

UNITED STATES PATENT OFFICE.

CHARLES A. MORSE, OF LEOMINSTER, MASSACHUSETTS.

EXPLOSIVE COMPOUND.

SPECIFICATION forming part of Letters Patent No. 234,489, dated November 16, 1880.

Application filed November 1, 1879.

To all whom it may concern:

Be it known that I, CHARLES A. MORSE, of Leominster, in the county of Worcester and State of Massachusetts, have invented a new and useful Process for Solidifying and Hardening Nitro-Glycerine and the Product Resulting therefrom, of which the following is a specification.

I am aware that nitro-glycerine has been mixed with nitro-cellulose to form a gelatinous mass, and that in an English patent to H. E. Newton, No. 4,179 of the year 1875, (communication from A. Nobel,) the use of nitrated collodion cellulose is claimed for thickening nitro-glycerine and nitrate of methyl into a gelatinous mass.

My invention, however, relates to the conversion of nitro-glycerine into a hard, dry mass, which is capable of being granulated or pulverized, and which can be handled and transported with perfect safety, and is free from the injurious effects and dangerous properties of nitro-glycerine, and which, further, cannot be exploded by heat, fire, or concussion while in an unconfined state, but is easily exploded when confined by the use of a fulminate cap, such as is used in exploding ordinary dynamite compounds.

In the different dynamite now and heretofore manufactured in which nitro-glycerine is mixed with non-explosive and incombustible earths, the nitro-glycerine being only in an absorbed condition, and the explosive force being dependent wholly upon the amount of nitro-glycerine therein contained, the absorbents must necessarily contain a large amount of that explosive substance, or they are extremely difficult to explode, and are therefore practically useless, and there is always a liability of the nitro-glycerine leaking out under the varying temperatures of climate to which they are exposed, and thus become nearly if not quite as dangerous as liquid nitro-glycerine itself. Further, explosives in which meal gunpowder or other analogous substances are used as the absorbents for the nitro-glycerine are extremely dangerous to handle, on account of their low igniting-point, and consequent liability to explode from a spark, friction, heat, or concussion.

In my improved compound all of these defects are entirely overcome, and my object is

to produce a substance which shall lack all of the above objectionable qualities, and yet shall be equal to the best of them in exploding qualities.

In order to enable others skilled in the art to which my invention appertains to make and use this solidified nitro-glycerine, I will proceed to describe my method of preparing the same, though I do not wish to be limited to the use only of the materials named, but claim also the use of other substances equivalent thereto.

I dissolve common yellow rosin or colophony, or its equivalent resin, or gum-resin, (such as gum copal, shellac, or sandarac,) in sufficient alcohol, chloroform, ether, or other equivalent solvent capable of dissolving both the resin and nitro-glycerine to effect a complete solution, (preferring the ordinary methyl-alcohol or wood spirits as being the cheapest,) either in the cold or by the aid of heat obtained by a water-bath heated to about 120° Fahrenheit. To this solution, when cold—that is, when reduced to the ordinary temperature of the air—I add an amount of nitro-glycerine equivalent to about one-third of the weight of the resin dissolved, and introduce this mixture into a distilling apparatus provided with stirrers.

The temperature of the distilling-vessel is raised, by means of a water-jacket or exterior hot material, sufficiently high to volatilize the alcoholic or other solvent. In the case of methyl-alcohol the distilling temperature to evaporate need not exceed 150° Fahrenheit. It is desirable for economy to connect the distilling-vessel with a suitable condenser to collect the solvent for repeated use.

During the process of distillation the stirrers are set in motion, in order to break down the mass, so that it may be discharged from the vessel in a more or less pulverized form.

Other methods of granulation may be used, if it is not desirable to save the solvent for further use—as, for instance, by stirring the drying mixture with a wooden rake, or by rubbing it through a sieve with a stiff brush. In general, however, it will be found more economical and equally as effective to arrange for the distillation and collection of the solvent by some of the devices well known in the arts for that purpose. The proportions of one-fourth nitro-glycerine and three-fourths colo-

phony may be varied as circumstances may require, within this limit, however, that there must always be sufficient of the resinous substance used to combine with the nitro-glycerine to form a dry, hard substance or product when the solvent is evaporated or distilled.

By this process I produce a perfectly homogeneous mixture of nitro-glycerine and the resinous substance, which can be handled and transported with perfect safety, and which is free from the injurious effects of the pure nitro-glycerine.

The proportion of the substances to produce the hardened nitro-glycerine would be as follows: to twenty-five parts, by weight, of nitro-glycerine I add fifty parts of methyl-alcohol and seventy-five parts of resin.

Having thus described my process of manu-

facture, what I claim, and desire to secure by Letters Patent, is—

1. The herein-described process of manufacturing an explosive compound, consisting in dissolving nitro-glycerine and resin in a common solvent, and then in evaporating off or otherwise eliminating the solvent, substantially as set forth.

2. The herein-described explosive compound, consisting of nitro-glycerine and resinous or equivalent substance, formed into a hard, dry, solid, granulated, or pulverized mass, substantially as described.

CHARLES A. MORSE.

Witnesses:

R. H. EDDY,

W. W. LUNT.