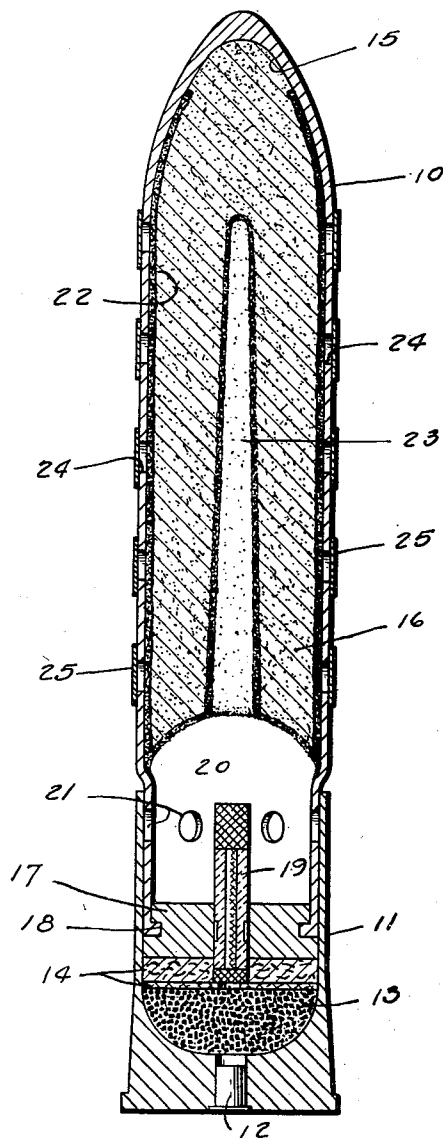


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GAS DISPERSING PROJECTILE
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GAS DISPERSING PROJECTILE

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The present invention relates generally to a method and devices for dispersing toxic and irritant substances and more particularly to fast burning gas dispersing projectiles used with large caliber portable firearms as well as field pieces of the one pounder, 75 m. m. and 155 m. m. type of ordnance.

Generally, ordnance pieces of this type have been limited in their use to piercing and/or shrapnel carrying projectiles and it is new in the art to provide projectiles capable of carrying solid toxic or irritant gases to a point substantially remote from the firing join wherein there is provided means for effecting fast burning dispersion without decomposition of the gases.

The primary object of the present invention is to overcome the inherent disadvantages of prior art devices and provide an incapacitating gas producing projectile capable of use in various types of ordnance pieces and which projectile incorporates a gas producing material, a booster and an igniter together with means for the dispersion of the gas without explosion.

A further object of the present invention is to provide in a shell of this character a chamber containing an explosive charge ignited by a conventional primer adapted to propel the projectile and to ignite a non-detonating fuse carried by the projectile.

A specific object of the invention is to provide in a projectile of this type, a burning chamber and burning areas adjacent to ports specifically provided in said projectile to thereby permit of the evolution and dispersion of the gases without decomposition and/or explosion.

A further specific object of the invention is to provide a construction of projectile whereby the solid irritants are effectively sealed from the explosive charge, providing thereby a carrier for the fuse whereby the ignition of the projectile's fuse may be effected by the explosion charge.

A still further specific object is to provide a gas producing projectile having a burning chamber area provided with open ports which are effectively sealed to the atmosphere by the coating arrangement of the projectile body and the casing of the shell when in assembled relation but which are open to the atmosphere immediately upon separation of the projectile body from its casing.

In order to secure fast burning and concentrated dispersion of the gases, there is further provided a secondary group of ports on the main body of the projectile normally sealed to the atmosphere by a booster material in direct contact with

a booster in the burning area and with the gas producing material in the main body. In practice this secondary group or groups of ports are further sealed by adhesive wads.

The burning of the booster at the points adjacent and in contact with the ports on the main body, although responsible for a limited fast burning and resulting limited decomposition of the irritant gases, tends to form almost instantaneously a second burning area in communication with the burning chamber area heretofore mentioned.

