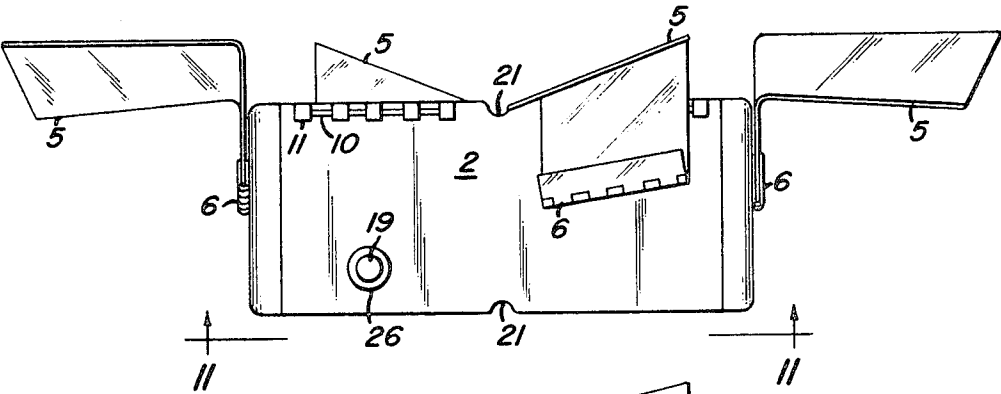
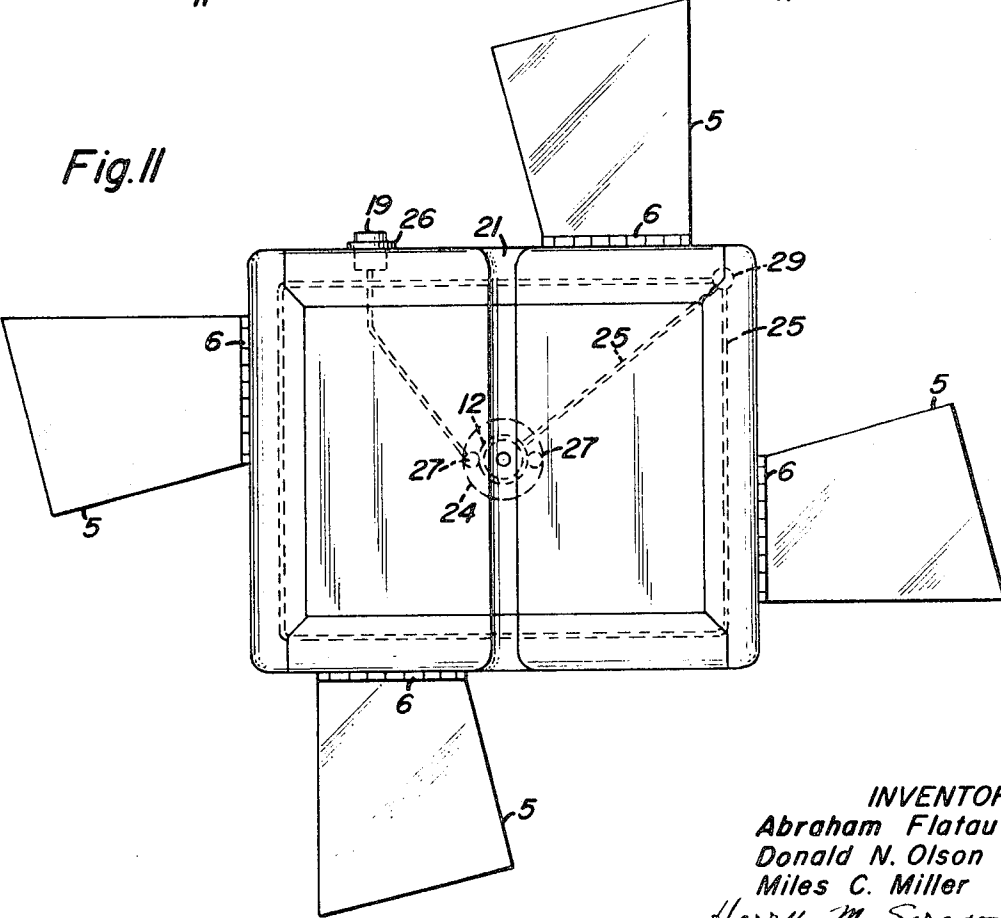


