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(71) Applicant: EXXON RESEARCH AND ENGINEERING COMPANY [US/US]; 180 Park Avenue, P.O. Box 390, Florham Park, NJ 07932-0390 (US).

(72) Inventors: GUPTA, Ramesh; 57 Lawrence Drive, Berkeley Heights, NJ 07922 (US). JUNG, Henry; 17 Coleman Avenue West, Chatham, NJ 07928 (US). ELLIS, Edward, Stanley; 39 Rankin Avenue, Basking Ridge, NJ 07920 (US). SCHORFHEIDE, James, John; 1534 Stoneleigh Drive, Baton Rouge, LA 70808 (US). IACCINO, Larry, Lee; 2017 San Joaquin Parkway, Friendswood, TX 77546 (US).

(74) Agents: NAYLOR, Henry, E. et al.; Exxon Research and Engineering Company, P.O. Box 390, Florham Park, NJ 07932-0390 (US).

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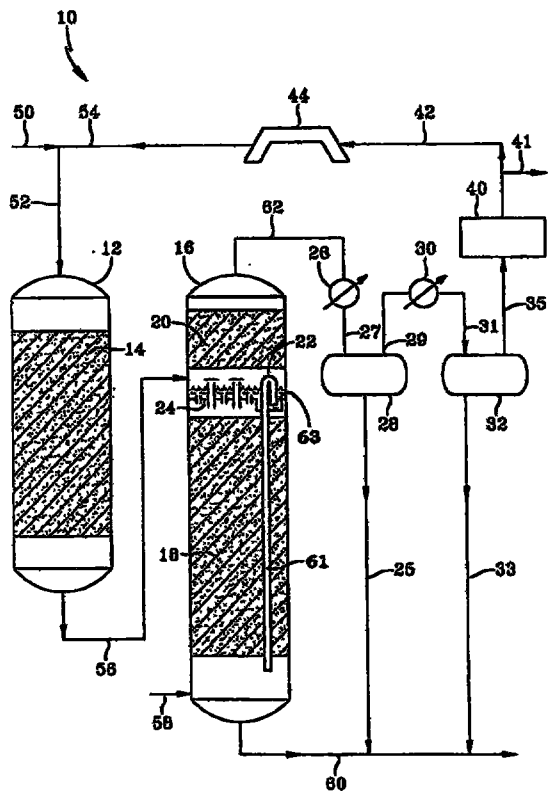
(54) Title: COMBINATION COCURRENT AND COUNTERCURRENT STAGED HYDROPROCESSING WITH A VAPOR STAGE

(57) Abstract

A hydroprocessing process including a cocurrent flow liquid reaction stage, a countercurrent flow liquid reaction stage and a vapor reaction stage in which feed components are catalytically hydroprocessed by reacting with hydrogen is disclosed. A hydrocarbon feed (50) and hydrogen (54) are passed via line (52) to a cocurrent reaction stage in vessel (12) in order to produce a mixed liquid and vapor effluent (56). The mixed liquid and vapor effluent (56) is separated in flash zone (22) in vessel (16). The liquid effluent is subjected to a countercurrent reaction stage with hydrogen (58) in vessel (16) in order to produce a liquid effluent (60). Next, the liquid stage effluents are combined and catalytically reacted in bed (20) with hydrogen to form a hydroprocessed vapor (62).