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[Continued on next page]

(54) Title: A PROCESS FOR THE SELECTIVE HYDROGENATION AND HYDRODESULFERIZATION OF A PYROLYSIS GASOLINE FEEDSTOCK

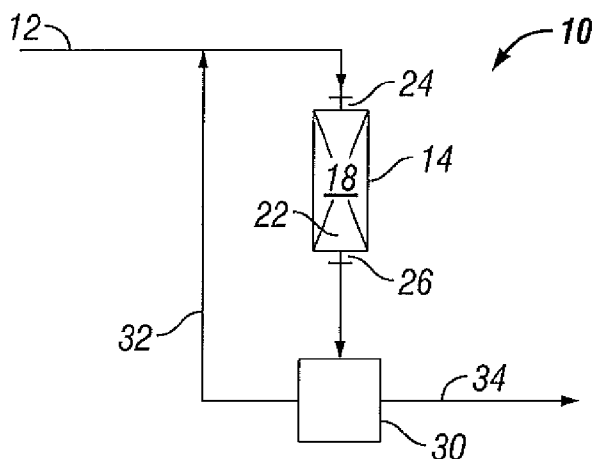


FIG. 1

(57) Abstract: Disclosed is a process for the selective hydrogenation of diolefins and sulfur compounds that are contained in a pyrolysis gasoline feedstream. The process includes utilizing a single hydrotreating reaction stage by introducing the pyrolysis gasoline feedstock that includes a diolefin concentration and an organic sulfur concentration into a reactor that is loaded with a high activity hydrotreating catalyst and which is operated under selective hydrogenation conditions. A reactor effluent having a reduced diolefin concentration and a reduced organic sulfur concentration is yielded from the reactor and is separated into a portion that is recycled as a reactor feed. The remaining portion of the reactor effluent is passed downstream for further processing or handling.

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- *with international search report (Art. 21(3))*
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**INTERNATIONAL SEARCH REPORT**

International application No  
PCT/US2010/037864

**A. CLASSIFICATION OF SUBJECT MATTER**  
 INV. C10G45/02 C10G45/32 C10G69/06

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)  
 C10G

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 practical, search terms used)  
 EPO-Internal, WPI Data

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 059 504 A (BAUER WILLIAM V) 22 November 1977 (1977-11-22) column 2 - line 12 column 3, line 8 - line 19; claims 1,4	1-13
X	WO 2009/039020 A1 (SHELL OIL CO [US]; SHELL INT RESEARCH [NL]; HIMELFARB PAUL BENJERMAN []) 26 March 2009 (2009-03-26) claim 1	1-13
X	WO 2004/003111 A1 (CORNING INC [US]) 8 January 2004 (2004-01-08) paragraphs [0008], [0009], [0018] - [0020], [0023], [0027]; claim 1; figure 1	1-13
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Further documents are listed in the continuation of Box C.

See patent family annex.

\* 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 document but 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

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
20 December 2010	01/04/2011

Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer  Deurinck, Patricia
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# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2010/037864

## Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
  
3.  Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1.  As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
  
2.  As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
  
3.  As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
  
4.  No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-13

### Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

## INTERNATIONAL SEARCH REPORT

International application No  
PCT/US2010/037864

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	AU 492 574 B2 (BRITISH PETROLEUM COMPANY LIMITED) 16 October 1975 (1975-10-16) page 5, paragraph 4; claims 1,2; figure 1 -----	1-13
X	US 3 221 078 A (KEITH CARL D ET AL) 30 November 1965 (1965-11-30) column 2, line 33 - column 3, line 14; claims 1,5; example 1 -----	1-13
X	EP 1 277 826 A1 (ATOFINA RES [BE]) 22 January 2003 (2003-01-22) paragraphs [0001], [0047] - [0053], [0061] - [0064]; claims 1,9,11,14,16 -----	1-13
X	GB 2 022 130 A (LUMMUS CO) 12 December 1979 (1979-12-12) claims 1,4,6; figure 1 -----	1-13
X	US 6 388 150 B1 (OVERBEEK RUDOLF A [US] ET AL) 14 May 2002 (2002-05-14) column 2, line 41 - line 49 column 8, line 17 - line 41; claims 1,4,5 -----	1-13
X	US 3 493 492 A (SZE MORGAN C) 3 February 1970 (1970-02-03) claim 1; figure 1; examples 1,2 -----	1-13
X	US 3 024 188 A (ARTHUR YEO ALAN ET AL) 6 March 1962 (1962-03-06) column 1, line 12 - column 2, line 7 column 2, line 42 - line 62 column 4, line 8 - line 29; claims 1,4,5; examples 1-7 -----	1-13
X	US 2 916 434 A (EARL DRAEGER KENNETH ET AL) 8 December 1959 (1959-12-08) column 1, line 15 - column 2, line 71; claim 1; figure 1 -----	1-13
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X	US 3 116 233 A (DOUWES CORNELIS T ET AL) 31 December 1963 (1963-12-31) column 1, line 11 - column 2, line 42; claim 1 -----	1-13
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# INTERNATIONAL SEARCH REPORT

Information on patent family members

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**FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210**

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-13

A process for the selective hydrogenation of diolefins and sulphur compounds contained in a pyrolysis gasoline feedstock

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2. claims: 14-18

A process for the selective hydrogenation of monoolefins, diolefins and sulphur compounds contained in a pyrolysis gasoline feedstock

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