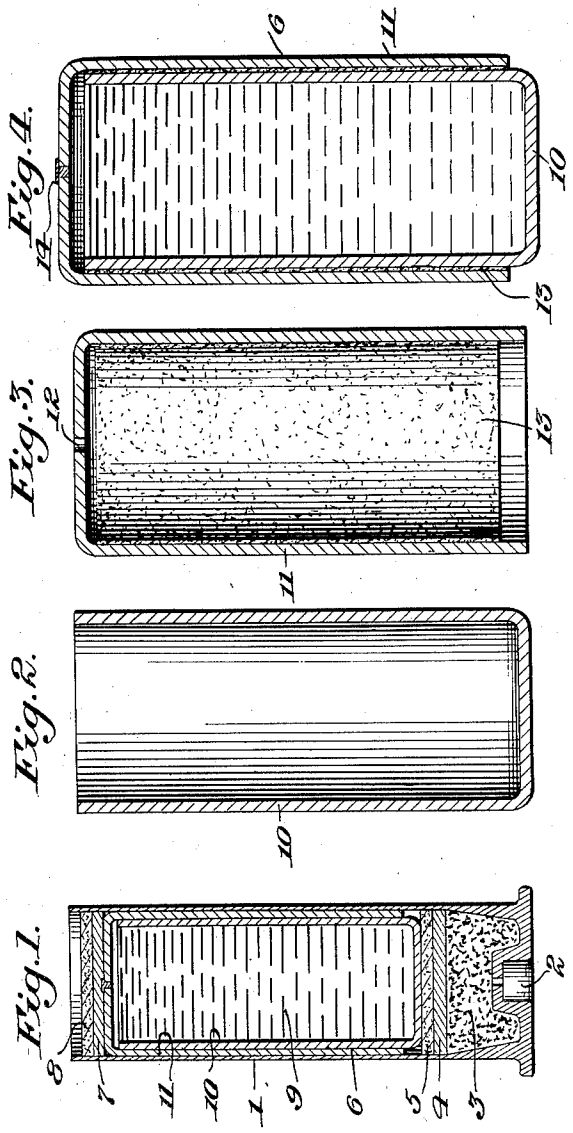
March 11, 1930. B. C. GOSS 1,750,101

GAS GENERATING CHEMICAL

Filed Jan. 19, 1927



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Patented Mar. 11, 1930 1,750,101

UNITED STATES PATENT OFFICE

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GAS-GENERATING CHEMICAL

Application filed January 19, 1927. Serial No. 162,178.

This invention relates to gas generating chemicals and to mixtures of such chemicals of the "tear gas" type, which are readily converted into fuming and blinding gases or gaseous mixtures possessing the property of causing excessive lachrymation accompanied by intense pain, sneezing, coughing, etc. on the part of a person or persons subjected to the action of such gases.

An object of the invention is to increase the effectiveness of the tear gas, by adding thereto a chemical or chemicals the fumes of which will produce extreme pain in the nose and throat when inhaled, and a burning sensation on the skin, in addition to the lachrymation effect produced by ordinary tear gas, thereby increasing the total effectiveness of a given volume of chemical used and of fume produced.

A further object of the invention is to produce highly concentrated compositions or mixtures of chemicals which readily evolve great volumes of the disabling gases.

A further object is to use such chemicals in combination with similar chemicals, one of said chemicals having the property of increasing the volatility of the other when associated therewith.

A further object is to use such chemicals and mixtures of such chemicals in grenades, bombs, cartridges, vault and safe protection devices, room protection devices, for spraying from airplanes, etc., automatic alarms, etc. in combination with or without an explosive or propellant powder to deliver the charge at a desired point, and which also has the property of suddenly generating great heat, or with or without other heat generating chemicals alone, the heat if used serving to volatilize and disperse the chemicals.

Other objects of the invention will be apparent on reading the specification.

In the accompanying drawings:

Fig. 1 is a longitudinal sectional view of a completed cartridge containing chemicals to be converted into fumes, etc. upon discharge of the fire arm;

Fig. 2 is an enlarged sectional view of an inside part of a gelatine or similar capsule, into which the chemical is placed;

Fig. 3 is an enlarged sectional view of a cover or outer casing for the capsule, on the inner wall of which is placed a suitable adhesive; and

Fig. 4 is an enlarged sectional view of a filled and closed capsule.

