

Nov. 26, 1935.

W. STRATHMEYER

2,021,927

SODIUM NITRATE

Filed July 29, 1932

Fig. 1.



SODIUM-NITRATE CONTAINING
BETWEEN 3% AND 5% POTASSIUM-NITRATE.

Fig. 2.



SODIUM-NITRATE CONTAINING
BETWEEN 3% AND 5% MAGNESIUM-NITRATE.

Fig. 3.



SODIUM-NITRATE CONTAINING
BETWEEN 3% AND 5% OF AMMONIUM-SULPHATE.

Inventor.

Walter Strathmeyer

By

Hauff Warland
ATTORNEYS.

UNITED STATES PATENT OFFICE

2,021,927

SODIUM NITRATE

Walter Strathmeyer, Oppau, Germany, assignor
to I. G. Farbenindustrie Aktiengesellschaft,
Frankfort-on-the-Main, Germany

Application July 29, 1932, Serial No. 625,662
In Germany August 5, 1931

7 Claims. (Cl. 23—239)

The present invention relates to sodium nitrate which is improved in its capacity for being stored and scattered and to a process for making such product.

5 The object of this invention is a process for producing sodium nitrate in globular granules having improved mechanical strength and the product of that process.

10 It has already been proposed, in order to improve the capacity of sodium nitrate for being stored and scattered, to melt it and spray it, for example according to the British Patent No. 315,262. In this manner globular granules are obtained which, however, have hollow spaces in the interior and the mechanical strength of which is consequently but slight, so that when stored in large amounts and when transported the globules collapse and thus lose their globular character. The advantages with regard to the desired properties in storing and scattering, which are produced by giving the salt the said form are thereby lost. In particular, the dust fraction, which has a very unfavorable effect both on the capacity for storage and the capacity for being scattered, is considerably increased by the destruction of the globular shape of the granules.

15 On the other hand, it is known that sodium nitrate has often been marketed in a form containing a substantial proportion of other salts, as for example potassium nitrate. It has also been proposed to prepare mixed fertilizers from sodium nitrate by mixing the same with other fertilizing salts, such as potassium chloride or potassium nitrate. However, products of the said kind which contain sodium nitrate and in addition thereto more or less substantial amounts of one or more other salts have never been marketed in the form of more or less globular granules.

20 I have now found that the mechanical strength of sprayed sodium nitrate is considerably increased and the disadvantages inherent in the sprayed products referred to above are therefore avoided by adding to the sodium nitrate, before the spraying, substances which increase the strength of the sprayed particles and which do not, or not appreciably, alter and in particular, not reduce, the nitrogen content of the sodium nitrate. Thus in accordance with the present invention, there are used as addition substances materials containing nitrogen, namely nitrates or ammonium salts, especially those which have approximately the same nitrogen content as sodium nitrate. Of these, ammonium sulphate and potassium nitrate are especially suitable. Other salts containing nitrogen, such as magnesium ni-

trate, ammonium nitrate and iron nitrate, also increase the strength of the sprayed sodium nitrate.

The annexed drawing shows by way of illustration, on an enlarged scale, single grains of examples of the type of product of this invention, namely:—

Fig. 1 sodium nitrate containing between 3% and 5% of potassium nitrate,

Fig. 2 sodium nitrate containing between 3% and 5% of magnesium nitrate, and

Fig. 3 sodium nitrate containing between 3% and 5% of ammonium sulphate.

From the following examples, which illustrate the nature of the invention but to which the invention is not restricted, it will be seen that small amounts of additional substances, ranging between 1.5 and 12 per cent, and preferably between 3 and 5 per cent, are sufficient to increase the pressure required to destroy the granules of the sprayed product by from two to seven times. In most cases amounts of less than 10 per cent will be employed.

