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(54) **METHOD AND APPARATUS FOR PRODUCING HIGH-PRESSURE NITROGEN**

(57) A method for producing a high-pressure gas from an air separation unit including the steps of introducing a cold air feed into a distillation column system (20) under conditions effective for separating the cold air feed into a first air gas (22) and a second air gas; withdrawing the first and second air gases from the distillation column system and warming said first and second air gases in a main heat exchanger (10), wherein the first

air gas is withdrawn from the distillation column system at a medium pressure; splitting the first air gas into a first fraction (24) and a second fraction (26); expanding the first fraction in a turbine (30); and compressing the second fraction in a booster (40) to a pressure that is higher than the medium pressure, wherein the booster is powered by the turbine

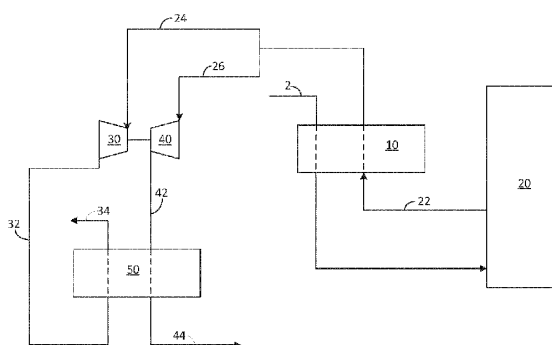


FIG. 1



EUROPEAN SEARCH REPORT

Application Number

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EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 0 932 000 A2 (AIR PROD & CHEM [US]) 28 July 1999 (1999-07-28)	1, 2, 4, 11-14	INV. F25J3/04
A	* page 8, lines 28-36; figures 6-7 * * page 9, lines 27-37 * -----	3, 5, 6	
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A	* figure 1 * -----	3, 5, 6	
Y	DE 15 01 732 A1 (MESSER GRIESHEIM GMBH) 27 November 1969 (1969-11-27) * figure 2 *	1-6, 11-14	
Y	US 4 894 076 A (DOBRACKI THADDEUS N [US] ET AL) 16 January 1990 (1990-01-16) * figure 3 * -----	1-6, 11-14	
<div style="text-align: center;">-----</div> <p>The present search report has been drawn up for all claims</p>			<div style="text-align: center;">TECHNICAL FIELDS SEARCHED (IPC)</div> <p>F25J</p>
Place of search		Date of completion of the search	Examiner
Munich		11 March 2022	Göritz, Dirk
<div style="display: flex; justify-content: space-between;"> <div> <p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone</p> <p>Y : particularly relevant if combined with another document of the same category</p> <p>A : technological background</p> <p>O : non-written disclosure</p> <p>P : intermediate document</p> </div> <div> <p>T : theory or principle underlying the invention</p> <p>E : earlier patent document, but published on, or after the filing date</p> <p>D : document cited in the application</p> <p>L : document cited for other reasons</p> <p>.....</p> <p>& : member of the same patent family, corresponding document</p> </div> </div>			



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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

2-6 (completely); 1, 11-14 (partially)

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).



LACK OF UNITY OF INVENTION SHEET B

Application Number

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The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 2-6(completely); 1, 11-14(partially)

A method for producing a high-pressure gas from an air separation unit, the method comprising the steps of:

- introducing a cold air feed into a distillation column system under conditions effective for separating the cold air feed into a first air gas and a second air gas;
- withdrawing the first and second air gases from the distillation column system and warming said first and second air gases in a main heat exchanger, wherein the first air gas is withdrawn from the distillation column system at a medium pressure;
- splitting the first air gas into a first fraction and a second fraction;
- expanding the first fraction in a turbine;
- compressing the second fraction in a booster to a pressure that is higher than the medium pressure, wherein the booster is powered by the turbine; and
- warming the expanded first fraction.

2. claims: 7-10(completely); 1, 11-14(partially)

A method for producing a high-pressure gas from an air separation unit, the method comprising the steps of:

- introducing a cold air feed into a distillation column system under conditions effective for separating the cold air feed into a first air gas and a second air gas;
- withdrawing the first and second air gases from the distillation column system and warming said first and second air gases in a main heat exchanger, wherein the first air gas is withdrawn from the distillation column system at a medium pressure;
- splitting the first air gas into a first fraction and a second fraction;
- expanding the first fraction in a turbine;
- compressing the second fraction in a booster to a pressure that is higher than the medium pressure, wherein the booster is powered by the turbine;
- the second fraction is withdrawn at an intermediate location of the main heat exchanger such that the second fraction is partially warmed and wherein
- the first fraction is withdrawn at an intermediate location of the heat exchanger, such that the first fraction is partially warmed in the main heat exchanger, or the first fraction is withdrawn at a warm end of the main heat exchanger, such that the first fraction is fully warmed.

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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