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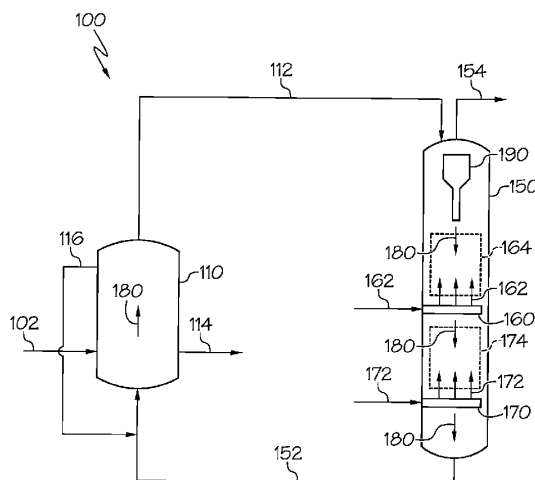


FIG. 1

(57) Abstract: According to one or more embodiments described herein, a method for dehydrogenating hydrocarbons may include contacting a feed stream including one or more hydrocarbons with a particulate solid, which may include an oxygen-carrier material, to form hydrogen and one or more products. At least a portion of the hydrogen may be reacted with oxygen from the oxygen-carrier material. A regeneration unit may include a first gas inlet and a second gas inlet that may be beneath the first inlet. A fuel may enter into the regeneration unit through the first gas inlet and an oxygen-containing gas may enter through the second gas inlet. In an area of the regeneration unit above the first gas inlet, at least a portion of the fuel may be reacted with oxygen from one or both of the oxygen-containing gas or the oxygen-carrier material.

[Continued on next page]

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