In Fig. 1, a cartridge shell 1, carrying a cap 2, is supplied with a quantity of propellant powder 3, such as black powder, smokeless powder, etc., and then covered with a wad 4; upon the wad is poured a quantity of melted gelatine 5, or other protecting material, and then the covered capsule 6, shown in Fig. 4 is inserted; upon the capsule is placed a wad 7, and upon the wad a final layer of melted gelatine 8, or other protecting material.

The capsule used preferably consists of inner and outer shells, shown in Figs 2 and 3, and may be made of gelatine or similar easily destructible material. The chemical 9. used as the fume-generating composition, is supplied to the inner capsule 10, Fig. 2, and then the cover 11, Fig. 3, which is provided with a perforation 12, is quickly given a coating of adhesive 13, for example melted gelatine, upon its inner wall, shown exaggerated in Figs. 3 and 4, and then quickly placed over the filled inner capsule. As soon as it is properly covered, the perforation 12 is closed with a drop of melted gelatine 14, or other suitable material. The sealed capsule, Fig. 4, is now inserted in the cartridge shell 1, and covered with a wad 7, which is then covered with a layer of melted gelatine 8, or similar material.

The preferred fume-generating composition used consists of a mixture of chemicals, each component of which possesses the property of causing intense irritation, and each of a different kind; the combined effect thereof is to render it difficult to completely protect one's self against being overcome and incapacitated by the violently active fumes. This is accomplished by combining or dissolving one such chemical or more than one, each of a different kind, in a solvent, which is itself a fume-generating chemical of the above kind, or a mixture of several such chemicals, each one different, may be used as the solvent. Saturated solutions of solute and sol

vent are preferred. For example, one of the chemicals may cause copious lachrymation, another may cause extreme irritation of all muccous membranes, such as of the nose, throat, etc., and be very painful; a third may consist of a violently disagreeable smelling substance, of a character that masks the other fumes, and that tends to increase the general incapacity of a person overcome thereby. Any person overtaken by the fumes will be subjected to intense pain. The combined or dissolved chemicals will have a much greater fume-generating effect than a similar volume of any one of them separately, due in part to their increased volatility, and also to a greater extent to their mutual solubility, since the resulting volume of a solution of one or more of such chemicals in a solvent is less than the sum of the separate volumes of the components.

Chemicals suitable for fume-generations as above described are normally solids, liquids, or gases. Among solids having the property of generating fuming, irritating or blinding gases are chloracetophenone; phenyl-brom-acetate; diphenylamine-chlorarsine; p-brom-chloracetophenone; iodo-acetophenone; diphenyl-chlorarsine; capsaicin.

Among liquids suitable as solvents of the above solids are the ethyl-brom-acetate; methyl brom-acetate; chloracetone; benzyl-bromide; brom-benzyl-cyanid; iodo-acetate; phenyl-iso-cyanide; bromo-acetone; chloro-methyl-chloroformate; chlor-acetotoluone; phenyl-carbylamine-chloride. The term alkyl-brom-acetate is used to include ethyl-brom-acetate and methylbrom-acetate, either separately or together. The term halogen-ketonic-compound is used to include such compounds as chloracetone, bromoacetone, chloracetophenone, p-brom-chloracetophenone, etc. The term lachrymatory-gas-halogen-containing-compound is used to include diphenyl-chlorarsine, diphenylamine-chlorarsine, phenyl-brom-acetate, etc.

Selected solid chemicals of the first group are dissolved in selected liquids of the second group, the resulting composition having less volume than the sum of the volumes of the components, and accordingly possessing increased fume-generating properties per unit of volume. The solid chemicals are also much more easily volatilized when in a dissolved state in the above liquids, than they are in the solid form, thus rendering them more effective as fuming agents for a given charge.

Combinations of the above chemicals develop fumes and gases which cause pain in the eyes, nose, throat, and skin, accompanied by copious lachrymation, sneezing and coughing and more or less completely disables any one exposed to their influence. The fumes generated cause such severe discomfort, and in such a brief time, that persons attempting to commit crimes are overcome before the criminal act is committed, and are obliged to quickly leave the fuming atmosphere.

