UNITED STATES PATENT OFFICE.

ALFRED NOBEL, OF HAMBURG, GERMANY, ASSIGNOR TO THE GIANT-POWDER COMPANY AND THE ATLANTIC GIANT-POWDER COMPANY, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN EXPLOSIVE COMPOUNDS.

Specification forming part of Letters Patent No. **141,455**, dated August 5, 1873; application filed June 4, 1873.

To all whom it may concern:

Be it known that I, ALFRED NOBEL, of the city of Hamburg, Germany, have invented a new and useful Explosive Compound; and I do hereby declare that the following is a correct description of the composition thereof:

I have in former specifications, on which Letters Patent have been granted to me, described the use and effect of the mixing of nitro-glycerine with other explosives, such as gunpowder, gun-cotton, &c., and also the mixing of nitro-glycerine with non-explosive substances capable of absorbing the nitro-glycerine, and have described the advantages obtained from such mixtures in greatly increasing the explosive power of such explosives, and in doing away with the extreme danger of handling nitro-glycerine in a liquid condition, and the facilitating of its use for blasting purposes.

My present invention relates to mixture with nitro-glycerine of a pulverized nitrate (such as the nitrates of soda, potash, baryta, or lead,) and a pulverized carbon or hydro-carbon, such as coal, resin, sugar, starch, &c., with or without the addition of pulverized sulphur, whereby a powerful explosive compound is produced, which may be handled with safety, and which, when not under strong restraint, will burn under the application of fire, but without explosion.

In describing the proportion of the several ingredients to be used in making my improved compound I desire not to limit myself to the exact proportion herein specified, for the reason that the proportions of niter and carbon or hydrocarbon used, as well as of the nitro-glycerine, may be greatly varied with no other material differences of result than an increase or decrease of explosive power, and a greater or less degree of moisture or pastiness in the mass.

The proportions which I shall proceed to specify will therefore serve as a type, from which such variations may be made as the strength of explosive required and the warmth of climate in which it is to be used may dictate. I take seventy parts, by weight, of pulverized nitrate of soda; ten parts, by weight, of pulverized resin; twenty parts, by weight, of nitro-glycerine, and mix them thoroughly, so that, as far as possible, each separate particle of the pulverized solid ingredients may have a coating of nitro-glycerine.

To the above-named ingredients may be added from five to eight parts of flour sulphur, which will be found to increase its effect.

Instead of the nitrate of soda, either of the nitrates of potash, baryta, or lead may be employed, and, instead of resin, other carbons and hydrocarbons, as coal, sugar, starch, wood, charcoal, &c., may be used. If coal is employed, such as contains the greatest proportion of hydrogen answers the best for this purpose.

It should be observed that the amount of nitro-glycerine which can be retained by the other ingredients will depend upon the degree of fineness to which they are pulverized, and will vary with the ingredients used, and also with the temperature of the atmosphere; and that if the nitro-glycerine is in excess, so that it will run out when the mixture has been allowed to stand, it is thereby rendered dangerous. It is better, therefore, to keep the amount of nitro-glycerine within the maximum which the dry ingredients will hold.

The above compound is a powerful explosive, and may be used either loose or in wrappings, or cartridges of metal, paper, &c., as may be desired.

To effect the explosion of this compound a tube or cap containing fulminate of mercury or other suitable detonating substance, and affixed to the end of a fuse, is inserted in the charge of the above-described compound, the fuse being fired in the usual way, or, if preferred, the cap inserted in the compound may be fired by electricity without a fuse. The explosion of the fulminate will effect

the explosion of my improved explosive compound.

What I claim as my invention, and desire to secure by Letters Patent, is

The composition of matter hereinbefore set forth, consisting of nitrate of soda and resin, or their equivalents, with or without sulphur, mixed with nitro-glycerine, as a new explosive compound, substantially as hereinbefore described.

In witness whereof I have hereunto set my hand.

ALFRED NOBEL.

In presence of us:
CH. F. CAUTINS,
C. ZANDER.