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Declarations under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

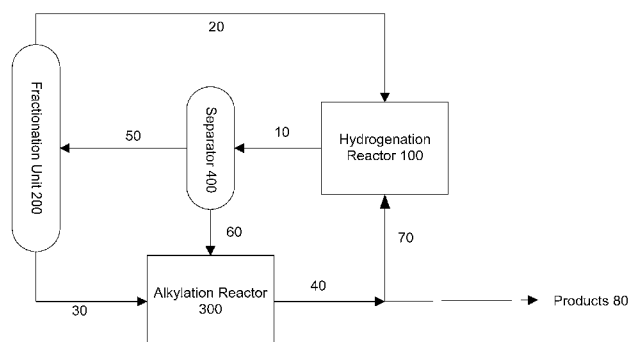
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- (54) **Title:** ALKYLATION PROCESS WITH RECYCLE OF HYDROGEN AND RECOVERY OF HYDROGEN CHLORIDE

FIGURE 1
An Alkylation Unit with Catalyst Hydro-Regeneration, Hydrogen Recycle,
and Hydrogen Chloride Recovery



(57) **Abstract:** We provide processes, and process units for practicing the processes, comprising a. regenerating a used catalyst comprising an ionic liquid catalyst and a chloride, from an alkylation reactor, in a hydrogenation reactor to produce a regenerated catalyst effluent; b. separating at least a portion of the regenerated catalyst effluent into a gas fraction comprising a hydrogen gas and into a light hydrocarbon fraction comprising a hydrogen chloride; c. recycling at least a part of the gas fraction comprising the hydrogen gas to the hydrogenation reactor; and d. recovering at least an amount of the light hydrocarbon fraction comprising the hydrogen chloride and recycling the at least the amount of the light hydrocarbon fraction to the alkylation reactor. The alkylation process units comprise a hydrogenation reactor, a fractionation unit, and connections for transmitting the gas fraction to the hydrogenation reactor and for transmitting the light hydrocarbon fraction to the alkylation reactor.