Fig. 11



INVENTORS
Abraham Flatau
Donald N. Olson
Miles C. Miller

Harry M. Saragovitz
Edward J. Kelly
Herbert Berl
Bernard J. Ohlendorf

BY

ATTORNEYS

Fig. 12

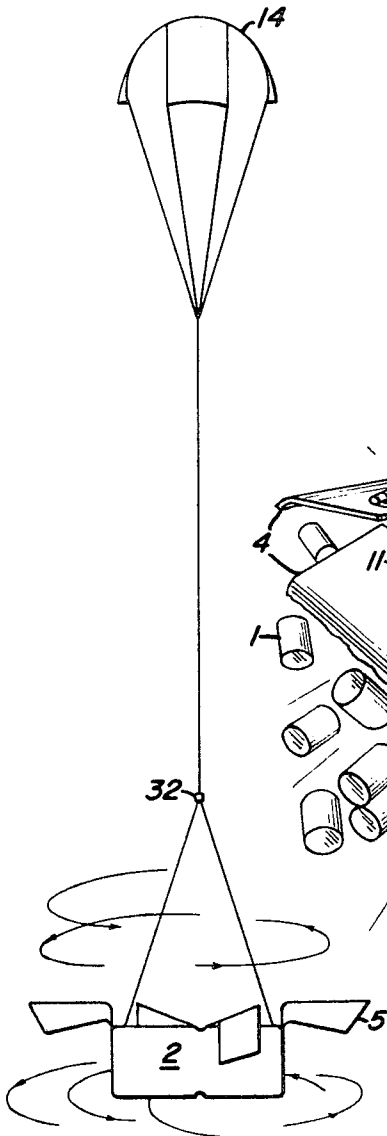


Fig. 13

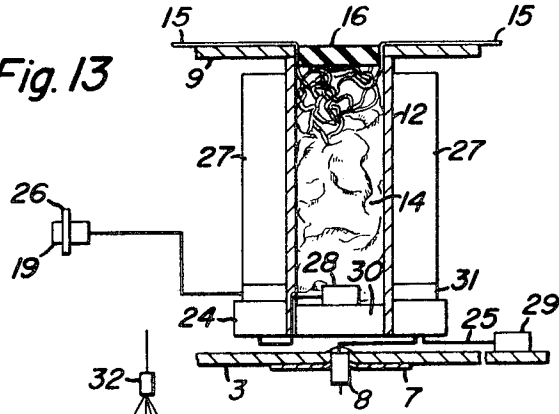
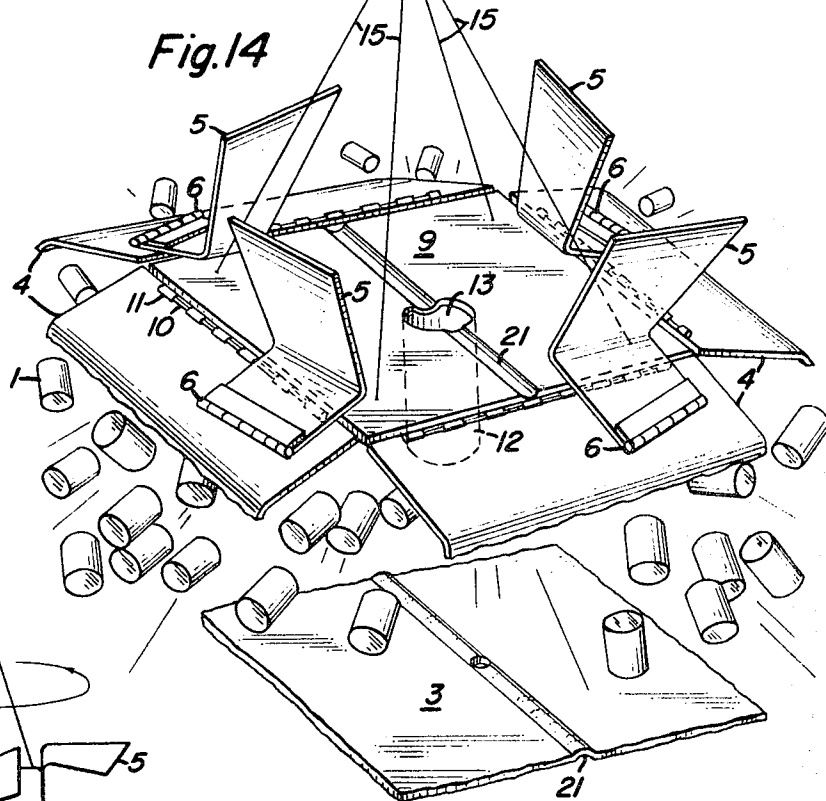


Fig. 14



INVENTORS

Abraham Flatau

Donald N. Olson

Miles C. Miller

Harry M. Saragovitz

Edward J. Kelly

Herbert Berl

BY

Bernard J. Ohlendorf

ATTORNEYS

SPIN LAUNCH RECTANGULAR-TYPE CANISTER

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 an aircraft dispensing and dispersion means for munitions.

