

- [54] **PROCESS FOR THE PRODUCTION OF SOLID UREA-NITRIC PHOSPHATE FERTILIZER PRODUCTS**
- [76] Inventors: **Jack M. Sullivan**, 106 Patsy Dr.; **Yong K. Kim**, 230 Roxie Dr., both of Florence, Ala. 35630; **Kjell R. Waerstad**, Rte. 3, Colbert Heights, Tuscumbia, Ala. 35674
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[57] **ABSTRACT**

The present invention relates to the reaction of phosphate rock with nitric acid and urea to produce nitrogen-phosphorus containing slurries, which slurries may be granulated and dried to produce solid N-P fertilizer products with agronomically advantageous low pHs (1.1-4.0). Products with optimum physical and chemical properties were discovered by investigating the characteristics of each individual material as a function of the nitric acid acidulation ratio (mole ratio HNO₃:CaO) and the mole ratio urea:CaO present in each product. Acidulation ratios ranged from 1.2 to 2.1 while ratios urea:CaO ranged from 1.6 to 4.0. Selected products with optimum physicochemical properties are tabulated below:

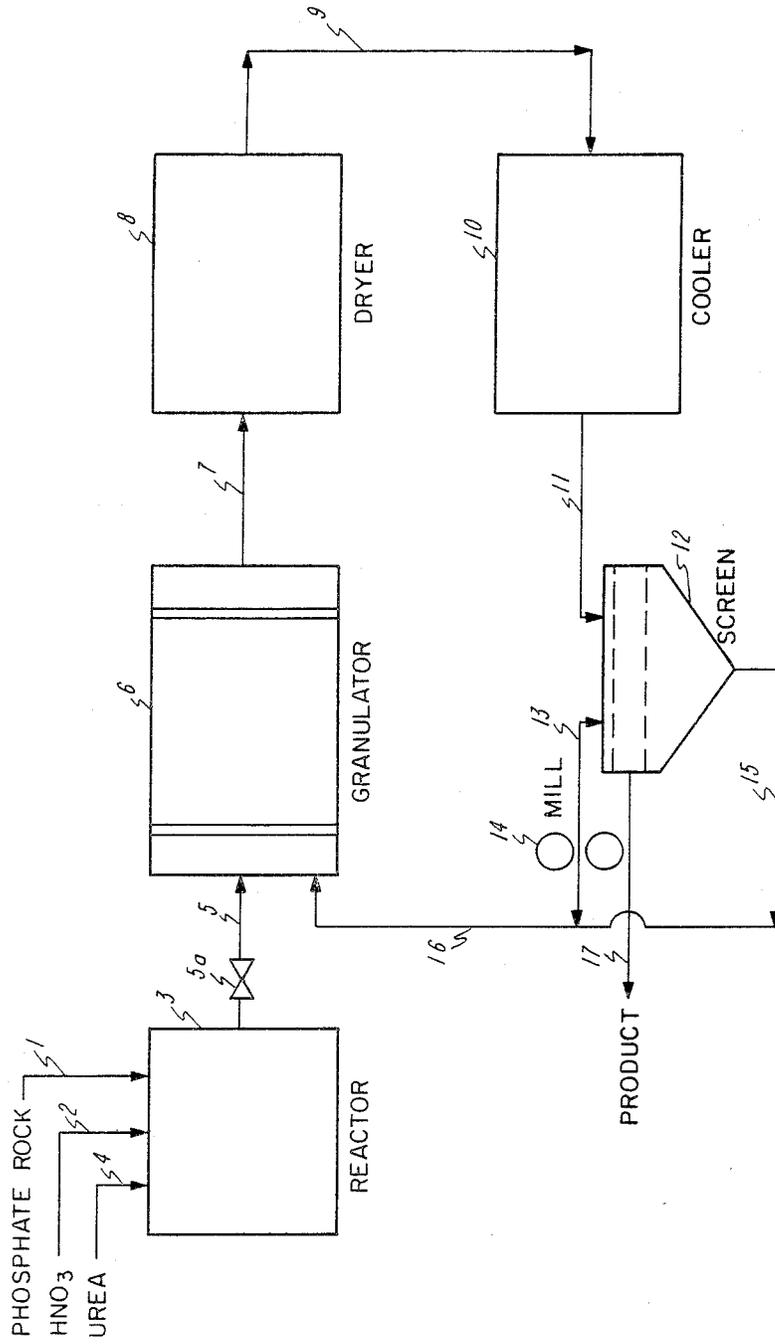
Acidulation Ratio HNO ₃ :CaO, M/M	Ratio		Grade	Melting Pt, °C.
	Urea:CaO, M/M			
1.2	2.2		23.8—11.7—0	137—139
1.4	2.4		25.0—11.0—0	136
1.6	2.8		25.9—9.9—0	133—137
1.8	3.0		26.4—9.2—0	134—135
2.0	3.3		27.2—8.7—0	130
2.1	3.2		36.6—8.8—0	125—130

Acidulation Ratio HNO ₃ :CaO, M/M	P ₂ O ₅ Solubility, %		pH of 1% solution	Critical Relative Humidity at 25° C., %
	Water	Citrate		
1.2	69.2	82.1	2.5	59.3
1.4	81.8	90.0	2.4	60.9
1.6	88.9	91.9	2.3	60.1
1.8	96.7	98.9	2.1	59.9
2.1	99.0	100	2.1	60.0
2.1	100	100	2.1	59.5

The products have excellent storage characteristics. The improved properties of these products result partially from the formation of a new compound, Ca(H₂PO₄)(NO₃).CO(NH₂)₂, which was discovered during the course of the investigation that led to the instant invention.

**17 Claims, 1 Sheet Drawing,
42 Pages Specification**

The file of this unexamined application may be inspected and copies thereof may be purchased (849 O.G. 1221, Apr. 9, 1968).



PROCESS FOR UREA-NITRIC PHOSPHATES

FIGURE 1