In actual practice, for the purpose of increasing the initial burning surface, we provide one or more holes, as may be desirable, depending upon the effective cross sectional area of the projectile, extending longitudinally of the main body of the irritant material.

The main body of the projectile comprises a mass consisting of an intimate mixture of gas and fuel in solid form normally placed in the projectile under pressure and may be one of several kinds; for example, nitro-cellulose compounds, gun powder mixture, mixture of gun powder and nitro-cellulose compounds, or any other combination of chemicals, which when caused to react produce heat to vaporize the physiologically active chemical compounds in the mixture, may be used.

The gas producing substance may be any one or a mixture of several types of such compounds. If a lachrymatory or crying gas is desired a chloroacetophenone compound known as "CN" may be used. If a sternutatory, or sneezing gas is desired a diphenylaminechloroarsine gas may be utilized. An example of a fumigatory gas is paraformaldehyde. An example of a sternutatory or smelling gas is mercaptan.

It is to be understood, however, that other forms of fuel and gas producing substances may be used within the scope of the invention, as the foregoing examples are given by way of explanation of the invention and not by way of limitation.

The single figure of the accompanying drawing illustrates a present preferred embodiment of the invention.

Referring more particularly to the drawing, the shell, generally, comprises a projectile portion 10 and a casing portion 11. The casing portion 11 is provided with a conventional firing cap or primer 12 and contains a propelling powder charge 13. The primer and propellent powder charge may preferably consist of the usual charges found in approved service ammunition, such for example as nitro-cellulose compounds or any other combination normally susceptible to ex-

plosive reaction. Above the powder charge 13 is placed suitable wads 14 of fibrous material, such as cotton and these wads are sealed in place by sealing material, preferably paraffin. Ignition of the primer 12 sets off the powder charge 13 and the resulting pressure produced thereby forcibly separates the projectile portion 10 from the casing and not only propels the projectile and its contents from the barrel of the weapon, but simultaneously ignites a non-detonating time fuse 19 carried by the projectile.

The projectile portion 10 is preferably bullet shaped and is provided with a chamber 15 into which the gas producing material 16 is loaded under pressure in an amount sufficient to provide a substantial space between the exposed top surface of the gas producing material and the base of the shell. In practicing the invention, the base of the shell is closed to the atmosphere and sealed from the propellant charge in the casing 11 by a fuse block 17 having a peripheral groove 18 into which the edge of the metals of the shell are suitably crimped. A non-detonating time fuse 19 carried by the fuse block 17 is in operative communication with the powder charge 13 in the casing 11 and the gas producing mixture in the projectile portion 10. Thus we provide a burning chamber 20 formed by the spaced relation of the exposed top surface of the gas producing mixture, the fuse block and the walls of the projectile within which the evolved combustion gases and irritant expand and become cooled to an appreciable extent prior to their emission to the atmospheric air. It will be noted that the rear end portion of the projectile in the vicinity of this chamber is reduced in size in an amount sufficient to permit this portion of the projectile to be tightly telescoped within the forward open end of the casing 11. The walls of the burning chamber 20 contain a plurality of outlet openings 21, which are normally sealed to the atmosphere by the coating arrangement of the projectile body portion and the casing 11. The flash of the propelling charge ignites the fuse 19 which is so timed as to set off the gas producing mixture at a predetermined time after the projectile portion 10 and its contents have been expelled from the firearm.

To the end that a fast burning of the mixture may be provided and ignition thereof insured, the periphery of the mixture or, if desired, the inner walls of the chamber 15 as well as the exposed top surface of the mixture is coated with a suitable starter substance 22 comprising a mixture of black powder, collodian and acetone or other suitable ignitable booster material.

If desired one or more burning holes 23 extending longitudinally through the gas producing mixture may be provided for the specific purpose of increasing the burning rate of the mass. When making use of such an expedient, the surface of the hole through the center of the gas producing mixture is coated with the booster material.