All prior art aircraft dispensing means presented the problem of producing insufficient area coverage by the munition ground dispersion and a nonuniform and unpredictable ground pattern. Our invention was conceived and reduced to practice to overcome the aforementioned problem and to satisfy the long felt need for a munition aerial dispersing means which is reliable and economical to manufacture and which produces a uniform and predictable dispersion pattern over a large area.

A principal object of our invention is to provide a reliable and economical means for dispersing munitions from an aircraft to produce a submunition dispersion pattern which is uniform and predictable over a large area.

Other objects of our invention will be obvious or will appear from the specification hereinafter set forth.

FIG. 1 is a utility view of our dispersion means.

FIG. 2 is a view of a munition utilizing our dispersion means mounted in an aircraft dispenser.

FIG. 3 is a view of the aircraft mounting means for a munition utilizing our dispersion means.

FIG. 4 is a view of the munition shown in FIG. 3.

FIG. 5 is a view of our munition having the canted vanes in the stowed position.

FIG. 6 is a view along 6-6 of FIG. 5.

FIG. 7 is a view showing the stowed vanes of FIG. 6 in detail.

FIG. 8 is an end view of FIG. 7.

FIG. 9 is a front view of FIG. 7.

FIG. 10 is a view showing our munition having the canted vanes in the open position to induce rotation.

FIG. 11 is a view of the munition shown in FIG. 10 and showing in detail the flexible linear shape charge embodiment for opening the sides and bottom of our munition to disperse submunitions.

FIG. 12 is a utility view showing an open parachute to provide stability for our falling and rotating munition.

FIG. 13 is a schematic view of our munition showing the parachute in the stowed position and the various detonation systems.

FIG. 14 is a view of our munition showing the dispersing of submunitions contained within our munition after the sides and bottom of our munition have been removed during drop.

Our invention, as shown in FIGS. 1 to 14, will now be described in detail as follows.

A plurality of submunitions 1, as shown in FIG. 14 and which can contain incendiary, explosive, or chemical composition of matter, are mounted in case 2, as shown most particularly in FIG. 4, by placing the desired number of submunitions in the desired configuration for a predetermined application on container bottom 3, as shown in FIG. 14; the bottom being integral with sides 4. A vane 5 is movably mounted on each side 4 by a hinge 6; the hinge being fixedly mounted on side 4 by any conventional means such as welding, riveting, bolting, etc. Hinge 6 is mounted at such an angle as to permit the vanes to be stowed by folding under bottom 3, as shown in FIG. 7, and to open to a position to induce rotation to the munition through swivel joint 32, as shown most particularly in FIG. 12. After loading the submunitions on bottom 3, vanes 5 are stowed as shown in FIG. 7 and secured in the stowed position by holding each vane under retainer 7 and securing the retainer 7 in position by conventional explosive bolt 8. Cover 9, as shown particularly in FIGS. 4 and 14 is fixed in place by inserting pins 10, as shown in FIGS. 5, 8, and 9 through hinges 11; hinge 11 being a composite of hinges fixedly mounted in

