Oct. 8, 1968 A. J. GRANDY 3,404,630

LIQUID OR GAS DISSEMINATING PROJECTILE

Filed Nov. 27, 1967 3 Sheets-Sheet 1

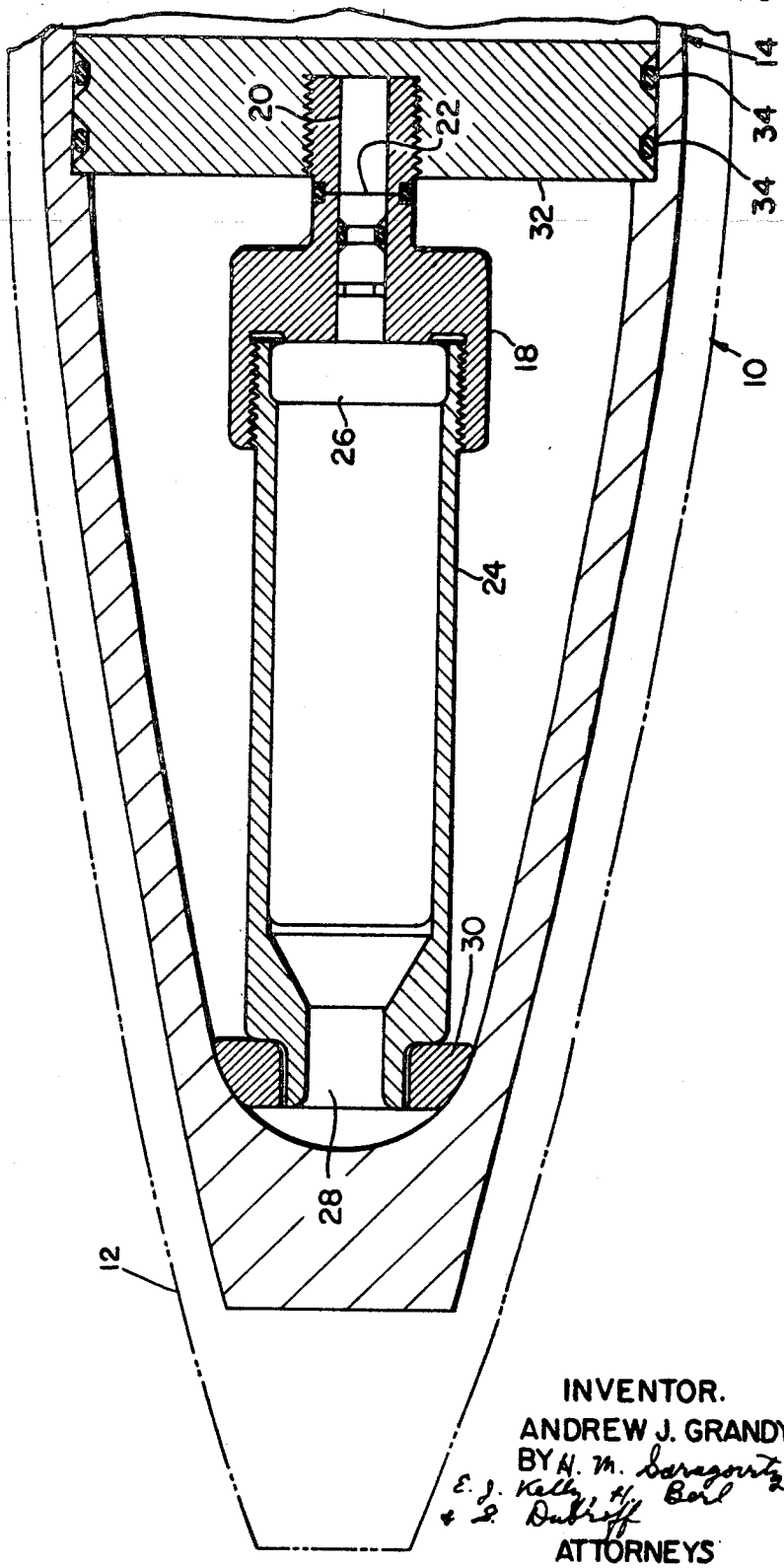


FIG. 1A

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LIQUID OR GAS DISSEMINATING PROJECTILE

