# United States Patent

**Gey et al.**

[15] **3,636,874**

[45] **Jan. 25, 1972**


## [54] METHOD AND MEANS FOR DISPERSING CHEMICAL AGENTS


[72] Inventors: **William A. Gey; Armin T. Wiebke,** both of China Lake, Calif.

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



[22] Filed: **Mar. 31, 1965**

[21] Appl. No.: **444,472**

[52] **U.S. Cl.** ..... **102/6,** 102/66, 102/90

[51] **Int. Cl.** ..... **F42b 13/14,** F42b 25/14

[58] **Field of Search** ..... 102/6, 39, 65, 66, 89, 90



[56] **References Cited**

UNITED STATES PATENTS

| | | | |
|---|---|---|---|
| 2,578,726 | 12/1951 | Moore | 102/6 |
| 2,586,801 | 2/1952 | Epler et al. | 102/6 |
| 2,742,856 | 4/1956 | Fieser et al. | 102/6 |
| 3,117,521 | 1/1964 | Reaves | 102/65 |



*Primary Examiner*—Samuel W. Engle

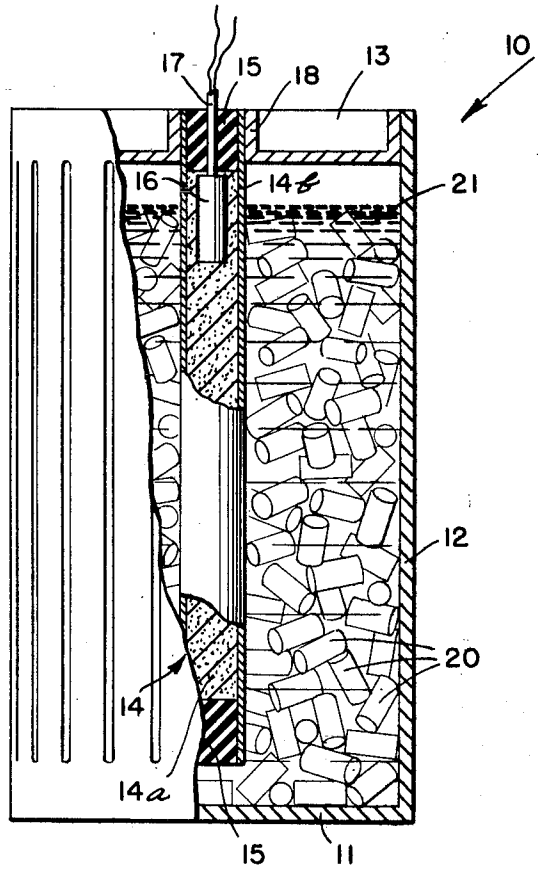
*Attorney*—Roy Miller and Victor C. Muller



[57] **ABSTRACT**

In a device for dispersing liquid agents: a frangible casing; a burster charge; means mounting the burster charge within the casing near the center thereof; an electrical initiator mounted within said burster charge; electrical connecting means connected with said initiator and extending from said casing adapted to conduct an electrical current from a given source to said initiator for initiating an activation thereof; a plurality of open containers randomly disposed within said casing and grouped about said burster charge in a self-supporting group in a manner such that a plurality of voids are established between said containers in communication with the interior thereof; a preselected liquid agent filling said casing and containers; and means sealing said casing to provide a sealed liquid agent disseminator.


