



A.D. 1867, 7th MAY. N° 1345.

Explosive Compounds.

LETTERS PATENT to William Edward Newton, of the Office for Patents, 66, Chancery Lane, in the County of Middlesex, Civil Engineer, for the Invention of "**IMPROVEMENTS IN EXPLOSIVE COMPOUNDS AND IN THE MEANS OF IGNITING THE SAME.**"—A communication from abroad by Alfred Nobel, of Rue St. Sebastien, Paris, in the Empire of France.

Sealed the 15th October 1867, and dated the 7th May 1867.

PROVISIONAL SPECIFICATION left by the said William Edward Newton at the Office of the Commissioners of Patents, with his Petition, on the 7th May 1867.

I, WILLIAM EDWARD NEWTON, of the Office for Patents, 66, Chancery Lane, in the County of Middlesex, Civil Engineer, do hereby declare the nature of the said Invention for "**IMPROVEMENTS IN EXPLOSIVE COMPOUNDS AND IN THE MEANS OF IGNITING THE SAME,**" to be as follows:—

This Invention relates to a method of modifying the nature of nitro-glycerine in a manner which renders it much safer for use than heretofore. Nitro-glycerine if mixed with porous inexplusive substances, such, for instance, as charcoal or silica, becomes very much altered in its properties; thus, for instance, nitro-glycerine alone is not inflammable by a spark, but may be got to explode by submitting it to a very rapid shower of sparks. Nitro-glycerine absorbed in porous substances, on the other hand, easily catches fire from a spark, but burns away slowly and without explosion, except under very close and resisting

Newton's Improvements in Explosive Compounds.

confinement, when a violent explosion ensues ; against shocks or blows the above mixture is also far less sensitive than nitro-glycerine alone. Owing to the aforesaid properties of the mixture described its use for blasting metal or very sound rock requires no other firing than an ordinary safety fuse. In shattered rock or coal, on the other hand, it will cause no real explosion at 5 all, the gas will leak out through the crevices and prevent a great accumulation of pressure from the explosive medium, which alone can determine the detonation of nitro-glycerine when absorbed in porous substances, such, as for instance, charcoal or silica ; for this reason a special igniter is used to explode the above mixture in fissured or shaky rocks, or wherever it is to be used 10 without close confinement ; that special igniter consists of a kind of percussion cap wherein the fulminate is caused to develop a very high gaseous pressure before it bursts, which may be attained either by increasing the charge of fulminate or diminishing the leakage of gas before the cap bursts ; this cap is adapted to the end of a safety fuse whereby it is ignited. 15

SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said William Edward Newton in the Great Seal Patent Office on the 6th November 1867.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, WILLIAM EDWARD NEWTON, of the Office for Patents, 66, Chancery Lane, in the County 20 of Middlesex, Civil Engineer, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Seventh day of May, in the year of our Lord One thousand eight hundred and sixty-seven, in the thirtieth year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said 25 William Edward Newton, Her special licence that I, the said William Edward Newton, my executors, administrators, and assigns, or such others as I, the said William Edward Newton, my executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully 30 might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "**IMPROVEMENTS IN EXPLOSIVE COMPOUNDS AND IN THE MEANS OF IGNITING THE SAME**," being a communication to me from Alfred Nobel, of Paris, in the Empire of France, upon the condition (amongst others) that I, the said 35 William Edward Newton, my executors or administrators, by an instrument

Newton's Improvements in Explosive Compounds.

in writing under my, or their, or one of their hands and seals, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately
5 after the date of the said Letters Patent.

NOW KNOW YE, that I, the said William Edward Newton, do hereby declare the nature of the said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement thereof (that is to say):—

10 This Invention relates to the use of nitro-glycerine in an altered condition which renders it far more practical and safe for use. The altered condition of the nitro-glycerine is effected by causing it to be absorbed in porous un-
explosive substances, such as charcoal, silica, paper, or similar materials, whereby it is converted into a powder, which I call dynamite or Nobel's safety
15 powder. By this absorption of the nitro-glycerine in some porous substance it acquires the property of being in a high degree insensible to shocks, and it can also be burned over fire without exploding.

The aforesaid safety powder or dynamite is exploded, first, when under very close and resisting confinement by means of a spark or any mode of
20 ignition used for firing ordinary gunpowder; second, without or during confinement by means of a special fulminating cap containing a strong charge of fulminate, which is adapted to the end of a fuse, and is strongly squeezed to the latter for the purpose of more effectually confining the charge, so as thereby to heighten the effect of the detonation; third, by means of an addi-
25 tional charge of ordinary gunpowder the explosion of the latter will cause the dynamite to go off even when it is only partially confined.

From the aforesaid it will be understood that a strong fulminating cap, if adapted to the fuse by being squeezed thereon, will cause dynamite to explode under all conditions of confinement or non-confinement, and that an addi-
30 tional charge of gunpowder or analogous substance will cause dynamite to explode only when confined or partially confined; and that any ordinary mode of ignition as used for gunpowder, for instance, a fuse will determine the explosion of dynamite only under very close and resisting confinement. It is evident that the above-described fulminating cap may be greatly varied
35 in form, but the principle for its action lies in the sudden developement of a very intense pressure or shock. In order to ensure a perfect stability in the nitro-glycerine contained in the dynamite the porous substance before it is saturated with nitro-glycerine is to be rendered alkaline by washing it with a solution of carbonate of soda or lime water or analogous substance in order to

Newton's Improvements in Explosive Compounds.

neutralize the acid and prevent any decomposition of nitro-glycerine from taking place. I would here remark that the above-described safety powder or dynamite, (being nitro-glycerine absorbed in porous non-explosive substances) possesses very distinct properties from and very great practical advantages over liquid nitro-glycerine, and its explosion except under very close and 5 resisting confinement requires a special ignition, as described above.

Having now described the Invention of Improvements in Explosive Compounds and in the Means of Igniting the same," and having explained the manner of carrying the same into effect, as communicated to me by my foreign correspondent, I claim as the Invention secured to me by Letters 10 Patent as aforesaid, the mode herein set forth of manufacturing the safety powder or dynamite herein described, and also the modes of firing the same by special ignition, as herein set forth.

In witness whereof I, the said William Edward Newton, have hereunto set my hand and seal, the Fifth day of November, in the year of our 15 Lord One thousand eight hundred and sixty-seven.

W. E. NEWTON. (L.S.)

Witness,

J. W. MOFFATT,

66, Chancery Lane.

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