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(54) Title: BIOHYDROGEN PRODUCTION METHOD AND REACTOR

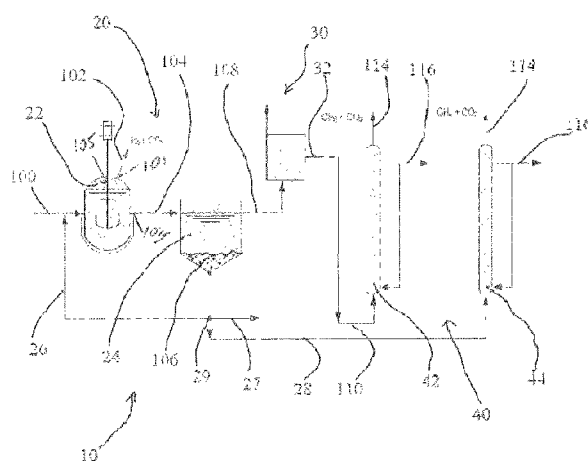


Figure 2

(57) Abstract: A method for producing H₂, VFAs and alcohols from organic material is disclosed, including the steps of introducing organic material and microorganisms into a completely mixed bioreactor for producing H₂, CO₂, VFAs, and alcohols; sequestering CO₂ in the headspace of the reactor; recovering H₂ from the headspace; and recovering a first liquid effluent including microorganisms, VFAs, and alcohols. Also disclosed is a system for producing H₂, VFAs and alcohols from organic material, including a completely mixed bioreactor for dark fermentation; an input for supplying microorganisms and the organic material to be broken down; a CO₂ trap in the headspace and including a solid hydroxide for sequestration of the CO₂ gas from the headspace; and a gas output for removal of a gas effluent including H₂ gas from the headspace. The system and method provide higher H₂ production rates and a H₂ stream is substantially free of CO₂.