**3 Claims, 5 Drawing Figures**



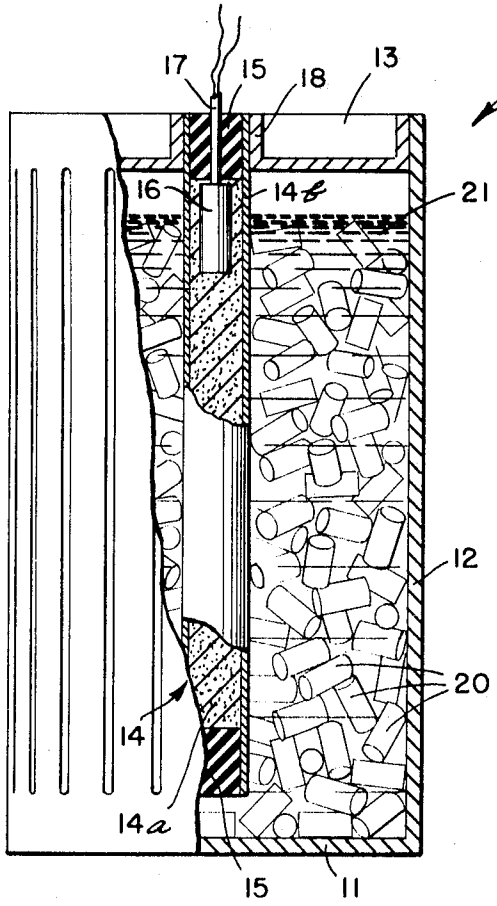



FIG. 1.

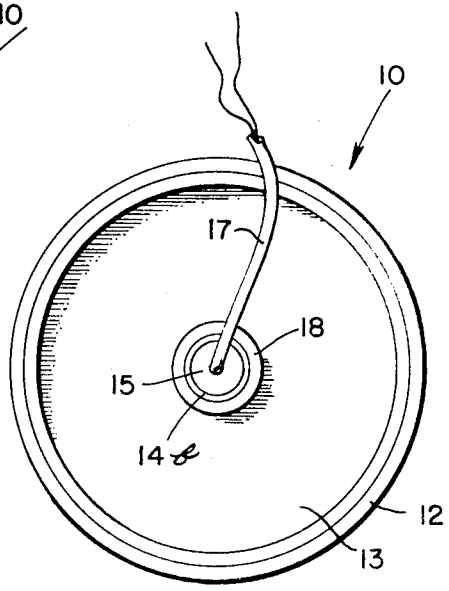



FIG. 2.

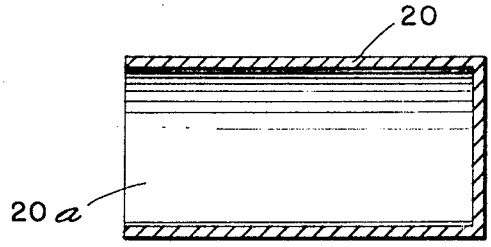



FIG. 3.

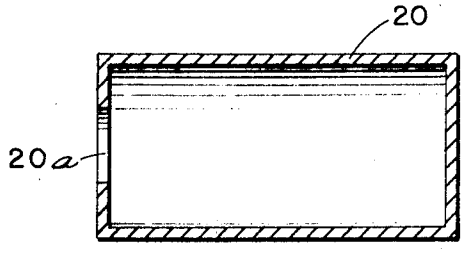



FIG. 4.

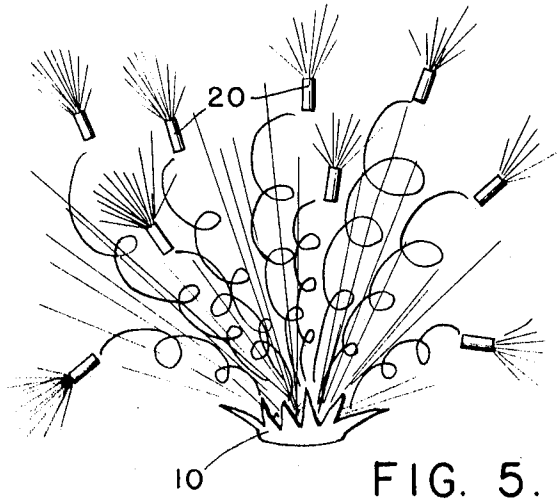



FIG. 5.

INVENTORS.
WILLIAM A. GEY
ARMIN T. WIEBKE
BY
P. H. Firsht
ATTORNEY.

