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GAS LIBERATING CHARGE

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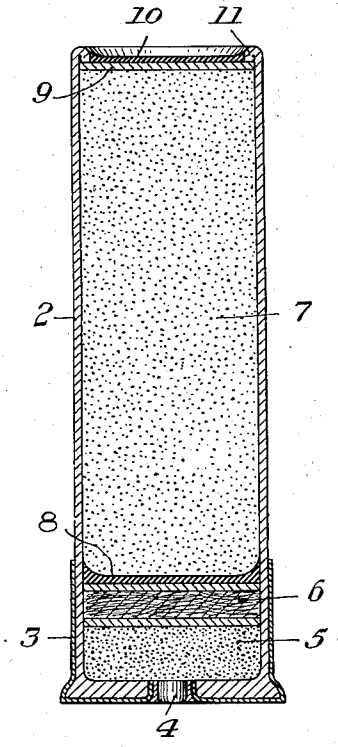


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# UNITED STATES PATENT OFFICE

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## GAS LIBERATING CHARGE

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My invention relates to dispersing irritating substances, and more particularly to containers and container charges for liberating gas of an incapacitating character.

In devices for liberating incapacitating gas it has heretofore been customary to provide a container in which a charge of powder is ignited by a cap. The burning of the powder generates gas which discharges a body of small particles of a chemical compound which, when released to air either with or without the heat incident to the burning of the powder charge, is transferred to a smog, colloidal and/or gaseous state. The gas serves to incapacitate a person within the zone of discharge of the contents of the container.

A number of types of devices for discharging such containers are in use. These devices take the form of pistols, policemen's maces, fountain pens, pencils, bombs, and the like. Some of the containers when in the form of cartridges have the general shape of a shot gun shell and are usually made in sizes corresponding to standard sizes of bullets so that the cartridges can be used in standard fire arms, if desired.

When containers as heretofore constructed have been discharged, the chemical compounds in a finely divided state have been discharged as a spray of liberated gas and small particles of the charge. As the effectiveness of the charge depends to a considerable extent upon its remaining in the air, where the particles can be converted into a gaseous state, the presence of large particles of the charge lowers the efficiency of the discharged products. The large particles offer less exposed surface area per unit of weight to the atmosphere than do fine particles or thin films. The large particles do not remain suspended in the air as long as the small particles since the larger particles fall more rapidly than do the smaller particles which tend to float in the air. The particles of the charges also tend to form aggregates and cohere, thereby producing larger particles or lumps, with the resultant disadvantages of less surface area per unit of weight and a higher settling speed. As a result of such conditions considerable more of the charge has been placed in the containers than is ultimately converted into gas.

Chloroacetophenone is a common chemical used in such containers and the commerical product is somewhat oily in its nature and tends to cohere.

The life of such containers and charges as heretofore constructed has been limited to rather definite periods of time by reason of the deterioration of the gas producing charge, as the result of chemical deterioration occasioned by chemical reactions between the various ingredients in the container. This is true where chloroacetophenone is used as a gas liberating charge.

I provide a container in which a barrier or wad having a cooperating coating or film, impervious to the vapors liberated by the gas liberating charge, is interposed between the propelling powder and the charge. The presence of the impervious coating prevents the circulation of gases from the charge into contact with the propelling powder, thereby preserving the effective life of the gas liberating charge over periods of a considerable number of years. Where chloroacetophenone is used, a nitrocellulose coating may be employed. It is to be understood, however, that the invention contemplates the use of charges other than chloroacetophenone. Such charges may be of stenchatory, lachrymatory, sternutatory, fumigatory and the like characteristics as desired.

For preventing the formation of aggregates of the discharged material and for insuring a better floating of the particles of the material in the air, the chemical compounds of the gas liberating charge are associated with an inert substance. The inert substance is of a light fluffy nature with considerable surface area, such that each particle tends to float in the air and retain its individual shape without cohering into an aggregate. By coating the particles of inert matter with thin films of the chemical compound, greater surface areas per unit weight of the chemical charge is obtained. This produces a saving in the amount of the incapacitating chemical compounds required with greater efficiency.

