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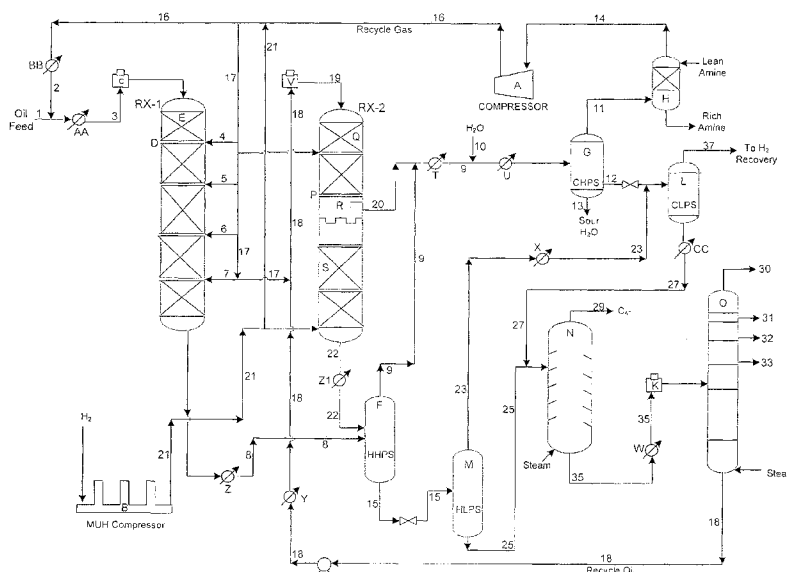
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[Continued on next page]

(54) Title: HIGH CONVERSION HYDROPROCESSING



(57) Abstract: In the refining of crude oil, hydroprocessing units (D and P) such as hydrotreaters and hydrocrackers are used to remove impurities such as sulfur, nitrogen, and metals from the crude oil. They are also used to convert the feed (1) into valuable products such as naphtha, jet fuel, kerosene and diesel. The current invention provides very high to total conversion of heavy oils to products in a single high-pressure loop, using multiple reaction stages. The second stage (P) or subsequent stages may be a combination of co-current and counter-current (N) operation. The benefits of this invention include conversion of feed to useful products at reduced operating pressures using lower catalyst volumes. Lower hydrogen consumption also results. A minimal amount of equipment is employed. Utility consumption is also minimized.

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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

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U.S. : 208/58, 59, 89, 97, 210

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6,797,154 B2 (MUKHERJEE et al) 29 September 2004 (29.09.2004), see entire patent.	1
A,P	US 7,128,828 B1 (KALNES) 31 October 2006 (31.10.2006), see entire patent.	1

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

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