

UNITED STATES PATENT OFFICE.

GEORGE M. MOWBRAY, OF NORTH ADAMS, MASSACHUSETTS.

IMPROVEMENT IN BLASTING-POWDER.

Specification forming part of Letters Patent No. **150,428**, dated May 5, 1874; application filed March 19, 1873.

To all whom it may concern:

Be it known that I, GEORGE M. MOWBRAY, of North Adams, in the county of Berkshire and State of Massachusetts, have invented an Improved Mica Blasting-Powder, of which the following is a specification:

The nature of my invention consists in forming an explosive blasting-powder by mixing nitro-glycerine with finely-divided mica or muscovy tale in the form of scales, varying the relative proportions, so as to adapt the mixture, when used for blasting purposes, to transportation in any climate or season, and so as to modify the force of explosion when applied to artillery, shells, fixed ammunition, sporting-guns, &c. The distinguishing feature of this compound from other mixtures of nitro-glycerine with inert matter consists in its elasticity or resilient properties, for on ramming a charge of it into a cartridge, on withdrawing the rammer, there is an immediate increase of bulk, the mixture being quite elastic. This remarkable elastic property renders it not only safe to transport, but suitable for artillery, shells, fixed ammunition, small-arms, &c. Further, owing to the extreme tenuity or thinness of mica scales, notwithstanding its heavy specific gravity (2.900) or density, a given bulk or weight presents an enormous surface; thus I have found twenty-five grams, or three hundred and eighty-six grains, well shaken down, of such scales will occupy a space of ten cubic inches, which would contain of water two thousand five hundred and thirty-two grains, (2531.8,) being less than one-sixth as heavy as water in the form of scales finely divided, while in block masses it is nearly three times as heavy as water, (2.900.) Now, if we incorporate with these three hundred and eighty-six grains of finely-divided mica, say, treble their weight of nitro-glycerine, and then introduce the mixture into a glass graduated tube by ramming or pressure with the hand, it will be found to occupy six cubic inches and still retain much of the elastic property I have referred to. Calculation will show that in such a rammed tube there must exist two cubic inches and two-thirds of a cubic inch of interspace, besides the nitro-glycerine and finely-divided mica, occupied by atmospheric air, which explains the elasticity referred to.

The danger arising during transportation of liquid nitro-glycerine is chiefly from concussion or leakage. It will, therefore, be obvious that this mixture, being elastic, protects the nitro-glycerine from the vibrations of concussion; meanwhile the adhesion or capillary attraction of the nitro-glycerine to the immense superficial area of the thin scales of mica also prevents leakage. On comparing the combustion of dynamite or giant-powder with the above mica blasting-powder, a remarkable difference will be observed on applying a lighted match successively to each of them in the open air. While the mica compound gives a vivid voluminous flame, quadruple in volume that yielded by dynamite or giant-powder, and the particles of mica are carried up three feet into the air by the rapid motion of heated gases, the flame of giant-powder and dynamite under the same conditions of temperature and quantity, is limited to one-fourth of the mica-mixture flame, and the residuary matter is not carried up by the heated gases. While neither giant-powder nor dynamite can be compared with the mica mixture in developing blasting force, this latter compares very favorably with liquid nitro-glycerine in its pure state, and in the proportions stated above (three of nitro-glycerine to one of mica scales) continuous experiments have convinced me that it fully develops the entire blasting effect of the nitro-glycerine it contains, and does not, as is the well-known fact with dynamite, dualin, and giant-powder, lose half its power as a blasting agent by mixture with the inert matter associated with it.

To enable any one skilled in the art to prepare the mica blasting-powder, the blocks of mica should be split into slabs of half-inch thickness and then offered to the teeth of a rotating rasp in rapid motion, being held perpendicular to the edges of the plates of mica, and not sidewise. Such small pieces as cannot be held edgewise to the rasp may be divided up by subjecting them to the action of edge-runners. It is then sifted through a sieve with large meshes, say one-quarter to three-eighths of an inch. The mica is warmed to 80°, and raked level in a tank, and nitro-glycerine warmed to 80° Fahrenheit is then poured over the finely-divided mica from the rose of a

watering-pot, stirring the mixture carefully. The proportions of each will depend on the purpose to which it is to be applied. Where the greatest possible explosive or blasting force is required, one part of finely-divided mica to three parts of nitro-glycerine may be used; for heavy guns, three parts of mica to one part of nitro-glycerine; for charging shells, and for the exploding charge of rockets, equal parts of mica and nitro-glycerine; for small-arms, fixed ammunition, &c., to three or four parts of mica two parts of nitro-glycerine.

Experience and further experiments will develop the proportions for the varied projectiles of modern warfare.

Having thus described my invention, I claim—

A combination of nitro-glycerine with finely-divided mica or muscovy tale, without confining my invention to any specific proportions of the materials, as described.

GEORGE M. MOWBRAY.

Witnesses:

W. H. GRISWOLD,
WM. K. BARLOW.