# METHOD AND MEANS FOR DISPERSING CHEMICAL AGENTS

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.

The present invention relates generally to a method and means for disseminating a liquid agent and more particularly to an explosive method and means for achieving controlled dissemination and persistence of chemical agents in a liquid form.

Heretofore, various techniques have been employed for disseminating cloud-forming chemical agents or liquids over wide areas for many and varied purposes. The conventional techniques normally utilize airborne spray devices, and the like, which prove to be ineffective in instances where the target area is inaccessible, wind conditions are adverse, and the altitude beneath which an aircraft may operate over the target area is restricted. Further, aerial incendiary devices are also well known. However, the primary purpose of these devices is to spread a burning liquid over a given area, the dimensions of which are limited due to the inherent requirements that the liquid remain sufficiently concentrated for igniting combustible materials contacted by the incendiary liquid. Consequently, these devices are deemed inadequate for disseminating cloud-forming chemical agents. Certain explosive devices, such as those disclosed in copending application Ser. No. 410,033 filed Nov. 9, 1964, now U.S. Pat. No. 3,382,800, have been utilized quite successfully for effecting widespread dispersion of cloud-forming chemical agents. However, problems of efficiency, costs and complexity continue to plague those concerned with the development of disseminators for liquid agents.

The purpose of the present invention is to provide a method and means for overcoming the aforementioned disadvantages.

An object of the instant invention is to provide a simple and efficient method and means for effecting a widespread dispersion of cloud-forming chemical agents.

Another object is to provide a simple means for effectively disseminating a liquid agent over a wide area, and which may be readily assembled under adverse conditions.

And yet another object is to provide an effective method and means for forming a cloud of dispersed liquid particles and/or vaporized liquids over a wide area.

Other objects, advantages and novel features of the invention will become apparent from the following detailed description of the invention when considered in conjunction with the accompanying drawings wherein:

FIG. 1 comprises a partially sectioned elevation of the device of the instant invention;

FIG. 2 comprises a top plan view of the device of FIG. 1;

FIGS. 3 and 4 illustrate modifications of liquid containers utilized by the device of FIG. 1; and

FIG. 5 is a diagrammatic view illustrating an operation of the device of the instant invention.

Turning now to the drawings, wherein like reference characters designate like or corresponding parts throughout the several views, there is shown in FIG. 1 a partially sectioned side elevation of the device of the instant invention. The device includes a casing **10**, which may be formed of any suitable frangible material, having a bottom wall **11** sealed to a cylindrical sidewall **12**, at a first end thereof, to form an open receptacle. A cover plate **13** is seated and sealed in contiguous engagement with the internal surfaces of the sidewall **12** at the uppermost or second end of the casing **10** and serves to seal the casing **10** as well as to provide a mounting member for a cylindrical explosive or burster charge **14** mounted to extend therethrough.

The burster charge **14** comprises any well-known explosive material **14***a*, normally a solid material, contained within a tubular housing **14***b*, sealed at opposite ends by inserts or sealing plugs **15**. In order that the burster charge **14** may be selectively activated or detonated, an electrically activated initiator **16**, of any well-known design, is seated within the explosive material **14***a* and connected with an electrical source, not shown, by electrical connecting means or leads **17**, which extend from the initiator **16** through the outermost one of the inserts or sealing plug **15**. However, it is to be understood that any suitable means, including mechanical fuzes, may be employed for activating the burster charge **14**.



In order to secure the housing **14***b* of the burster charge **14** in operative position, a flanged opening **18** is formed in the cover member **13** for receiving, in mating relationship therewith, an end portion of the housing **14***b*. The housing **14***b* and the cover member **13** are secured together in sealing relationship by any suitable conventional means.