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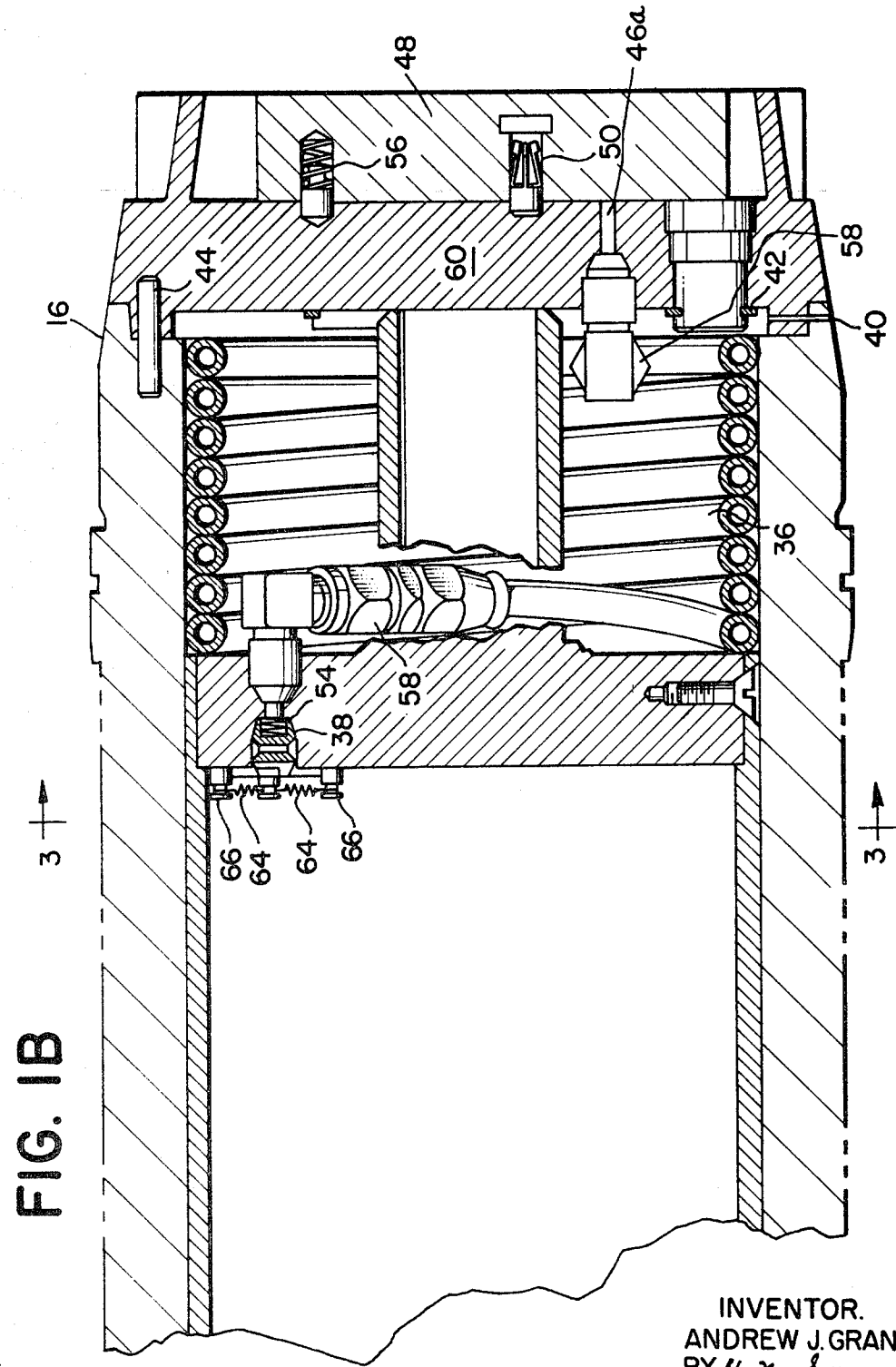