any conventional manner such as welding, riveting, bolting, etc. in pairs, on each side of cover 9 and each upper edge of sides 4, the hinges on the cover and sides being mated together when cover 9 is superimposed on sides 4. Cover 9 has a container means 12, having one end, 13, open, fixedly mounted within a hole in the center of the cover; the mounting being by any conventional fastening means such as welding, brazing, riveting, etc. Parachute 14, as shown in FIGS. 12 and 13, is stored within container 12 and conventionally and fixedly connected to cover 9 by conventional four point bridle attachment 15. Container 12 is closed by inserting blow out plug 16 within the container; the plug being retained within the container by friction fit. After the munition is loaded with submunitions and assembled as described above, the munition is placed on a door means 17 fixedly mounted to retention rod 18, as shown in FIG. 3; the placement causing initiator switch 19 to continue to be depressed after removal of a safety pin, similar to a conventional hand grenade safety pin, which retained switch 19 in the depressed position prior to placing on door 17 to prevent premature activation of the detonation systems within the munition. While the aforementioned safety pin is not shown in the drawing, it is inserted through a hole in mounting flange 26, as shown in FIG. 11, and a mating hole in switch 19. Retention rods 18 rest within recesses 21 of case 2, and arms 22 of the retention rods are connected to conventional aircraft racks, not shown in the drawing. When the aircraft is over the target area, the pilot activates a switch on the aircraft control panel connected to a conventional inter-velometer through the aircraft power supply by leads 20, as shown in FIG. 2, in the conventional manner. Activation of a conventional pyrotechnic device results in a sudden and rapid downward thrust on the retention rods 18 which causes the rods to break at preweakened point 23, as shown in FIG. 3, and door 17 to fall downward. Falling of door 17 releases initiator switch 19 to arm the munition by completion of the electrical circuit contained within our munition, and permits the munition to fall from the aircraft dispenser. Switch 19 is connected to the various detonating systems of the munition by connection through, and in the conventional manner, an internally contained conventional timing mechanism 24, the sequencing of the timing events being selected within the skill of the art to suit each application and type of munition utilized.

After the munition has been armed, a detonating means 28 is activated which generates gas within container 12, in the conventional manner such as cartridge 30, to force blow out plug 16 from the container and to eject parachute 14 from the container to stabilize the fall of the munition, as shown in FIG. 12.

At the next predetermined interval, explosive bolt 8 is detonated to release and permit vanes 5 to spring into the rotating position, as shown in FIGS. 10, 11, and 12, which results in the rotation of the munition, as shown in FIG. 12. At the last predetermined interval, subsequent to the rotation and stabilization of the falling munition, a detonator means 29 activates the conventional flexible linear shape charge 25, or, in the alternative, a conventional mild detonating fuze, as shown in FIG. 11, which separates bottom 3, from sides 4 by the explosive force means and permits submunitions 1 to be dispersed as a result of the centrifugal force and tangential velocity, as shown in FIG. 14. The various detonating systems, connected through the timing means and the initiator switch, are shown schematically in FIG. 13. Power to activate the timing means and result in the activation of the various detonator means is supplied by electrical energy source 27, as shown in FIG. 13, such as a conventional battery; the electrical energy source being retained in position by mount means 31. Tests conducted have demonstrated that a sufficiently high rotational value has been obtained to permit the submunitions to be spin launched by means of the high tangential velocity and to result in a uniform and predictable ground dispersion pattern over a large area. While a conventional mild detonating fuze means was utilized in our invention to separate the bot-

tom from the sides of the munition, it would be readily apparent to one of ordinary skill in the art that other designs which utilize centrifugal force from spinning can be employed to separate the bottom from the sides.

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 dispensing a munition from an aircraft and for dispersing submunitions, as a result of centrifugal force and high tangential velocity, over a large area with a uniform and predictable ground pattern, said system having a plurality of components comprising a case means adapted to contain a plurality of submunitions and adapted to be mounted within an aircraft, and to be released from said aircraft by a dispenser means; a case cover means adapted to be secured to said case means; a vane means mounted on each side of said case means, said vane means being adapted to induce rotation to the munition after release of the munition from the aircraft; retention means adapted to retain the vane means in a stowed position prior to a predetermined interval for inducing rotation to the munition; parachute means adapted to be stored within a container means prior to a predetermined interval for release of the parachute means, said parachute means being adapted to impart stability to the munition after release of the munition from the aircraft, said container means being integral with the case cover means; a detonation system within the munition adapted to activate members of the plurality of components; arming means adapted to activate the detonation system and a timing means; and a timing means adapted to control a sequence of events of the detonation system.

2. The dispensing system of claim 1 wherein the submunitions contain a payload selected from the group consisting of explosive composition, incendiary composition, and chemical agent composition.

3. The dispensing system of claim 1 wherein the dispenser means comprises a door means adapted to have the munition placed thereon; a pair of retention rod means fixedly connected to the door means at one end and adapted to rest within a pair of recesses located in the sides of the case means, said retention rod means being integral with a pair of arms at the end of the retention rod means opposite to the door end, said arms being adapted to connect to an aircraft rack, said retention rod means having a preweakened section located between the door means and the arms, said preweakened section being adapted to be ruptured by an explosive thrust generated as a result of the activation of a pyrotechnic means to dispense the munition from the aircraft.

