

[72] Inventors **Harold J. Gryting;**  
**Lewis A. Stevens, China Lake; Robert C.**  
**Robbins, Menlo Park, all of, Calif.**

[21] Appl. No. **578,922**

[22] Filed **Sept. 12, 1966**

[45] Patented **Aug. 3, 1971**

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

[50] Field of Search..... 102/6, 39,  
 65, 66, 90

[56] **References Cited**

**UNITED STATES PATENTS**

2,372,264	3/1945	Firth.....	102/6
2,703,527	3/1955	Hansen.....	102/6
2,741,177	4/1956	Ricards, Jr. et al. ....	102/6
3,188,954	6/1965	Roach et al. ....	102/6

*Primary Examiner*—Robert F. Stahl  
*Attorneys*—G. J. Rubens, R. Miller, V. C. Muller and M. F. Oglo

[54] **METHOD OF DISPERSING BW/CW OR OTHER**  
**MATERIALS**  
**2 Claims, 3 Drawing Figs.**

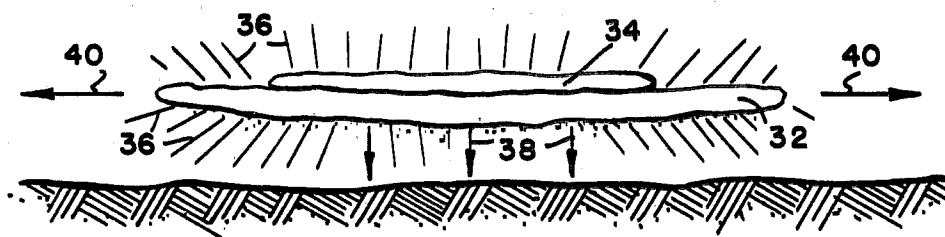
[52] U.S. Cl..... 102/90,

102/6

[51] Int. Cl..... F42b 15/30,

F42b 25/12

**ABSTRACT:** A method and apparatus for forming a flat cloud of BW/CW agent and simultaneously a superposed flat cloud of fuel air. The fuel air cloud is then detonated.



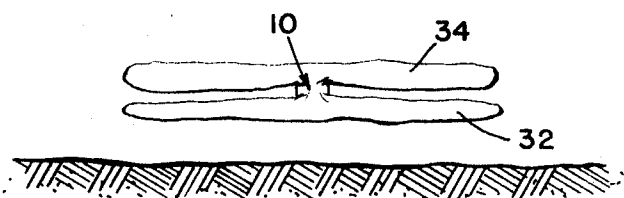


FIG. 1.

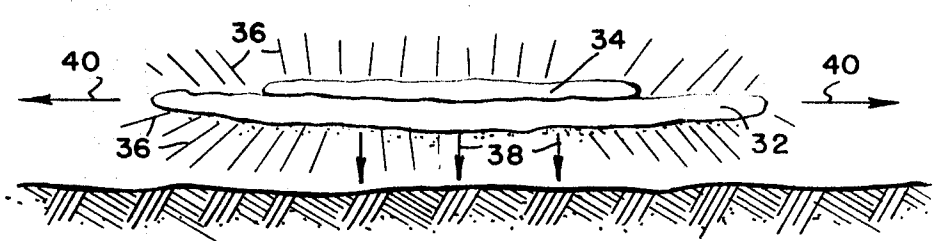
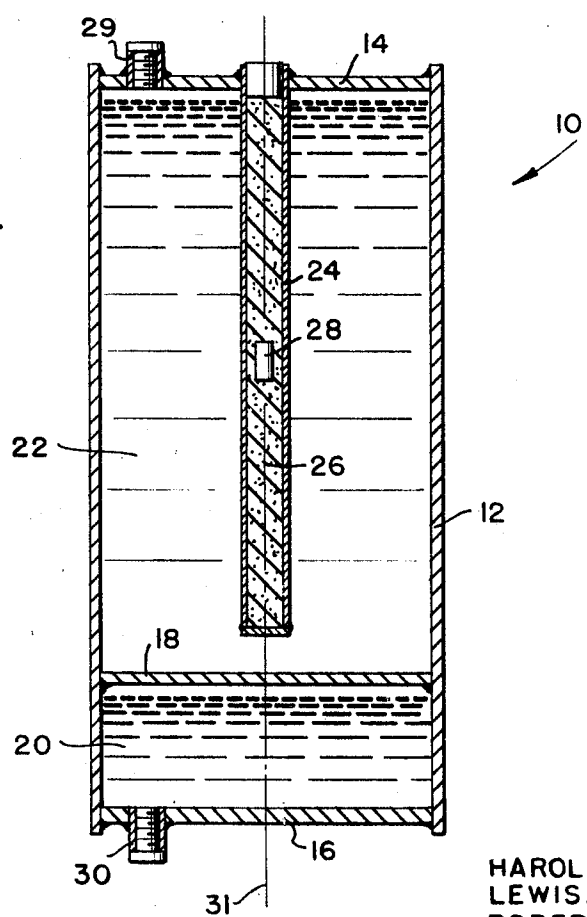


FIG. 2.

FIG. 3.



INVENTORS.  
HAROLD J. GRITING  
LEWIS A. STEVENS  
ROBERT C. ROBBINS  
BY  
V. C. MULLER  
ROY MILLER  
ATTORNEYS.

