Abstract: A synthesis plant (309A) includes a compression device (360A) that increases a pressure differential between the bottom product pressure of a cryogenic separator (340A) and the delivery pressure of the bottom product to a downstream plant component. Such increased pressure differential is employed to increase cooling in the separator (340A) to thereby significantly reduce the volume of excess air. In most preferred aspects, at least part of the energy required for the compression device is provided by expansion (320A) of the separator feed.
# INTERNATIONAL SEARCH REPORT

## A. CLASSIFICATION OF SUBJECT MATTER

**IPC(7)**: C01C 1/00, 1/04; F25B 19/02; F25J 1/00  
**US CL**: 423/359, 360, 361; 62/51.2, 619  
According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
U.S.: 423/359, 360, 361; 62/51.2, 619

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category *</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>US 4, 409,196 A (SKINNER et al.) 11 October 1983 (11.10.1983), Column 3, lines 6-51</td>
<td>1-4, 9-10 and 15</td>
</tr>
<tr>
<td>Y</td>
<td>US 5, 935,544 A (BHAKTA) 10 August 1999 (10.08.1999)</td>
<td>5-8, 11-14 and 16-20</td>
</tr>
</tbody>
</table>

* Special categories of cited documents:
- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

Future documents are listed in the continuation of Box C. | See patent family annex.

Date of the actual completion of the international search: 19 December 2005 (19.12.2005)

Date of mailing of the international search report: 13 January 2006

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