

# UNITED STATES PATENT OFFICE.

WALTER F. REID, OF STOWMARKET, COUNTY OF SUFFOLK, AND DAVID JOHNSON, OF CHESTER, COUNTY OF CHESTER, ENGLAND.

HARDENING EXPLOSIVE GRANULATED POWDERS CONTAINING NITRO-CELLULOSE, &c.

SPECIFICATION forming part of Letters Patent No. 267,108, dated November 7, 1882.

Application filed February 28, 1882. (No specimens.)

*To all whom it may concern:*

Be it known that we, WALTER FRANCIS REID and DAVID JOHNSON, residing respectively at Stowmarket, in the county of Suffolk, and the city and county of Chester, both in England, have invented new and useful Improvements in Hardening Explosive Granulated Powders Containing Nitro-Cellulose or Solid Organic Nitro Compounds, of which the following is a specification.

Heretofore all explosive granulated powders containing nitro-cellulose or other solid organic nitro compounds have been comparatively loose in texture and easily compressible, so that the ballistic effects of such powders and the strain produced by their explosion upon the barrel of the gun varied according to the degree of compression to which they were subjected in loading the cartridge or gun.

The object of this invention is to produce a powder of hard and uniform grain, the use of which is free from the irregularities due to the variations of pressure in loading cartridges and guns.

In carrying out our invention we take explosive powders containing nitro-cellulose or other solid organic nitro compounds which have been granulated by ordinary and well-known methods. We moisten the granulated powder with ethylic or methylic ethers or alcohols, or any mixture of these, whether with each other or with other liquids. The amount and proportion of liquid required to saturate the granulated powder may vary according to the size of the grains and the nature of their composition; but from fifty to eighty parts, by volume, of the liquid will in most cases be found sufficient to moisten one hundred parts, by volume, of powder granulated in the usual manner. After the addition of the liquid the powder is dried, during which process the volatile portions may be recovered and afterward used again. The grains which adhere slightly to each other are then separated by rubbing them through a sieve, and are ready for use. If necessary, suitable substances which are

soluble in the liquids which we employ may be added to them for the purpose of waterproofing the powder or modifying its explosive properties; but we have found that compounds of nitro-cellulose which are hygroscopic when their texture is loose do not absorb moisture when they have been hardened in the manner described.

The invention then consists in hardening the grains of such powders by treating them with a liquid which acts upon the organic nitro compounds, either softening or partially dissolving them. When this liquid is subsequently evaporated the nitro compound which has been softened or partially dissolved is re-deposited in a more compact form, and cements the particles composing each grain in such a manner that the powder becomes hard-grained.

We do not claim the treatment of gunpowder with a spirit such as alcohol. This simply acts to soften such gunpowder, or becomes a solvent by which a gum is introduced. Neither do we broadly claim the use of alcohol in the manufacture of pyroxyline or other nitro compounds.

We claim as our invention—

The method herein specified of hardening explosive granulated powders containing nitro-cellulose or solid organic nitro compounds, consisting in moistening such grains with a spirit, as described, and preventing the adhesion of the grains, substantially as set forth.

WALTER F. REID.  
DAVID JOHNSON.

Witnesses to the signature of Walter Francis Reid:

E. G. BREWER,

E. W. ECAILLE,

Both of 33 Chancery Lane, London.

Witnesses to the signature of David Johnson:

CHAS. BERKLEY HARRIS,

JOHN DEAN,

Both of 17 Gracechurch Street, London.