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(54) Title: SYSTEM FOR OXIDATIVE DESULFURIZATION ENHANCED BY ULTRASONICALLY INDUCED CAVITATION

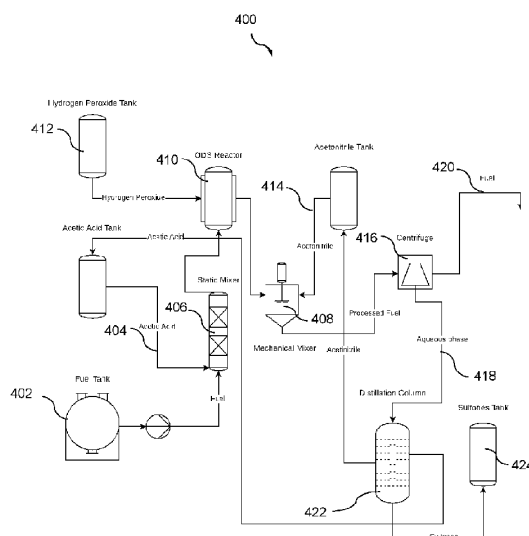


FIG. 4

(57) Abstract: A system is disclosed for desulfurizing liquid fossil fuel comprising: liquid fossil fuel supply; a first mixer; a second mixer; an oxidizer supply; a catalyst supply; an extractant supply; a centrifuge; and an ultrasonically induced cavitation reactor comprising: a vessel configured to receiving the liquid fossil fuel, oxidizer and catalyst as a multiphase reaction medium; and a vibrating probe disposed within walls of the vessel. The multiphase reaction medium is configured to flow generally parallel to the probe. The probe is configured to produce pressure waves to induce formation of nano-sized bubbles in the multiphase reaction medium along one or more cavitation zones along a length of the probe. The vessel walls are at a distance of approximately 0.5 to 5 times the diameter of a smallest diameter of the probe. The first mixer is configured to receive and mix the liquid fossil fuel supply with the catalyst supply. The reactor is configured to receive the mix of liquid fossil fuel supply and the catalyst supply from the first mixer and the oxidizer

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supply. The second mixer is configured to receive the multiphase reaction medium and extractant supply to form processed fuel. The centrifuge is configured to receive the processed fuel from the second mixer to extract sulfones to yield an organic phase and aqueous phase. The organic phase substantially consists of desulfurized fuel.