FIG. 1B

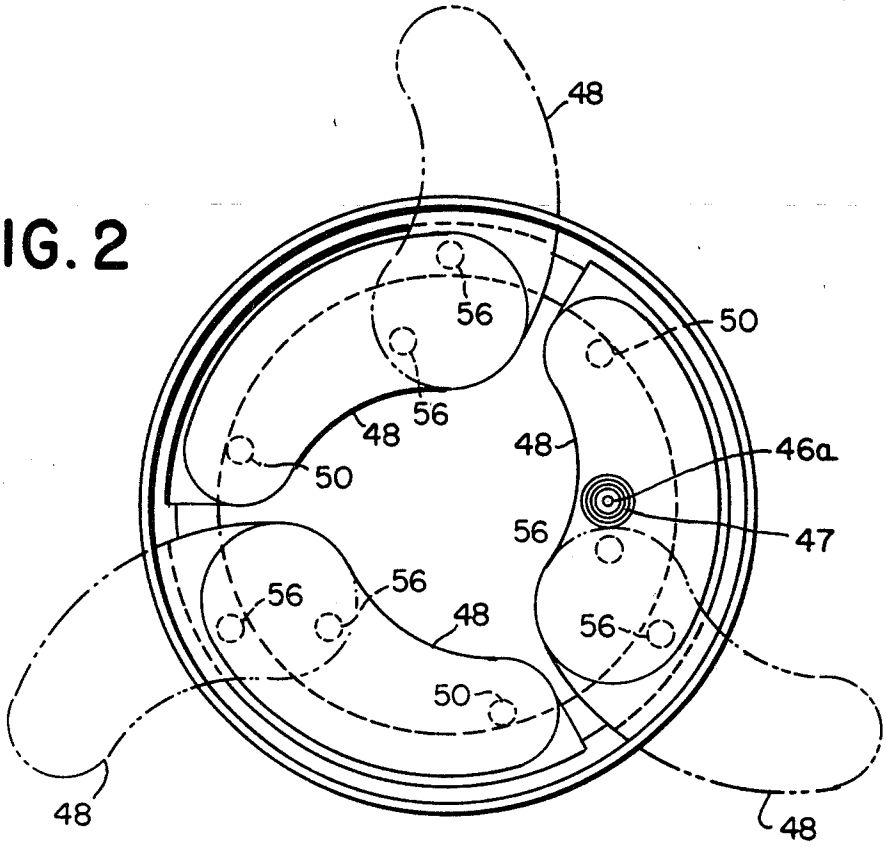
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LIQUID OR GAS DISSEMINATING PROJECTILE

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FIG. 2



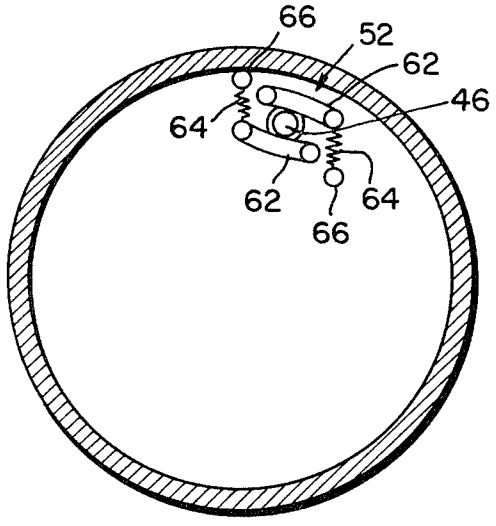


FIG. 3

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LIQUID OR GAS DISSEMINATING PROJECTILE

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ABSTRACT OF THE DISCLOSURE

A projectile for disseminating a liquid or gaseous agent including a gas generator which upon impact causes a piston to travel towards the base of the projectile thereby forcing a fluid or gaseous material contained in said projectile out through a high pressure hose which is attached to the projectile base. Upon impact, anchors on the projectile base expand and grasp the earth as the projectile continues therein causing separation of the projectile base from the projectile, and a high pressure hose which is attached to said projectile and to said projectile base, to unravel. The liquid or gaseous agent contained in the said projectile, will, by the action of the piston, be forced through the high pressure hose and out an atomizing nozzle.