For the purpose of comparison with the products obtained according to the following examples, sodium nitrate was melted without any additional substances and sprayed through a nozzle having an internal diameter of 1 millimeter. From the sprayed product, 10 globules were picked out having a diameter of 2.2 millimeters and the pressure required to destroy them was determined. The average destroying pressure amounts to 350 grams. The products described in the examples were tested in the same manner. The proportions given in the examples are given in parts by weight.

Example 1

97 parts of sodium nitrate are fused with an addition of 3 parts of magnesium nitrate and sprayed as already described. The average destroying pressure of 10 globules having a diameter of 2.2 millimeters is 650 grams. The product of the type herein described is illustrated in Fig. 2.

Example 2

If 3 parts of ammonium nitrate be employed instead of the magnesium nitrate in Example 1, the destroying pressure under the same conditions amounts to 1080 grams.

Example 3

By employing 3 parts of potassium nitrate instead of the magnesium nitrate in Example 1,

a destroying pressure of 1800 grams is attained and a product of the type illustrated in Fig. 1 is obtained.

Example 4

5 By employing 3 parts of ammonium sulphate as the addition instead of magnesium nitrate as in Example 1, the destroying pressure amounts to 2450 grams. The product of this type is illustrated in Fig. 3.

10 The hollow space in the single globules of sodium nitrate prepared according to the present invention with the said addition materials is considerably less than in the case of sodium nitrate without additions and in some cases there are no hollow spaces at all. This is indicated by the following "pour weights" i. e. the weight of the product which occupies a given volume after pouring:—

20 The "pour weight" with sodium nitrate without any additional substances is 1150 grams per liter. The "pour weights" of sodium nitrate each with 3 per cent of additional substances are given in the following table:—

Additional substance	Pour weight
	Grams per liter
Magnesium nitrate.....	1180
Ammonium nitrate.....	1190
Potassium nitrate.....	1200
Ammonium sulphate.....	1220

Example 5

35 95 parts of sodium nitrate are fused with an addition of 5 parts of magnesium nitrate and sprayed as already described. The average destroying pressure of 10 globules having a diameter of 2.2 millimeters is 1400 grams.

Example 6

40 90 parts of sodium nitrate are fused with an addition of 10 parts of magnesium nitrate and sprayed as already described. The average destroying pressure of 10 globules having a diameter of 2.2 millimeters is 1800 grams.

What I claim is:

1. Sodium nitrate in the form of substantially globular rounded grains substantially free from voids and containing between 1.5 and 12 per cent of an inorganic nitrogenous fertilizing salt selected from the group consisting of ammonium salts and those nitrates which are different from sodium nitrate. 5

2. Sodium nitrate in the form of substantially globular rounded grains substantially free from voids and containing between 3 and 5 per cent of an inorganic nitrogenous fertilizing salt selected from the group consisting of ammonium salts and those nitrates which are different from sodium nitrate. 10 15

3. Sodium nitrate in the form of substantially globular rounded grains substantially free from voids and containing between 3 and 5 per cent of magnesium nitrate.

4. Sodium nitrate in the form of substantially globular rounded grains substantially free from voids and containing between 3 and 5 per cent of potassium nitrate. 20

5. Sodium nitrate in the form of substantially globular rounded grains substantially free from voids and containing between 3 and 5 per cent of ammonium sulphate. 25

6. The process of producing sodium nitrate of improved storage properties from practically pure sodium nitrate which comprises spray-solidifying the sodium nitrate from the fused state after having incorporated therewith between 1.5 and 12 per cent of an inorganic nitrogenous fertilizing salt selected from the group consisting of ammonium salts and those nitrates which are different from sodium nitrate. 30 35

7. The process of producing sodium nitrate of improved storage properties from practically pure sodium nitrate which comprises spray-solidifying the sodium nitrate from the fused state after having incorporated therewith between 3 and 5 per cent of an inorganic nitrogenous fertilizing salt selected from the group consisting of ammonium salts and those nitrates which are different from sodium nitrate. 40 45

WALTER STRATHMEYER.