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

Referring to the drawing, a container illustrated in the form of a cartridge 2 having a base 3 of metal, such as brass, is provided with a firing cap 4. The cap 4 is ignited by a firing pin mounted in the weapon in which the cartridge is inserted. The cap 4 ignites a body 5 of inflammable material, such as black or smokeless powder, for developing a pressure and heat to discharge the contents of the cartridge after the ignition of the cap 4.

The inflammable charge 5 is covered by a barrier or wad 6 which separates it from a charge 7 of a chemical mixture which, upon being discharged into the air, is an irritant and is converted into fine particles of the desired irritating characteristics. The compounds frequently used in such cartridges release an incapacitating gas which may be of any one of a number of types, such as stenchatory, lachrymatory, sternutatory or fumigatory. A chemical compound frequently used for such purposes is chloroacetophenone.

For preventing the deterioration of the propelling charge 5 by infiltration of gases between the charge 7 and the inflammable charge 5, the wad 6 is provided with a coating or film 8, preferably placed on top of the wad. The material of the coating 8 is impervious to the gases liberated by the charge 7. Suitable impervious material for the coating 8 is obtained from films of cellulose derivative type lacquers or gum varnishes, or both, containing cellulose derivatives.

Where chloroacetophenone is used in combination with either black or smokeless powder, a slow deterioration of the chemicals results by mutual reactions of the ingredients. By providing an impervious coating 8, such circulation or infiltration is prevented and the chloroacetophenone and powder used for propelling purposes are kept in effective condition over long periods of time. The top of the cartridge is closed by a wad 9 having a water-proof coating 10. The edge 11 of the cartridge 2 is spun over to rest on top of the wad 9.

For preventing the cohesion of aggregates of the discharged particles of the charge 7, the incapacitating chemicals are in a thin film associated with an inert material, in a finely subdivided state, and to which the chemical particles adhere. The inert material may be one of any one of a number of such materials, each of which is light, fluffy and capable of floating in the air for considerable periods of time. By having the fine coating or film of the incapacitating chemical compound disposed over the surfaces of the inert material, the exposed surfaces of the chemical compound per unit of weight is greater than is the case where the particles of the chemical salts cohere and form aggregates. This results in a material saving in the amounts of chemicals used as a more thorough vaporization of the chemicals is obtained with greater efficiency. The presence of the finely divided inert material, which does not go into a gaseous state, also adds to the irritating effect of the discharged material as the fine particles produce an irritating effect upon the eyes, nose and throat.

There are a number of inert substances suitable for such purposes, such as finely pulverized celite, silica, a hydrate of silicon mined in Colorado; silica gel powders; bentonite, a geological colloidal clay; finely ground pumice; finely ground China clay; precipitated chalk; asbestine, a ground asbestos; kieselguhr, etc. It is to be understood, however, that the invention contemplates the use of inert materials other than those just enumerated.

For producing a film of the incapacitating chemical materials with the particles of inert material, the chemicals may be dissolved in solvents and then mixed with the inert particles, after which the solvents are evaporated and thereby deposit a coating of the chemical material on the particles of inert material. In the case of chloroacetophenone, it may be dissolved in carbon tetrachloride or benzol and deposited on an inert material.

Where it is desired to associate the incapacitating chemical material with the inert material mechanically, the two may be ground together.

While I have shown and described the present preferred embodiment of the invention, it is to be understood that it may be otherwise embodied and practiced within the spirit of the invention and the scope of the appended claims.

I claim:

1. A charge for conveying and distributing irritating gas when expelled by force from a container, comprising a confined mass of detached particles of finely divided solid earthy material said particles being light and capable of floating in air for a considerable time, said particles being coated with films of an irritant which is solid at ordinary temperatures.

2. A charge for conveying and distributing irritating gas when expelled by force from a container, comprising a confined mass of detached particles of finely divided solid non-explosive material said particles being light and capable of floating in air for a considerable time, the particles being coated with films of chloracetophenone.

3. A charge for conveying and distributing irritating gas when expelled by force from a container, comprising a confined mass of detached particles of finely divided sili-

ceous material said particles being light and capable of floating in air for a considerable time, said particles being coated with films of an irritant which is solid at ordinary temperatures.

4. A charge for conveying and distributing irritating gas when expelled by force from a container, comprising a confined mass of detached particles of finely divided kieselguhr coated with films of chloracetophenone.

In testimony whereof I have hereunto set my hand.

ALEXANDER LOWY.