4. The dispensing system of claim 1 wherein the cover means is secured to the case means by a plurality of hinges integral with the edges of the cover means nested in juxtaposition within a plurality of hinges integral with the upper ends of the case means, the nested plurality of hinges being held in juxtaposition by pin means.

5. The dispensing system of claim 1 wherein the vane means are mounted on each side of the case means by a hinge means under spring tension, said hinge means being adapted to permit the vane means at a predetermined time to spring from the stowed position to a position lying in a plane adjacent to a plane of the top of the case means which results in rotation being induced to the munition, the hinge means being mounted on the case means at such an angle as to permit stowing the vanes in a folded position under the case means prior to dispensing from the aircraft and to permit the vanes to spring to the plane adjacent to the plane in which the top of the case means lies.

6. The dispensing system of claim 5 wherein the vane means are retained in the stowed position by a bow shaped retainer means adapted to be superimposed on a portion of each vane means, said bow shaped retainer means being secured in position by an explosive bolt, said explosive bolt being adapted to be detonated at a predetermined time to permit the vane

means to spring to the rotating position to induce rotation to the munition.

7. The dispensing system of claim 1 wherein the parachute means is secured to the case means by a bridle means, said bridle means being connected to the parachute means through a swivel means.

8. The dispensing system of claim 1 wherein the arming means is a pushbutton switch means adapted to prevent electrical current flow in the depressed position and to permit electrical current flow when released from the depressed position, said arming means being held in the depressed position, said arming means being held in the depressed position by a safety pin means prior to placing the munition on the dispenser means and by the dispenser means while on said dispenser means and subsequent to removal of the safety pin means, said arming means being adapted to arm the timing means and the detonation system within the munition at a predetermined time subsequent to dispensing the munition from the aircraft.

9. The dispensing system of claim 8 wherein the detonation system comprises a first detonating means adapted to generate gas upon activation at a predetermined time subsequent to dispensing the munition from the aircraft, said gas generation being adapted to eject the parachute means from the container means and impart stability to the munition as the munition falls; a second detonating means adapted to explode an explosive bolt securing the vane means retaining means in the stowed position at a predetermined time subsequent to the ejection of the parachute means, the explosion of the explosive bolt being adapted to release the vane means from the stowed position to a position to induce rotation to the munition; and a third detonating means adapted to activate an explosive means at a predetermined time subsequent to the release of the vane means, the explosive means being adapted to separate the sides from the bottom of the case means and permit the submunitions to be dispersed as a result of centrifugal force and high tangential velocity.

10. The dispensing system of claim 9 wherein the explosive means is selected from the group consisting of flexible linear shape charge and mild detonating fuze.

11. The dispensing system of claim 9 wherein the predetermined times are controlled in sequence by a plurality of intervals preset in the timing means, the timing means being set prior to the aircraft reaching a target area.

12. A method of dispensing a munition from an aircraft and for dispersing submunitions as a result of centrifugal force and high tangential velocity over a large area with a uniform and predictable ground pattern comprising the steps of placing the munition in the aircraft dispenser means for delivery to a target area; setting an intervalometer and a timing means to control events after activation of the dispensing system; removing a safety pin from the arming means to permit arming the munition upon separation of the munition from a door means of the dispenser means; delivering the munition to a target area by the aircraft; activating a switch on the aircraft control panel connected to an intervalometer through the aircraft power supply while approaching the target area, said intervalometer controlling the activation of a pyrotechnic means to dispense the munition from the aircraft and result in the separation of the door means from the munition to permit activation of the arming means; activating the pyrotechnic means to rupture a preweakened section of a pair of retention rod means to permit the munition to fall from the aircraft and to be separated from the door means; closing an electrical circuit means by release of the arming means from a depressed position upon separation of the door means from the munition, the closing the electrical circuit being adapted to activate a timer means to control the detonation system; activating the timer means; activating a first detonation means to generate gas to eject the parachute means; ejecting the parachute means at a predetermined time subsequent to the dispensing of the munition from the aircraft and the separation of the munition from the door means; activating a second detonating means to explode an

5

explosive bolt to release the vane means from the stowed position to a position to induce rotation to the munition; exploding the explosive bolt; releasing the vane means from the stowed position to the position to induce rotation to the munitions; inducing rotation to the munition; activating a third detonating means to explosively separate the case sides from the case bot-

6

tom; separating the case sides from the case bottom; and dispersing the submunitions on the target area over a large area with uniform and predictable ground pattern as a result of centrifugal force and high tangential velocity.

10

15

20

25

30

35

40

45

50

55

60

65

70

75