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

The invention relates to a liquid or gas disseminating projectile and more particularly to a projectile which will disseminate a liquid or gaseous agent upon target impact.

The basic problem in the use of a projectile, which disseminated a liquid or gaseous agent upon impact, was in the limiting of ground penetration of the heavy projectile in order that the gas or liquid contents could be expelled to the atmosphere without hindrance. The use of prior art projectiles of this type involves the following steps:

(1) Setting a fuze prior to chambering;
(2) Firing the projectile from a gun tube;
(3) Blowing off a heavy base in flight;
(4) Deploying a drag chute to slow the projectile and limit ground penetration;
(5) "Blowing" or "Rose-Petaling" the forward part of the projectile to increase resistance prior to ground entry.
(6) Pressurization of the gas or liquid contents and expelling these contents to the atmosphere.

The present invention eliminates the six above noted general functions to be performed, each of which is dependent on an expensive and intricate time fuze, by providing a simple and straight forward method of accomplishing same with only two functions.

In general, the projectile is simply fired from a gun tube and allowed to proceed unhindered to the target area. Upon ground impact a simple anchor will drag the projectile base and extend a length of high pressure aircraft hose from within the projectile base. Impact forces will simultaneously pressurize an internal cannister which cooperates with the aircraft hose. Since the rearward part of the hose is essentially above ground the liquid or gas agent can be expelled to the atmosphere with minimum difficulty.

It is therefore an object of the present invention to provide a projectile which will disseminate liquid or gaseous material upon impact.

Another object is the provision of a projectile for disseminating liquid and gaseous material wherein set-back, centrifugal force and impact force, arm and actuate the projectile.

A further object is to provide a projectile for disseminating liquid and gaseous material into the atmosphere no matter how far into the ground the projectile is buried.

The above objects as well as others together with the benefits and advantages of the invention will be apparent upon reference to the detailed description set forth below, particularly when taken in conjunction with the drawings annexed hereto.

FIGS. 1A and 1B illustrate a plan view, partly in section, of the present invention.

FIG. 2 shows a view of the base portion of the projectile illustrating the open and closed position of the anchors.

FIG. 3 shows a view as taken along line 3—3 of FIG. 1B.

As seen in the drawings a projectile **10** includes a nose portion **12**, a cannister portion **14**, and a base portion **16**. The cannister portion **14** contains a gas generator **18**, having a firing pin **20**. A shear pin **22** prevents said firing pin from moving. Said gas generator **18** includes a gas cartridge **24**, and a stabilizer **30**, and has a rear portion **26** which contains a primer composition such as lead styphonate, barium nitrate, tetrazene, or the like which when activated by said firing pin **20** ignites a gas producing a substance such as a single or double based propellant to produce a gas. Said gas is expelled out the front end **28** of the cartridge and back down towards the piston **32**. A pair of O rings **34** prevents said gas from leaking around the side of said piston **32** and the gas urges said piston **32** to move in a direction towards the base of said projectile. This causes the material in said cannister portion **14** to pass through a high pressure hose **36** which is attached at one end, to the cannister **14** by a pressure plug **38**, to be described infra, which allows the gas to pass from the cannister to the high pressure hose. The high pressure hose **36** has a high pressure aircraft fitting **58** at either end.

