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FOREIGN TECHNOLOGY DIVISION

A METHOD FOR OBTAINING NITRIC ACID

by

G. A. Skvortsov, M. M. Karavayev, et al.

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UNEDITED ROUGH DRAFT TRANSLATION

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A METHOD FOR OBTAINING NITRIC ACID

43 Source

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42 Author

SKVORTSOV, G. A.

16 Co-Author

KARAVAYEV, M. M.

16 Co-Author

KIRILLOV, I. P.

16 Co-Author

FERD, M. L.

16 Co-Author

ALEKSEYENKO, D. A.

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ABSTRACT : This Author Certificate presents a method for obtaining nitric acid under the pressure of 5--10 atm, out of nitrogen oxides in the system of condensation of water vapors. To increase the concentration of nitric acid, the unreacted nitrogen oxides are absorbed by the produced acid at a temperature of 25--45C in the absorption part of the bleaching column. English translation: 2 pages.

U. S. BOARD ON GEOGRAPHIC NAMES TRANSLITERATION SYSTEM

Block	Italic	Transliteration	Block	Italic	Transliteration
А а	*А а*	A, a	Р р	*Р р*	R, r
Б б	*Б б*	B, b	С с	*С с*	S, s
В в	*В в*	V, v	Т т	*Т т*	T, t
Г г	*Г г*	G, g	У у	*У у*	U, u
Д д	*Д д*	D, d	Ф ф	*Ф ф*	F, f
Е е	*Е е*	Ye, ye; E, e*	Х х	*Х х*	Kh, kh
Ж ж	*Ж ж*	Zh, zh	Ц ц	*Ц ц*	Ts, ts
З з	*З з*	Z, z	Ч ч	*Ч ч*	Ch, ch
И и	*И и*	I, i	Ш ш	*Ш ш*	Sh, sh
Й й	*Й й*	Y, y	Щ щ	*Щ щ*	Shch, shch
К к	*К к*	K, k	Ъ ъ	*Ъ ъ*	"
Л л	*Л л*	L, l	Ы ы	*Ы ы*	Y, y
М м	*М м*	M, m	Ь ь	*Ь ь*	'
Н н	*Н н*	N, n	Э э	*Э э*	E, e
О о	*О о*	O, o	Ю ю	*Ю ю*	Yu, yu
П п	*П п*	P, p	Я я	*Я я*	Ya, ya

* ye initially, after vowels, and after ъ, ь; e elsewhere. When written as ё in Russian, transliterate as yё or ё. The use of diacritical marks is preferred, but such marks may be omitted when expediency dictates.

A METHOD FOR OBTAINING NITRIC ACID

G. A. Skvortsov, M. M. Karavayev, I. P. Kirillov, M. L. Ferd,
D. A. Alekseyenko, and I. M. Kaganskiy

This invention concerns the industrial production of nitric acid of increased concentration.

The process of obtaining nitric acid from nitrous gases containing nitric oxide under conditions of condensation of water vapors and subsequent concentration of nitric acid by processing it with gases containing nitric oxide is well known.

By using the method offered here it is possible to increase the concentration of acid to 70-74% without using additional nitric oxides, resulting in conversion of a maximum amount of the oxide of nitrous gases to acid. In this method the process of acid formation under conditions of condensation of water vapors takes place in a refrigerator-condenser at a pressure of 5 atm.

Unreacted nitric oxides are absorbed by nitric acid at temperatures no higher than $-5^{\circ}C$ in absorption column, with subsequent bleaching.

The obtained 58-62-% nitric acid is strengthened to 70-74% in the absorption part of the bleaching column at a temperature of $25-45^{\circ}C$ by concentrated gases in the lower part of the bleaching column.

Example: Nitrous gases from conversion of ammonia, containing vol. % 6.56 NO; 4.37 NO_2; 68.76 N_2; 1.91 O_2, and 18.4 H_2O, after preliminary cooling to 120-150°C at a pressure of 5-10 atm, are passed through cooler-condensers, where at a temperature of 20-25°C the process of acid formation takes place. Unreacted gases, containing 4.77% O_2; 0.2-0.4% O_2; and 91.02% N_2, after cooling to -5°C, are fed to the absorption column, where at this temperature the nitric oxides are absorbed by the 72.0% HNO_3: The acid which has absorbed the nitric oxides from the absorption column is fed to the center of the bleaching column, in the lower part of which in air at 45-55°C the oxides are desorbed. To the upper, strengthening, part of the bleaching column is fed condensate from the cooler-condensers, containing 60.1% HNO_3 and 39.9% H_2O. The strengthening of acid to 72% is due to the desorbed nitric oxides in the bleaching part. Air, together with unreacted nitric oxides in the bleaching column, combines with nitrous gases of conversion and goes to the cooler-condensers. The degree of conversion of nitric oxides is 98.5-99.5%.

Object of invention

A method of obtaining nitric acid under pressure of 5-10 atm from nitric oxides under conditions of condensation of water vapors, distinguished by the fact that for the purpose of increasing the concentration of nitric acid the unreacted nitric oxides are absorbed by the produced acid at a temperature of not more than -5°C, with subsequent bleaching, these being used to strengthen the acid at a temperature of 25-45°C in the absorption part of the bleaching column.