I have discovered that I am able to greatly increase the effectiveness of the above chemicals, and similar solids, liquids and gases, used for disabling and subduing criminals, dispersing mobs, etc., by suitably combining, dissolving, or similarly molecularly associating some of the above chemical substances with others having in general like properties. This intimate association, as by solution, etc., of one or more of the above chemicals, either solid, liquid, or gaseous, in a suitable solvent also having powerful disabling properties, as above noted, or in a mixture of such solvents, produces a complex having as new properties a greatly increased concentration of violently active chemicals, increased volatility of the high boiling and solid components of the complex, greatly increased dispersion and effectiveness of the resulting fumes or gases for the purpose of disabling a person it is desired to subdue or capture. I have found, for example, that chlor-acetophenone, which is considered the most powerful lachrymator known, is very soluble at ordinary temperatures in ethyl-bromacetate, approximately fifty per cent by weight dissolving therein, and when so dissolved, is much more effective per unit of volume than when used alone. The resulting solution has a smaller volume than the sum of the volumes of the solute and solvent, and by reason of the decreased volume, an increase in concentration of each of the components is obtained. By using such a solution, a reduced quantity of explosive may be used, thereby allowing an increased amount of chemical disabling agent to be used in a given sized shell or bomb. Methyl-brom-acetate may be substituted for the ethyl-brom-acetate.

As an illustration of the above reduction in volume of the mixed and dissolved chemicals, fifty cubic centimeters of highly compressed solid chlor-acetophenone will dissolve in fifty cubic centimeters of ethyl-brom-acetate, giving a solution having a resulting volume of ninety cubic centimeters, measured at the same temperature.

The following will also give satisfactory results. Solutions of chlor-acetophenone, diphenyl-amine-chlorarsine, capsiacin, or diphenyl-chlor-arsine, in a liquid containing alkyl-brom-acetate, preferably ethyl-brom-acetate, and about one per cent or less of phenyl-iso-cyanide, are highly effective combinations for the above purpose, producing intensely irritating and lachrymatory fumes, and a very offensive and disagreeable odor. Methyl-brom-acetate, or chloracetone may be substituted for the ethyl-brom-acetate.

The mixed chemicals so produced may be used in all types of weapons designed for this purpose, such as shells, bombs, grenades, aero-

plane spray devices, etc., and are especially adapted for use in the cartridge described in my United States Patent No. 1,600,223, dated September 21, 1926.

I claim:

1. Gas generative chemicals comprising a solution of a solute gas-generating chemical having disabling properties in a solvent gas-generating chemical having the property of generating irritating and disabling fumes of a character different from that of the solute, thereby obtaining the combined effect of the component chemicals.

2. Gas generating chemicals comprising the solution of chemicals developing lachrymatory gases, in a solvent capable of developing fumes which irritate the mucous membranes such as of the nose and throat.

3. Gas generating chemicals comprising the solution of chlor-acetophenone in an algyl-brom-acetate solvent.

4. Gas generating chemicals comprising a solution of chlor-acetophenone in a solvent containing ethyl-brom-acetate.

5. Gas generating chemicals comprising a solution of chlor-acetophenone in a solvent containing alkyl-brom-acetate and phenyl-isocyanid.

6. Gas generating chemicals comprising as a solute, a dissolved chemical capable of developing a fuming, blinding or disabling gas, in a solvent having the property of forming an intermolecular mixture therewith, and thereby producing a resulting solution having a smaller volume than the sum of the separate volume of the components of said resulting solution.

7. Gas generating chemicals comprising a solution of a lachrymatory-gas-halogen-containing-compound in a solvent containing an alkyl-brom-acetate.

8. Gas generating chemicals comprising a solution of a lachrymatory-gas-halogen-containing-compound in a solvent containing ethyl-brom-acetate.

9. Gas generating chemicals comprising a solution of a lachrymatory-gas-halogen-containing-compound in a solvent containing an alkyl-brom-acetate and phenyl-iso-cyanide.

10. Gas generating chemicals comprising a solution of a lachrymatory-gas-halogen-containing-compound in an alkyl-brom-acetate solvent.

11. Gas generating chemicals comprising a solution of a lachrymatory-gas-halogen-containing-compound in ethyl-brom-acetate.

12. Gas generating chemicals comprising a solution of a halogen-ketonic-compound in a solvent containing an alkyl-brom-acetate.

13. Gas generating chemicals comprising a solution of a halogen-ketonic-compound in a solvent containing an alkly-brom-acetate and phenyl-iso-cyanide.

14. The method of generating irritating, blinding, or disabling gases, which comprises dissolving a chemical capable of producing such gases in a solvent having additional disabling gas producing properties, each of the components having the property of mutually dissolving each other and producing a final volume smaller than the sum of the separate volumes of the components, and volatilizing the resulting products.

15. The method of producing a highly concentrated disabling gas producing chemical mixture and of increasing the volatility of a solid component thereof, which consists in dissolving a solid disabling gas producing chemical in a volatile liquid having disabling gas producing properties.

In testimony whereof I hereby affix my signature.

BYRON C. GOSS.