UNITED STATES PATENT OFFICE.

ROBERT CLYDE GOWDY, OF CINCINNATI, OHIO, ASSIGNOR TO THE GOVERNMENT OF THE UNITED STATES.

SMOKE-MAKING COMPOSITION FOR SIGNAL-ROCKETS.

1,319,329. Specification of Letters Patent. Patented Oct. 21, 1919.

No Drawing. Original application filed November 23, 1918, Serial No. 270,234. Divided and this application filed April 24, 1919. Serial No. 292,352.

To all whom it may concern:

Be it known that I, ROBERT CLYDE GOWDY, a citizen of the United States, residing at Cincinnati, Ohio, have invented new and useful Improvements in Smoke-Making Composition for Signal-Rockets, of which the following is a specification, and is a divisional application of my prior case, Serial #270,234, filed November 23, 1918.

This invention relates to pyrotechnic signals and more particularly to the smoke making compound used therein.

It was one of the objects of the present invention to provide an improved simple and practical compound for use in devices such as shown in my above referred to application adapted to give a trail of smoke of the desired color which may be employed to advantage in signaling military and like information.

It is a further object to provide a smoke producing compound characterized by a high degree of dispersion of the colored particles, resulting in a colored cloud of good visibility and stability of coloring materials. Another object is to provide a compound which will not easily decompose when volatilized and be comparatively insensible to shock thus permitting it to be handled without danger of exploding, and one which will have a uniformity and rapidity of rate of reaction between the various ingredients when ignited. Other objects will be in part obvious and in part hereinafter pointed out.

The composition, which upon ignition, produces highly colored smoke, of course, will vary with the color of smoke desired. I have found that to produce a satisfactory smoke the coloring matter must be volatilized and not merely mechanically dispersed. The vapor condenses as soon as it cools but the volatilization is a prerequisite for the high degree of dispersion of the color particles necessary for good visibility of a cloud produced by a small weight of material. In accordance with the present invention, each of my improved smoke producing compositions consists of a combustible agent, an oxidizing agent and an organic dye which serves as the color producing material when, upon combustion of the combustible and oxidizing agents, sufficient heat is produced to volatilize the organic dye. Preferably the dye should be cheap and available in the desired quantities. It should be volatile either by sublimation or by passing through the liquid phase, but in case it should pass through the liquid phase, the melting and boiling points of the dye should be close together so that large quantities of liquid which would have a tendency to stop the combustion, are not present during combustion. Chemically the dye must not be easily decomposed when volatilized and should not be effected to any great degree by the burning of the mixture.

As illustrations of the compositions which may be used and which are within the spirit of this invention, the following are noted.

To produce a yellow smoke, auramin is employed as the color producing material. This material is mixed with potassium chlorate which serves as the oxidizer and lactose which serves as the combustible. The use of lactose in this composition is of advantage as it burns smoothly, the gaseous product therefrom is comparatively cool, and no undesirable products result from its burning. The materials may be employed in the following proportions by weight:—

Potassium chlorate	33%
Lactose	24%
Auramin	34%
Chrysoiden	9%

To produce a red smoke, the following composition is employed:—

Paranitraniline red	60%
Potassium chlorate	20%
Lactose	20%

For a green smoke the following composition may be employed:—

Auramin	15%
Indigo (synthetic)	26%
Potassium chlorate	33%
Lactose	26%

It is understood, of course, that the above percentages or proportions of the ingredients are merely approximate, and they may be varied depending on the depth of color of smoke desired.

The ignition powder which is employed

for starting the smoke composition, may comprise a mixture of six parts by weight finely powdered potassium chlorate, and one part of finely powdered hard wood charcoal. Of course, other ignition mixtures may be employed.

It is thus seen that the present invention provides a simple and practical smoke making compound which will be inexpensive to manufacture and adapted to accomplish, among others, all of the objects and advantages herein set forth.

What I claim is:—

1. A smoke producing composition consisting of a combustible agent, an oxidizing agent, and an organic dye which is volatilized and highly dispersed when the composition is ignited.

2. A smoke producing composition consisting of potassium chlorate, lactose, and a volatile organic dye.

3. A smoke producing composition consisting of potassium chlorate, lactose, auramin, and chrysoiden.

Signed at Cincinnati, Hamilton Co., Ohio, this 25th day of February, 1919.

ROBERT CLYDE GOWDY.