

AVAILABLE PORTFOLIOS
ENERGY

PS 557	PLASTIC TO OIL CONVERSION TECHNIQUES <i>Steven W. Smith</i>
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PLASTIC TO OIL CONVERSION TECHNIQUES

Steven W. Smith

This patent portfolio discloses techniques for converting waste products such as plastic into usable fossil fuels. Thermal Depolymerization Process (TDP) is a known technique through which longer polymer chains found in organic material are broken into shorter hydrocarbon polymer chains through the application of heat and pressure. However, the components of such a system have to withstand both high temperatures (over 500°C) and high pressures (up to 700 psi relative pressure). Further, some TDP techniques require complex mechanical structures to heat a rotating retort and maintain an internal vacuum while adding raw material and removing volatile gases or solid materials. A simple, efficient, and easy to manufacture system is therefore desired for converting wastes to oil.

Value Proposition: This portfolio discloses a system that operates as a Reverse Internal Combustion Engine (RICE) for heating process materials (e.g., plastic, tires, or other materials comprising polymer chains) to the point that volatile compounds are vaporized to form gases. The gases are then extracted and condensed to generate usable fuels such as oil, kerosene, toluene, gasoline, and natural gas. The system includes a hollow cylinder having a sliding piston. The cylinder is charged with an inert gas such as Nitrogen, which is heated to a high temperature. The process material is reduced to powder form and injected into the heated cylinder. The small particle size of the powder causes the process material to instantly vaporize and form volatile gases that are expelled by sliding the piston. Thereafter, a condenser connected to the cylinder condenses the volatile gases into the usable fossil fuel.

Priority Date: 09-20-2005

Representative Claim: US 7,588,665– Claim #1

An apparatus for converting powdered plastic to usable fossil fuel, said apparatus comprising: a hollow cylinder containing an inert gas, said cylinder having a piston slidably mounted therein; means for externally heating the cylinder to raise an internal temperature to a predefined internal temperature; a compressed gas injector for injecting the powdered plastic into the heated cylinder as individual particles, wherein a size of the particles is sufficiently small and the predefined internal temperature is sufficiently high to vaporize the powdered plastic and form a volatile gas without the particles falling onto an internal surface of the cylinder; means for sliding the piston to expel the volatile gas from the cylinder; and a condenser connected to the cylinder for receiving the volatile gas and condensing the volatile gas into the usable fossil fuel.

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TECHNOLOGY

ENERGY

NOVELTY

CHEMICAL REFORMING PROCESS AND APPARATUS FOR CONVERTING WASTE PRODUCTS INTO USABLE FOSSIL FUELS

IMPORTANCE

TECHNOLOGY HAS SIGNIFICANT ENERGY APPLICATIONS AS IT ALLOWS VOLATILE GASES TO BE EXTRACTED FROM WASTE PLASTIC OR RUBBER AND CONDENSED INTO USABLE FUELS SUCH AS OIL, KEROSENE, TOLUENE, GASOLINE, AND NATURAL GAS

NUMBER OF ASSETS

1

US PATENTS (1)

7,588,665

RADIANT ENERGY DEVICES

Michael Retsky

This portfolio discloses techniques for directing radiant energy as charged particle beams. With electron (or any charged particle) beams, it is relatively easy to create a small, bright focused spot if the beam is not deflected to any great extent. Generally however, when a beam is deflected, aberrations of deflection are induced which are usually significant and often much larger than the un-deflected focused spot size. An electron beam can be deflected by using magnetic or electrostatic means. Some devices use magnetic deflection because of its lower deflection aberration coefficient which provides high performance. But electrostatic deflection has advantages in that it can be modulated at a very rapid rate and requires less energy. There is a need for techniques that deflect electron beams with the energy efficiency of electrostatics while also providing the performance of magnetic methods. There are multiple applications for this technology including very energetic electron beams used in ballistic missile defense.

Value Proposition: This patent portfolio discloses techniques for energy-efficient methods of directing electron beams. The electron beam is injected offset between conductive plates that are shaped in a non-linear manner. Voltages are applied to the shaped plates to deflect the beam with high energy efficiency and low aberrations. The disclosed technique provides the low energy and high performance solution to reduce deflection aberrations in electrostatic deflection systems to allow greater resolution and control of the particle beam. Deflecting charged particle beams is very common in technological devices. The technique described here may be applicable to at least some of the many devices that deflect charged particle beams. There are over 33,000 hits in US Patents and US Patent Applications for “electron or ion” and “beam” and “deflection”. This portfolio further discloses techniques for producing an electron beam device that can be used as a directed energy ballistic missile defense in space and with further modifications as a land mine detection device.

Priority Date: 03-28-1996

Forward Citing Companies: Kabushiki Kaisha Toshiba, Rapiscan Systems

Representative Claim: US 5,825,123 – Claim #8

Apparatus for deflecting a charged particle stream by injecting the stream between a first pair of symmetrical deflection plates, comprising: a particle source, the particle source operative to aim the particle stream in a substantially un-deflected condition offset from a centerline between the symmetrical deflection plates, the offset position being at a predetermined location based upon stream deflection and stream offset characteristics, wherein the predetermined location comprises an inflection point on a deflection versus offset curve; and a target disposed substantially orthogonal to the particle stream the particle stream to impact the target.

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TECHNOLOGY
ENERGY

NOVELTY

REDUCED DEFLECTION ABERRATION AND ENERGY CONSUMPTION IN ANY DEVICE THAT USES DEFLECTED ELECTRON OR ANY CHARGED PARTICLE BEAMS

IMPORTANCE

THE PORTFOLIO IS IMPORTANT TO COMPANIES MANUFACTURING ANY DEVICES THAT USE CHARGED PARTICLE BEAMS IN MILITARY AND COMMERCIAL INDUSTRIES

NUMBER OF ASSETS

5

US PATENTS (4)

5,825,123
6,232,709
6,614,151
7,282,727

US APPLICATIONS (1)

60/591,219

PS
570