As can be seen in FIG. 1B, the high pressure hose is coiled in the base portion **16** of the projectile **10**, and said base portion is secured to the rest of the projectile by shear pin **40**, a snap ring **42** and a twist pin **44**. At the other end of the high pressure hose is an atomizing nozzle **46***a* having a plurality of orifices therein through which the cannister material is expelled. This nozzle is located beneath one of a plurality of anchors **48**, see FIG. 2, and is, when said anchors are in the closed position, as indicated by the solid lines, concealed. When said anchors **48** are in the open position, as illustrated by the broken lines, the nozzle **46***a* is exposed. An O-ring seal **47** is provided to prevent leakage when said anchors **48** are in closed position.

Upon set-back the three anchors **48** are free to move into the open position due to the release of the three unlocking detents **50**. The spin initiated in the gun tube will then centrifuge the retainer **52** (FIG. 3), which retainer includes a pair of arcuate members **62** each having a spring **64** attached thereto and secured at **66** to said cannister **14**. The pressure plug **38** (FIG. 1B) is then free to creep forward during flight with the aid of a spring **54**. Upon target impact the pressure plug **38** will fully emerge, exposing the nozzle **46***a* of the high pressure hose **36**. Rapid spin degradation upon impact will cause the three anchors **48** to be spun to the open position as shown by the dotted or broken lines and locked by the locking detents **56**. Upon opening, the nozzle **46***a* of the high pressure hose **36** will be exposed. Target impact will also shear the pin **22** and actuate the firing pin **20** thus initiating the gas cartride **24**. Gas will commence to flow and act upon the piston **32**. During travel into the ground, the open anchors **48** will be subjected to an impact force which is transmitted to shear pin **40**, snap ring **42** and thrust pin **44** to separate the base plate **60** from the projectile base portion **16**. After this, the anchor will remain close to the surface of the earth, with the freed projectile base plate **60**,

which is attached to the high pressure hose **36**. Continued travel of the projectile **10** will unreel the required length of hose from within the projectile base portion. Travel of piston **32** under the influence of the gas pressure will simultaneouly force the liquid or gaseous material, such as alcohol-glycol simulant, from the cannister **14** through the high pressure hose **36** and out the nozzle **46***a*.

It is not necesary for the projectile to fully bury itself and release the hose to obtain the desired result. With the anchors **48** in the open position, impact will actuate the gas cartridge thus causing a flow through the exposed atomizing nozzle. Approximately 10 feet of hose can be accommodated in the existing projectile body of, for example, a 155 mm. projectile, without detracting from the liquid volume of approximately 275 cu. in. Also, if tensile characteristics of the hose require, a "tandom" high strength steel wire can be laid across the length of the hose. This wire will be purposely made shorter than the extended length of hose and thus be able to absorb the tensile load after full payout is achieved.

Obviously many variations and modifications of the present invention are possible in 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.

I claim:

1. A projectile for disseminating fluid material into the atmosphere after impact comprising:

a cannister including a forward portion and a rearward portion,

a piston movably secured within said forward portion, and

means to move said piston in a direction towards the rearward portion,

material to be disseminated contained within said rearward portion,

a base portion including:

coiled hose means secured to said cannister portion at one end,

a base plate separably connected to said base portion and connected to the other end of said hose means, and

means for preventing said base plate from travelling with said projectile after impact.

2. A projectile of the type described in claim **1** wherein said means to move said piston includes a gas generator.

3. A projectile of the type described in claim **2** wherein gas generator includes:

a gas cartridge,

a firing pin in alignment with said gas cartridge,

a shear pin securing said firing pin from moving until impact.

4. A projectile of the type described in claim **1** wherein said coiled hose means includes a high pressure hose having high pressure aircraft fittings at both ends.

5. A projectile of the type described in claim **4** wherein said high pressure hose is communicates with said cannister portion through a retainer comprised of:

a pair of arcuate members,

a pair of springs each attached at one end to one of said arcuate members and secured at the other end to said cannister, and

a pressure plug having a spring therein.

6. A projectile of the type described in claim **1** wherein said means for preventing said base plate from travelling with said projectile after impact includes:

a plurality of anchors attached to and spaced radially around said base plate.

7. A projectile of the type described in claim **6** wherein said base plate includes an atomizing nozzle having a plurality of orifices therein.

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