In order to insure fast burning and concentrated dispersion of the combustion gases and the irritant there is further provided in the walls of the projectile portion 10, a plurality of groups of secondary outlet openings 24 which coact with the booster composition disposed along the sides of the gas producing mixture to provide secondary burning areas in addition to the burning area in the chamber 20 which permit the evolution and dispersion of the combustion gases and irritant without decomposition and/or explosion.

Each secondary opening or outlet 24 in the walls of the projectile 10 is normally sealed to the atmosphere by booster substance 22 although in actual commercial practice it is further preferred to cover the said openings with strips of adhesive tape 25 though other materials and means for closing the openings prior to the functioning of the projectile may be employed, if desired.

From the foregoing description, it will be appreciated that we have devised an efficient fast burning gas dispersing projectile. By providing a cooling and expansion chamber in the manner hereinabove set forth, the evolved gases of combustion and irritant issue from the openings in the wall of the projectile body portion at a temperature below that at which flashing or substantial decomposition of the irritant would occur on coming in contact with the oxygen of the air, thus rendering the dispersion of the irritant highly efficient and minimizing to a large extent, if not entirely, the waste of irritant which would otherwise occur by chemical reaction or decomposition into compounds or compositions lacking the desired properties of the irritant.

While we have shown and described the preferred embodiment of our invention, we wish it to be understood that we do not confine ourselves to the precise details of construction herein set forth, by way of illustration, as it is apparent that many changes and variations may be made therein, by those skilled in the art without departing from the spirit of the invention, or exceeding the scope of the appended claims.

We claim as our invention—

1. In gas dispersing ammunition, a cartridge casing containing a propellant charge, a primer in the base of said casing, a projectile body mounted in said casing having openings in the walls thereof normally sealed to the atmosphere by the coating relation of the projectile body and the cartridge casing, the said projectile containing in a portion thereof a solidified mass of a combustible and a vaporizable gas producing substance, an adjacent communicating portion forming a burning chamber sufficient in area to cool and expand the evolved gases from said mass, a closure member for said projectile forming a wall of said burning chamber, a coating of booster material applied to the inner walls of said projectile and in intimate contact with said solidified mass to provide longitudinal disposed burning areas, upon ignition of said booster, in communication with said burning chamber area, and a non-detonating time fuse carried by said closure member ignitable by the firing of said propellant charge and operating to delay the ignition of said mass and effect a fast burning concentrated dispersion of the evolved combustion gases.

2. In gas dispersing ammunition, a cartridge casing containing a propellant charge, a primer in the base of said casing, ignition means, and a perforate projectile, a fuse block, and a gas producing mixture, the said projectile having a burning and expansion chamber formed by spaced relation of the exposed top surface of the gas producing mixture, and the fuse block, the walls of the projectile having primary gas emitting ports normally sealed to the atmosphere by coacting relation of the projectile and its casing, and secondary gas emitting ports normally sealed to the atmosphere by a booster material forming a part of the said ignition means.

3. The combination of a cartridge and a projectile containing an intimate mixture of a gas

5 producing substance and a fuel, a recessed rear
body portion adapted for telescopic engagement
with said cartridge, a fuse block and fuse element
in the base of said recessed body portion, the
10 latter comprising ignition means for the said
intimate mixture, the said cartridge containing a
primer and a propellant charge comprising igni-
tion means for the fuse element, and gas emit-
ting ports in said recessed body portion normally
sealed to the atmosphere by the coacting relation
of the projectile and the cartridge.

4. The combination of a cartridge and a pro-
jectile containing an intimate mixture of a gas

producing substance and a fuel, a rear body por-
tion adapted for telescopic engagement with said
cartridge, a fuse block and fuse element in the
base of said body portion, the latter comprising
5 ignition means for the said intimate mixture,
the said cartridge containing a primer and a pro-
pellent charge comprising ignition means for the
fuse element, and gas emitting ports in said rear
body portion normally sealed to the atmosphere
10 by the coacting relation of the projectile and the
cartridge.

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