

Vorsana Patent Portfolio

Dec. 2014

IP Counsel: Marger, Johnson & McCollom, Portland OR

1. TriPhase Filter

[US Patent 7,757,866 \(Jul 20, 2010\)](#)

“Rotary Annular Crossflow Filter, Degasser, and Sludge Thickener” issued July 20, 2010
Wilmot H. McCutchen, Applicant; US Patent application 12/004,308 filed December 20, 2007.
International PCT/US08/85916 filed Dec. 8, 2008, pending in Brazil and India.
Issued patents in Australia (2008340363), China (ZL 200880123937.0), Korea (10-1103433), Mexico (295798) and Canada (2709477).

High shear crossflow filter in radial recirculation reactor for continuous clarifying, degassing, and sludge thickening in wastewater treatment and food processing.

2. Desalinator

[US Patent 8,025,801 \(Sep 27, 2011\)](#)

“Radial Counterflow Inductive Desalination”

Wilmot H. McCutchen, Applicant; US Patent application 11/893,454 filed August 16, 2007.
International PCT/US07/81892 filed Oct. 19, 2007; Pending in Brazil, Canada, and the EPO. Patented in China (ZL 200780100246.4), Australia (2007357653), Mexico (293545), Israel (203765); allowed in Korea.

Electromechanical desalination and trace metal recovery in a continuous process using an RF inductor and high shear for crystallizing scale and salt and concentrating trace metals in brine mining.

3. Cavitation Water Purifier

[US Patent 8,268,136 \(Sep 18, 2012\)](#)

“Electrohydraulic and Shear Cavitation Radial Counterflow Liquid Processor”

Wilmot H. McCutchen and David J. McCutchen, Applicants;
US Patent application 12/234,541 filed September 19, 2008.

International PCT/US2009/036059. Issued patents in Mexico (295799) and China (ZL 2009 8 0114540.X).

Disinfection and degassing of water and precipitation of metals and scale in a continuous reactor suitable for field water purification in disaster areas, without added chemicals.

4. Steam Stripper

[US Patent 7,987,677 \(Aug 2, 2011\)](#) and [US Patent 8,474,264 \(July 2, 2013\)](#)

“Radial Counterflow Steam Stripper”

Wilmot H. McCutchen, Applicant; US Patent application 12/345,324 filed December 29, 2008
International PCT/US2008/088579, pending in China.

Waste heat power harvesting from turbine exhaust steam; reducing water consumption at power plants.

5. Flue Gas Scrubber

[US Patent 7,901,485 \(Mar 8, 2011\)](#)

“Radial Counterflow Carbon Capture and Flue Gas Scrubbing”

Wilmot H. McCutchen, Applicant; US Patent application 11/827,634 filed July 11, 2007.
International PCT/US07/81886 filed Oct. 19, 2007, pending in India.

Fly ash, mercury, and CO2 capture by mechanical vortex gas separation, without added chemicals.

6. HIPE Foam Nanocomposite

[US Patent 8,475,616 \(July 2, 2013\)](#)

“Reactors for Forming Foam Materials from High Internal Phase Emulsions, Methods of Forming Foam Materials and Conductive Nanostructures Therein”. Pending in China.

Carbon nanotubes in a polymer foam matrix join into conductive structures under microhammering from a radio frequency inductor.

Pending US Patent Applications

7. Cracker

“Radial Counterflow Shear Electrolysis”

Wilmot H. McCutchen and David J. McCutchen, Applicants

[US Patent application 12/167,771](#) filed July 3, 2008.

International PCT/US09/33598 filed Feb. 9, 2009, pending in Germany. Patented in the United Kingdom (GB2468831) Canada (2715370) and China (ZL 2009 8 0111988.6).

High shear between oppositely-charged electrodes cracks CO₂ or methane and continuously extrudes elemental carbon as nanotubes.

8. Nanotube Spinneret

“Shear Reactor for Vortex Synthesis of Nanotubes”

David J. McCutchen and Wilmot H. McCutchen, Applicants

[US Patent Application 12/368,236](#) filed Feb. 9, 2009.

International PCT/US09/33600, pending in Germany. Patented in the United Kingdom (GB2469251).

Continuous CNT cable synthesis by extrusion between high shear electrodes.

9. Shear Retort

“Mechanical Pyrolysis in a Shear Retort”

Wilmot H. McCutchen and David J. McCutchen, Applicants

[US Patent application 13/016,328](#) filed Jan. 28, 2011, allowed in Australia and the US. Pending in China, Canada, the EPO, India, and Korea.

Axially-fed double disk mill shear-heats carbonaceous materials, continuously extruding char for soil improvement and axially extracting light hydrocarbons from pyrolysis of agricultural waste or oil sands.

10. Bioreactor

“Radial Counterflow Reactor with Applied Radiant Energy”

Wilmot H. McCutchen and David J. McCutchen, Applicants

[US Patent application 13/360,564](#) filed Jan. 27, 2012.

International PCT/2012/023021 filed Jan. 27, 2012.

Algae churn for continuous extraction of oxygen and feed of CO₂ while extruding dewatered biomass.

11. Turbodiescharger

“Radial Counterflow Muffler for NO Reduction and Pollutant Collection”

Wilmot H. McCutchen and David J. McCutchen, Applicants

[US Patent application 13/364,247](#) filed Feb. 1, 2012, allowed in the US.

International PCT/US2011/023554 filed Feb. 1, 2012.

Noise suppression, soot collection, and NO cracking for cleaning internal combustion exhaust.

Others:

12. Convergent Scrubber

[US Patent 5,688,377 \(Nov 18, 1997\)](#)

“Rotary Radial Cyclonic Fluid Mixture Separator”

Wilmot H. McCutchen, Applicant. Term expired.

Continuous mechanical separation for collection of sediment, dust, ammonia, methane, mist, and VOCs.

13. Vacuum Distillation

[US Patent 5,534,118 \(Jul 9, 1996\)](#)

“Rotary Vacuum Distillation and Desalination Apparatus”

Wilmot H. McCutchen, Applicant. Term expired.

Suppressing mist entrainment by centrifugation in vacuum distillation.

14. Hybrid Power

“Hybrid Power for Cracking Power Plant CO₂”

Wilmot H. McCutchen and David J. McCutchen, Applicants.

[US Patent application 12/637,641](#) filed Dec. 15, 2009. Application abandoned.

Using surplus wind energy to turn CO₂ into syngas and carbon nanotubes.

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