

UNITED STATES PATENT OFFICE.

RUSSELL S. PENNIMAN, OF JENKINTOWN, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO JOHN C. SCHRADER, OF MCCAINSVILLE, NEW JERSEY.

PROTECTED NITRATE OF AMMONIA FOR USE IN EXPLOSIVE COMPOUNDS.

SPECIFICATION forming part of Letters Patent No. 312,010, dated February 10, 1885.

Application filed November 30, 1883. (No specimens.)

To all whom it may concern:

Be it known that I, RUSSELL S. PENNIMAN, of Jenkintown, in the county of Montgomery and State of Pennsylvania, have invented a certain new and useful Improvement in Protected Nitrate of Ammonia for use in Explosive Compounds; and I do hereby declare that the following specification is a clear, true, and complete description of my invention.

It is well known that the deliquescent or hygroscopic nitrates of which the nitrate of ammonia is the most prominent have heretofore been employed with various ingredients in the manufacture of explosive compounds, and that said nitrates have been combined with such solid fatty or waxy bodies as paraffine, naphthaline, stearine, ozocerite, palmitate of cetyl, and hard pitch; and, also, that in some cases some of these last-named ingredients have been employed for obviating the deliquescent tendency of said nitrates. These solid fatty or waxy matters, when combined as heretofore with the nitrates, as protecting agents, result in a practically solid mass of protected nitrate, which can only be fitted for use either by grinding or melting; and the object of my invention is to not only securely protect nitrate of ammonia against deliquescence, but to maintain it in substantially its normal disintegrated condition, so as to afford a new article of manufacture and trade suited for ready use in the manufacture of high explosives, and enable the immediate admixture thereof with any of the well-known explosive substances or compounds heretofore employed.

To those ends my invention consists in protecting nitrate of ammonia in a granulated or in an otherwise divided condition by jacketing the particles thereof with a soft or viscous or fluid or semi-fluid carbonaceous substance which will also serve as a carbonaceous element in explosive compounds embodying my protected nitrate, and I use petroleum or any of the well-known heavy viscous educts or products thereof which have the capacity of readily inclosing or enveloping the particles of nitrate by ordinary methods of mixing, as distinguished from the melting or grinding processes heretofore necessary in the

prior use of paraffine, stearine, naphthaline, or other similar solid waxy or fatty bodies.

It is obvious that for use in explosive compounds the nitrate, thus protected against deliquescence, should be in a condition which will enable it to be readily compounded with other bodies—as, for instance, prior to applying the protecting medium the nitrate should be either ground or granulated, although the latter is preferable. For granulating said nitrate, I proceed, in a manner well known to chemists, to subject a quantity of said nitrate in its solid or crystallized commercial form to a melting temperature in a suitable vessel. I then transfer it to a vessel provided with a water jacket, and then continuously stir the mass, while the temperature thereof is steadily reduced until, by the combined effect of cooling and stirring, the nitrate is developed into a granulated condition. Whether the nitrate be thus granulated or otherwise reduced to a granular or divided condition, it is then thoroughly mixed with about twelve (12) per cent. of the fluid or semi-fluid carbonaceous protecting medium, which forms a readily-applied jacket or coating for the granules of nitrate, and also serves as a carbonaceous element in such explosive compounds as it may thereafter be employed in.

I can obtain good results by the use of crude petroleum; but the protecting media best suited for my purpose are the heavy educts or products of petroleum in a fluid, semi-fluid, or viscous or soft condition, and in its application to the nitrate the percentage above named should obviously be varied, more or less, according to the consistence of the protecting medium, it being understood that said medium must be in such form as will enable the coating of the nitrate without that necessity for grinding or trituration or the melting operation heretofore essentially incident to the prior use of paraffine, stearine, and other solid fatty or waxy substances.

With a view to the greatest economy I use petroleum, or, in lieu thereof, the soft residuary matter obtained from petroleum-stills, but at a slightly greater cost. I prefer to use such well-known soft educts or products of

petroleum as are known under various names—
as, for instance, cosmoline, vaseline, paraf-
fine-butter, and paraffine-jelly—all of which
are well suited for my purposes, and I deem
5 them preferable to petroleum, mainly because
they have no offensive odors and are free from
earthy matter.

The protected nitrate of ammonia as de-
scribed somewhat resembles moist brown
10 sugar, and is readily distinguished from any
prior preparation of such nitrates of which I
have knowledge, and it is not liable to become
lumpy or solid if exposed to low tempera-
tures, nor are the granules or particles liable
15 to lose their coating under any of the circum-
stances incident to transportation, exposure,
or use, and it is specially valuable for use in
connection with explosive salts which are in
a finely-divided condition, because the soft
20 viscous and oily coating of the nitrate enables

it to be all the more readily and evenly com-
mingled with such salts, whether with or with-
out the previous admixture of said salts, with
an additional quantity of the same viscous
protecting medium, to serve as a carbon ele- 25
ment, as set forth in a prior pending applica-
tion for Letters Patent filed by me May 3,
1883, Serial No. 93,751.

Having thus described my invention, I claim
as new and desire to secure by Letters Patent— 30

Nitrate of ammonia in a finely-divided or in
a granulated condition, protected against del-
iquescence by a coating of petroleum or its
soft and viscous educts or products, substan-
tially as described.

RUSSELL S. PENNIMAN.

Witnesses:

C. MATHER,
MARY W. MATHER.