A plurality of relatively small open containers **20** are arranged or stacked at random within the casing **10**. The containers **20** normally comprise lightweight cylindrical cup-shaped members, FIG. **3**, having an opening **20***a*, the diameter of which is coextensive with the internal diameter of the container **20**. The containers **20** are arranged to form a self-supporting group of containers, disposed about the burster charge **14** in a manner such that a plurality of voids are randomly located between the containers and in communication with the internal portions of the containers **20**.

A selected liquid chemical agent **21**, which is to be dispersed, is introduced into the casing **10** for filling the existing voids, and consequently the containers **20**, whereby each container **20** comprises a container filled and supported in a bath of the liquid agent, which is to be dispersed upon activation of the device.

It will be appreciated that the specific composition of the liquid agent **21** may be varied, depending on its usage. However, where the device is to be used as a chemical cloud-forming device, the agent will normally comprise a volatile liquid which may be disseminated as a liquid prior to undergoing a change-in-state, i.e., a change from a liquid to a gas state. It will be further appreciated that the specific materials utilized in constructing the various components of the device must necessarily comprise compatible materials in order to avoid an occurrence of significant chemical reaction therebetween.

In certain instances, it has been found desirable to vary the size of the openings of the containers **20**, as illustrated in FIG. **4**, in order that the period of time required for discharging the liquid agent **21** contained therein may be selectively varied.

In assembling the device, the selected liquid chemical **21** may, as a practical matter, be introduced into the casing **10**, with the containers **20** and burster charge **14** being introduced later. The cover member **13** may then be inserted into a sealing relationship with the burster charge housing **14***a* and walls **12** of the casing. If desired, openings, not shown, may be provided within the casing wall **12** and/or cover member **13** to be utilized for introducing into the casing **10** the liquid agent **12**. Another assembly procedure, which has been found to be particularly desirable, comprises fixing the various structural components or elements in place, then introducing a vacuum within the casing **10** and thereupon adding the liquid **21**. Through the use of the vacuumizing step a complete filling of the containers **20** is insured. In any event once the device is assembled, it is in a completely sealed state and may now be stored, dropped from aircraft, and/or activated in fixed positions at ground level.

In operation, an electrical current is selectively passed through the connecting means **17** for activating the initiator **16**. The initiator **16** functions to effect a detonation of the burster charge **14**. The burster charge **14** serves to establish shock waves which pass outwardly through the liquid **21**. As the shock waves progress, the wall **12** is fractured or fragmented and the liquid agent **21** and filled containers **20** are violently accelerated outwardly from the fractured casing **10**. As the containers **20** progress from the point of detonation, additional motion is imparted thereto whereby quantities of the liquid agent is caused to be expelled from the containers while they are in the thus initiated flight, FIG. **5**. If the agent **2** is of a volatile nature, a gaseous cloud is formed about the outwardly progressing containers **20** as the contents thereof are expelled therefrom.

Consequently it is to be understood that the present invention comprises a very simple, efficient, and economic device which may readily be assembled, stored and/or used under adverse conditions, such as, for example, by troops in the field, and which may be utilized to achieve widespread dispersion of chemical agents.

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 is claimed is:

1. In a device for dispersing liquid agents:

a frangible casing;

a burster charge

means mounting the burster charge within the casing near the center thereof;

an electrical initiator mounted within said burster charge;

electrical connecting means connected with said initiator and extending from said casing adapted to conduct an electrical current from a given source to said initiator for initiating an activation thereof;

a plurality of open containers randomly disposed within said casing and grouped about said burster charge in a self-supporting group in a manner such that a plurality of voids are established between said containers in communication with the interior thereof; a preselected liquid agent filling said casing and containers; and means sealing said casing to provide a sealed liquid agent disseminator.

2. The device of claim 1, further characterized in that each container of said plurality of containers comprises a cylindrical container having means defining an opening at one end thereof the diameter of which is coextensive with the internal diameter of said container.

3. The device of claim 1, further characterized in that each container of said plurality of containers comprises a cylindrical container having means defining an opening defined therein with the diameter thereof being substantially less than the internal diameter of said container.

* * * * *