

UNITED STATES PATENT OFFICE.

ROBERTO IMPERIALI, OF NAPLES, ITALY.

EXPLOSIVE.

998,007.

Specification of Letters Patent.

Patented July 18, 1911.

No Drawing.

Application filed January 6, 1911. Serial No. 601,151.

To all whom it may concern:

Be it known that I, ROBERTO IMPERIALI, a subject of the King of Italy, residing at Naples, in the Kingdom of Italy, have invented certain new and useful Improvements in Explosives, of which the following is a specification.

The object of the present invention is a high explosive consisting substantially of a mixture of nitrates and aluminum powder, to which an agglutinant can be added.

The composition of the explosive is as follows:

15	Nitrate of ammonium	80	parts in weight
	Nitrate of potassium	5	" " "
	Aluminum powder	15	" " "

In order to correct the hygroscopicity of the nitrate of ammonium, and to increase the sensibility of the explosive, an agglutinant is employed in proportions of 10 to 20 per cent., said agglutinant having preferably the following composition:

25	Mononitrotoluol	75	parts in weight
	Glycerin	5	" " "
	Collodion	15	" " "
	Potassium permanganate	3	" " "

As to the different components, of which these mixtures consist, it is remarked that in the composition of the explosive the percentage of the nitrate of potassium could be diminished, or this substance could even be done away with altogether, the explosive being thus formed only of ammonium nitrate and aluminum powder. In the agglutinant the potassium permanganate can be substituted by ammonium perchlorate in the same proportions, and the quantity of the glycerin can be increased or diminished according to the consistency to be given to the paste. It should be further remarked that the addition of the agglutinant is not absolutely necessary, and that the mixture of the nitrates with the powder of aluminum, or of the ammonium nitrate only with the powder of aluminum is sufficient for constituting a perfect explosive. The agglutinant, by cementing the incoherent powders, renders the explosive thus prepared more fit for certain manipulations.

When it is desired to diminish the intensity of the explosive it will be convenient to add to the above mentioned mixtures inert substances, such as, for instance, the fossil

flour in proportions of 2 to 10 per cent. of the mixture, according to the circumstances.

For the preparation the nitrates, after having been perfectly dried, are ground finely and mixed with the aluminum powder, and the whole is stirred until a uniform composition is obtained. To the mixture thus obtained, the agglutinant, when it is required, is added in the proportion of about 10% and the whole is mixed thoroughly. The explosive thus obtained can be utilized in forming the charge of perforating projectiles, mine grenades and can be employed for industrial uses.

The particular advantages of the explosive thus composed are the following: (a) It is composed of matters which do not react together, thus insuring the greatest stability; (b) it can remain for a long time at a temperature variable between 60° to 70° C. even for several months without undergoing alterations of any kind. As soon as the temperature of 98°-100° is reached, the sublimation of the ammoniacal salts begins; at 160° it melts and at a higher temperature it dries up. (c) By raising the temperature suddenly above 450°, the decomposition and drying up of the explosive is produced causing neither explosion nor deflagration. (d) When the explosive thus prepared is compressed, it can be worked at the lathe, with the chisel and the file without any precaution. (e) The explosive can be struck with iron on iron without any danger of deflagration or decomposition. (f) The power of the explosive measured in the Trauzl lead varies from 700 to 950 cubic centimeters with 15 gr. explosive. To produce the explosion a detonator of fulminate of mercury must be employed.

I claim:

1. An explosive consisting of alkali nitrates and aluminum powder and containing an agglutinant consisting of mononitrotoluol, glycerin, collodion, and an oxygen-bearing substance.

2. An explosive consisting of alkali nitrates and aluminum powder and containing about 10 per cent. of an agglutinant consisting of mononitrotoluol, glycerin, collodion, and potassium permanganate.

3. An explosive consisting of alkali nitrates and aluminum powder and containing an agglutinant consisting of substan-

tially 75 parts of mononitrotoluol, 5 parts glycerin, 15 parts collodion, and 3 parts of an oxygen-bearing substance.

- 5 4. An explosive consisting of substantially 85 parts of alkali nitrates and 15 parts of aluminum powder and containing an agglutinant consisting of mononitrotoluol, glycerin, collodion, and an oxygen-bearing substance.
- 10 5. An explosive consisting of substantially 85 parts of alkali nitrates and 15 parts aluminum powder and containing about 10 per cent. of an agglutinant consisting of substantially 75 parts mononitrotoluol, 5 parts glycerin, 15 parts collodion, and 3 parts potassium permanganate.
- 15 6. An explosive comprising 80-85 parts ammonium nitrate, 15 parts aluminum powder, and containing about 10 per cent. of an agglutinant consisting of mononitrotoluol, glycerin, collodion, and an oxygen-bearing substance.
- 20 7. An explosive consisting of 80 parts ammonium nitrate, 5 parts potassium nitrate,

15 parts aluminum powder, and containing 25 an agglutinant consisting of mononitrotoluol, glycerin, collodion, and an oxygen-bearing substance.

8. An explosive consisting of 80 parts ammonium nitrate, 5 parts potassium nitrate, 30 15 parts aluminum powder, and containing about 10 per cent. of an agglutinant consisting of substantially 75 parts mononitrotoluol, 5 parts glycerin, 15 parts collodion, and 3 parts potassium permanganate. 35

9. An explosive consisting of ammonium nitrate, potassium nitrate, aluminum powder, an agglutinant consisting of mononitrotoluol, glycerin, collodion, and potassium permanganate, and an inert substance in admixture therewith. 40

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

ROBERTO IMPERIALI.

Witnesses:

PIETRO CALZONI,
LEFFERN LABSCIETTA.