## METHOD OF DISPERSING BW/CW OR OTHER MATERIALS

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 of any royalties thereon or therefor.

This invention relates to Biological-Chemical (BW/CW) and more particularly to improvements in dispersing the BW/CW agent.

In the dispersal of BW/CW agents it is known practice to detonate a canister containing the agent at or near the ground, which forms a cloud of particles of various sizes which contact ground targets, such as personnel. Such type of weapon has only a limited area of dispersion and may be rendered ineffective if the personnel are protected by tarpaulins, "soft" buildings, or other frangible or porous coverings.

It is also well known to disperse a fuel in similar manner to form a cloud of fuel-air particles (FAX) and detonate the cloud after it has been formed. The resulting detonation then produces overpressure and shock waves which may destroy the intended target by such effects.

The present invention, briefly, combines the BW/CW and FAX effects to provide a dual purpose weapon in which the FAX effect is superimposed on the BW/CW effect.

One of the objects of the invention is to provide method and apparatus for destroying or opening up frangible protective covers by a FAX detonation and utilizing such detonation to disperse a BW/CW agent into or through such covers.

Another object is to disperse the BW/CW agent over larger areas than was heretofore possible in the absence of the FAX effect.

Still further objects, advantages and salient features will become apparent from the description to follow, the appended claims, and the accompanying drawing in which:

FIG. 1 illustrates the initial step in the formation of a BW/CW cloud and a superimposed FAX cloud,

FIG. 2 illustrates the effects of detonation of the FAX cloud a short interval later, and

FIG. 3 is a cross section of a canister for delivering the materials for forming the clouds of FIG. 1.

Referring first to FIG. 3, canister 10 for forming the clouds referred to, comprises a metallic tubular casing 12, closed at opposite ends by walls 14, 16 and having a partition wall 18, near its lower end, forming compartments 20, 22, the various parts being secured together, such as by welding. A burster tube 24, welded at one end to wall 14 extends substantially to the bottom of compartment 22 and contains a high explosive 26, such as tetryl, which may be initiated by any type of fuse, such as a proximity fuse 28.

Compartment 20 contains the BW/CW agent and compartment 22 the fuel such as ethylene oxide, these being introduced through suitable pipe fittings 29, 30 which are then plugged. A relatively small ullage space in each compartment is preferred. The circumferential wall of the upper compartment may be scored longitudinally and circumferentially to provide weakened zones to permit uniform rupture of same and the circumferential wall of the lower compartment may be similarly scored and thinned in thickness to ensure that both walls simultaneously rupture upon detonation of the burster charge.

In operation, the canister is delivered to a point above the target by dropping from aircraft or by mortar with its longitu-

dinal axis 31 in a vertical position and with compartment 22 disposed above compartment 20. Suitable vanes (not shown) may be provided on the canister so that it may be delivered in such orientation or it may be stabilized by a parachute. When it reaches a desired point above the target, fuse 28 is initiated which causes the burster tube to detonate and the canister ruptures, as illustrated in FIG. 1, producing a BW/CW cloud 32 and a superimposed contiguous FAX cloud 34, these being generally flat clouds. A fraction of a second later when the FAX cloud has reached the optimum air-to-fuel-ratio it is detonated in any manner known in the art of detonating such clouds which produce shock waves 36, as illustrated in FIG. 2, and overpressure. This effect causes the particles of the BW/CW cloud to move downwardly and outwardly at high velocity, as illustrated by the arrows 38, 40 respectively, also breaking up any larger drops or droplets into extremely fine particles which may pass through porous coverings such as tarpaulins and the like. Since the shock wave and overpressure of the detonated FAX cloud is transmitted to and through the particles of the BW/CW cloud, this opens or destroys soft targets permitting the BW/CW agent to penetrate into same which would otherwise not have occurred in the absence of the FAX detonation. Also, since the BW/CW cloud is confined between the FAX cloud and the ground, the shock wave and overpressure moves its particles outwardly in all radial directions, thus covering an area greater than would have been covered in the absence of the FAX detonation.

While the canister and its contents may be varied as desired, a specific example found to produce the results described comprises an aluminum tube about 10 inches long and 5 inches in diameter of about 0.075 inches wall thickness, divided into about an 8 inch upper compartment and a 2 inch lower compartment, the ends being of sufficient thickness to confine rupture to the circumferential wall.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

What we claim is:

1. The process of disseminating a BW/CW agent for contacting ground targets, such as personnel, which comprises the steps of:
  - a. simultaneously forming from the same locus adjacent the ground a generally flat cloud containing particles of a BW/CW agent and a similarly shaped superposed contiguous fuel-air (FAX) cloud, and,
  - b. detonating the FAX cloud when it has reached optimum fuel-air ratio.
2. Apparatus for disseminating a BW/CW agent for contacting ground targets, such as personnel which comprises:
  - a. a frangible canister having upper and lower adjacent compartments.
  - b. a liquid fuel substantially filling the upper compartment, adapted when disseminated in the air, to provide an explosive mixture
  - c. a BW/CW liquid substantially filling the lower compartment, and
  - d. a burster charge within the canister adapted to simultaneously rupture both compartments for forming a lower BW/CW cloud and an upper contiguous FAX cloud adapted to be detonated after it has reached optimum fuel-air ratio.