

UNITED STATES PATENT OFFICE.

THEODOR IEVLEV, OF ST. PETERSBURG, RUSSIA.

EXPLOSIVE.

SPECIFICATION forming part of Letters Patent No. 598,096, dated February 1, 1898.

Application filed May 28, 1897. Serial No. 638,618. (No specimens.)

To all whom it may concern:

Be it known that I, THEODOR IEVLEV, a subject of the Emperor of Russia, residing at St. Petersburg, Russia, have invented certain new and useful Improvements in Explosible Substances, of which the following is a specification.

My invention has relation to explosives; and it has for its object a compound that is neither explosive nor inflammable *per se*, but which when impregnated or saturated with a combustible liquid rich in carbon becomes explosive, not in the open air, but when confined and subjected to concussion or percussion or when ignited, or both.

The further object of my invention is to avoid the use of nitrogen-bearing substances, notwithstanding the great energy of nitrogen in explosives, on account of the unstable nature of the compounds of this element.

The non-explosive and non-inflammable compound referred to consists, in accordance with this invention, of oxygen-bearing substances or a substances capable of evolving oxygen in the presence of heat, together with oxygen-bearing substances, as a chlorate of a metal of the alkalies and a metallic oxid or oxids. Such a compound when impregnated with an inflammable or combustible liquid, as a hydrocarbon or an essential hydrocarbon oil, or both, becomes highly explosive when subjected to percussion or concussion or when ignited, or both, the explosive power being at least equal to that of dynamite or other like high explosives, while in the open air the compound burns quietly, producing an intense white light.

According to the uses made of the explosive I add or may add what is usually termed a "moderator"—that is to say, a substance capable of retarding combustion—and to this end I use a slow-burning oil, as an oil of the fatty-acid series, such as oil of almonds; but that my invention may be fully understood I will describe the same in detail.

The non-inflammable and non-explosive compound consists or may consist of the fol-

lowing substances in or about in the proportions, by weight, set forth:

Chlorate of pot-ash, (KClO ₃ .)	Sesquioxid of iron, (Fe ₂ O ₃ .)	Oxid of manganese, (MnO ₂ .)	Total.	50
56 parts.	24 parts.	20 parts.	100	
or				
76 parts.	24 parts.	.....	100	
or				55
80 parts.	.....	20 parts.	100	

The impregnating liquid consists or may consist of the following, to which may be or is added a moderator in the proportions, by 60 weight, stated:

Oil of petroleum.	Oil of turpentine.	Oil of almonds.	Total.	
50 parts.	40 parts.	10 parts.	100	
or				
50 parts.	50 parts.	.....	100	65
or				
80 parts.	15 parts.	5 parts.	100	
or				
100 parts.	.....	.....	100	70
or				
.....	100 parts.	.....	100	

The proportions of inflammable liquid necessary to convert the non-explosive and non-inflammable compound into an inflammable and explosive compound is about as of three 75 of the latter to one of the liquid, or, in other words, it requires two hundred and fifty grams of the liquid to seven hundred and fifty grams of the compound.

The explosive may be used as such or made up into cartridges of any desired size and form, which cartridges can be provided with the percussion-firing devices or caps commonly used with explosives or they may be 85 fired by electricity.

The impregnation of the non-explosive compound with the liquid may be effected at once or after being made up into cartridges, the latter method being of course preferred because all danger of premature explosion is 90 thereby avoided, and in order that the impregnation may be readily effected I make the cartridge-cases of a material that will

readily absorb the liquid, the compound itself taking up or absorbing such liquid very readily, and, according to the material used for the cartridge-cases, from ten to fifteen minutes will be required for the absorption of the liquid.

The non-inflammable and non-explosive compound—*i. e.*, the non-impregnated compound—possesses the following properties: It is, as inferred, non-inflammable and non-explosive when subjected to concussion or percussion, whether in the open air or confined. It is therefore absolutely safe, not only in its manufacture and in the handling thereof otherwise, as in packing or storing, but also in transportation on land or water. It is not affected by atmospheric influences, nor does it undergo either physical or chemical changes under such influences, however sudden or great in the degree of their variations these changes may be.

The impregnating liquid possesses the following properties, to wit: It does not ignite very readily, burns quietly when ignited, and produces during combustion relatively large quantities of carbon, while if ignited it can be readily extinguished by water and possesses besides this the properties of the non-explosive compound. It follows that so long as the compound is not impregnated with the liquid an explosion is not to be feared, so that the laws relating to the storage of high explosives do not apply and the usual expenses in providing special storage are avoided.

The explosive—*i. e.*, the compound—when impregnated with the liquid possesses the following properties: It will burn quietly in the open air, producing an intense white light and evolving comparatively enormous quantities of gas. When confined either within solid walls or in water and ignited or subjected to concussion or percussion it explodes with an energy equally as great as that of dynamite, the combustion being apparently perfect in that there is no discoloration (unconsumed carbon) noticeable on the surfaces in contact with the explosive, nor will the explosive or a cartridge of such when exploded in the vicinity of another result in the explosion of the latter, which clearly shows that an explosion will not result unless the impregnated powder is subjected to the direct action of percussion or concussion or to fire, or both.

Inasmuch as the impregnating liquid is more or less volatile, should a cartridge have been impregnated and not used it can be exposed to sufficient heat to evaporate the liquid, whereby its explosive properties will be destroyed, and such cartridge can at any time thereafter be again impregnated for use.

Inasmuch as it takes some time to impregnate a cartridge with the liquid, as above stated, the compound does not become explosive until the absorption is complete, so that ample time is afforded for the introduction of the cartridge into the blast-hole and for the attendants to move to a safe distance or place.

It will also be observed that the explosive is free from nitrogen-bearing substances, hence free from nitrogen, which element although very energetic in explosive compounds is not desirable, because its combinations are very unstable.

In view of the properties of the explosive it can be used without the least danger in an atmosphere of explosive gases, as in an atmosphere of fire-damp.

Finally, it will be obvious to any one conversant with the manufacture of high explosives that, irrespective of the advantages possessed by the explosive forming the subject-matter of this invention and hereinabove described, there is a further and very great advantage in the extremely low cost of the explosive as compared with the cost of explosives of like power heretofore used.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. An explosive consisting of chlorate of potash, a metallic oxid or oxids, petroleum and turpentine, in about the proportions set forth.

2. An explosive compound consisting of chlorate of potash, sesquioxid of iron, oxid of manganese, petroleum, turpentine and an oil of the fatty-acid series, as oil of almonds, in about the proportions set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

THEODOR IEVLEV.

Witnesses:

N. TSCHÉKALOFF,
J. BLAU.