Patented May 13, 1930 1,758,169

UNITED STATES PATENT OFFICE

FREDRICH OLSEN, OF DOVER, NEW JERSEY

EXPLOSIVE COMPOSITION

No Drawing. Application filed October 16, 1925. Serial No. 62,930.

The subject of this invention is an explosive composition.

The principal object of the invention is the provision of an inexpensive and easily detonated explosive which will be sufficiently insensitive to shock to render it especially suitable for use as the bursting charge of armor piercing projectiles as well as of field shells and bombs intended to produce demolition by penetrating the objective before exploding.

Other objects are to provide an explosive which is less hygroscopic than others intended for similar purposes and which can be loaded into the shell by pouring rather than by the expensive and difficult pressing operation, thus permitting of greater uniformity of loading density.

With the foregoing and other objects in view, my invention resides in the novel arrangement and combination of ingredients hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein described may be made within the scope of what is claimed without departing from the spirit of the invention.

The explosive composition, which forms the subject matter of my invention, is made preferably of a nitro-aromatic and a compound of guanidine.

Examples of compositions which have been found successful in practice are as follows:

	Per cent
Trinitrotoluene	65
Guanidine nitrate	35
Trinitrotoluene	69
Guanidine picrate	31
Trinitrotoluene	77
Nitroguanidine	23

These proportions need not be strictly adhered to and by proper regulation the brisance and power of the explosive mixture can be controlled, for instance, the shattering effect is increased or decreased by correspondingly increasing or decreasing, within limits, the proportion of trinitrotoluene.

There are a wide variety of compositions containing, for example, T. N. T. and guanidine nitrate which may be prepared and which will have explosive properties. However, there exists a quite definite and limited range of compositions which possess certain unique characteristics.

When a mixture is made which comprises one molecular weight of trinitrotoluene to one molecular weight of guanidine nitrate, the following properties are found to characterize the mixture:

(*a*) The mixture can be safely and easily loaded by the casting method at temperatures below the normal boiling point of water (this is perhaps the most significant property as it obviates the necessity of loading the charges in armor piercing projectiles by pressing).

(*b*) It is sufficiently insensitive to shock to permit the penetration of armor when loaded in armor piercing projectiles.

(*c*) It is readily detonated by the ordinary fuse and booster system.

If the proportions above outlined should vary considerably by increasing the guanidine nitrate content the charge could not be cast and detonation by action of initial detonating agents becomes more and more difficult. On the other hand, if the proportion of T. N. T. is increased beyond rather narrow limits the charge becomes too sensitive to stand the shock of impact against armor plate.

The following is a statement of the preferred proportions in which the ingredients should be mixed:

From a minimum of ½ molecular weight of T. N. T. to one molecular weight of guanidine nitrate to a maximum of 1½ molecular weights of T. N. T. to one molecular weight of guanidine nitrate, with the most desirable composition as one molecular weight of T. N. T. to one molecular weight of guanidine nitrate. Similarly the range for mixtures of T. N. T. and guanidine picrate is, a minimum of 2½ molecular weights of T. N. T. to one molecular weight of guanidine picrate up to a maximum of three molecular weights of T. N. T. to one molecular weight of guanidine picrate but the most desirable composition is 2.8 molecular weights of T. N. T. to one molecular weight of guanidine picrate.

Finally, for mixtures of T. N. T. and nitroguanidine a range of composition should be a minimum of one molecular weight of T. N. T. to one molecular weight of nitroguanidine up to a maximum of two molecular weights of T. N. T. to one molecular weight of nitroguanidine with the most desirable compositions as 1½ molecular weights of T. N. T. to one molecular weight of nitroguanidine.

While the compositions above cited have been found to give excellent results, it is not intended to limit the invention to the ingredients and proportions stated.

I claim:

1. An explosive mixture consisting of trinitrotoluene and an explosive compound of guanidine.

2. An explosive mixture consisting of trinitrotoluene and guanidine nitrate.

3. An explosive mixture consisting of trinitrotoluene and an explosive compound of guanidine in the proportion of one-half to three molecular weights of the former to one molecular weight of the latter.

4. An explosive consisting of a fusible mixture of trinitrotoluene and guanidine nitrate.

5. An explosive consisting of a fusible mixture of trinitrotoluene and an explosive compound of guanidine in equimolecular proportions.

6. An explosive consisting of a fusible mixture of trinitrotoluene and guanidine nitrate in equal molecular proportions.

7. An explosive consisting of a fusible mixture of trinitrotoluene and an explosive compound of guanidine in the proportion of two to five molecules of trinitrotoluene to two molecules of the explosive compound.

FREDRICH OLSEN.