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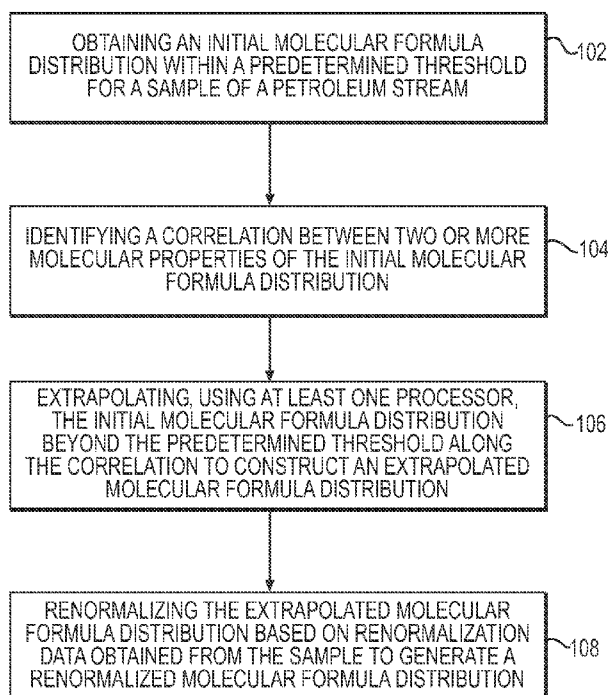
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(54) **Title:** SYSTEM AND METHOD TO GENERATE MOLECULAR FORMULA DISTRIBUTIONS BEYOND A PREDETERMINED THRESHOLD FOR A PETROLEUM STREAM



(57) **Abstract:** Methods for generating molecular formula distributions beyond a predetermined threshold for a petroleum stream are disclosed. An initial molecular formula distribution within a predetermined threshold is obtained for a petroleum stream. A correlation between two or more molecular properties of the initial molecular formula distribution is identified, and the initial molecular formula distribution is extrapolated beyond the predetermined threshold along the correlation. The extrapolated molecular formula is renormalized based on renormalization data obtained from the sample. The renormalized molecular formula distribution can then be blended with the initial molecular formula distribution, reconciled to secondary analytical measurements, and/or used to create a model of composition and/or a molecular composition-based model of a resid upgrading process. Systems for implementing the methods are also disclosed.