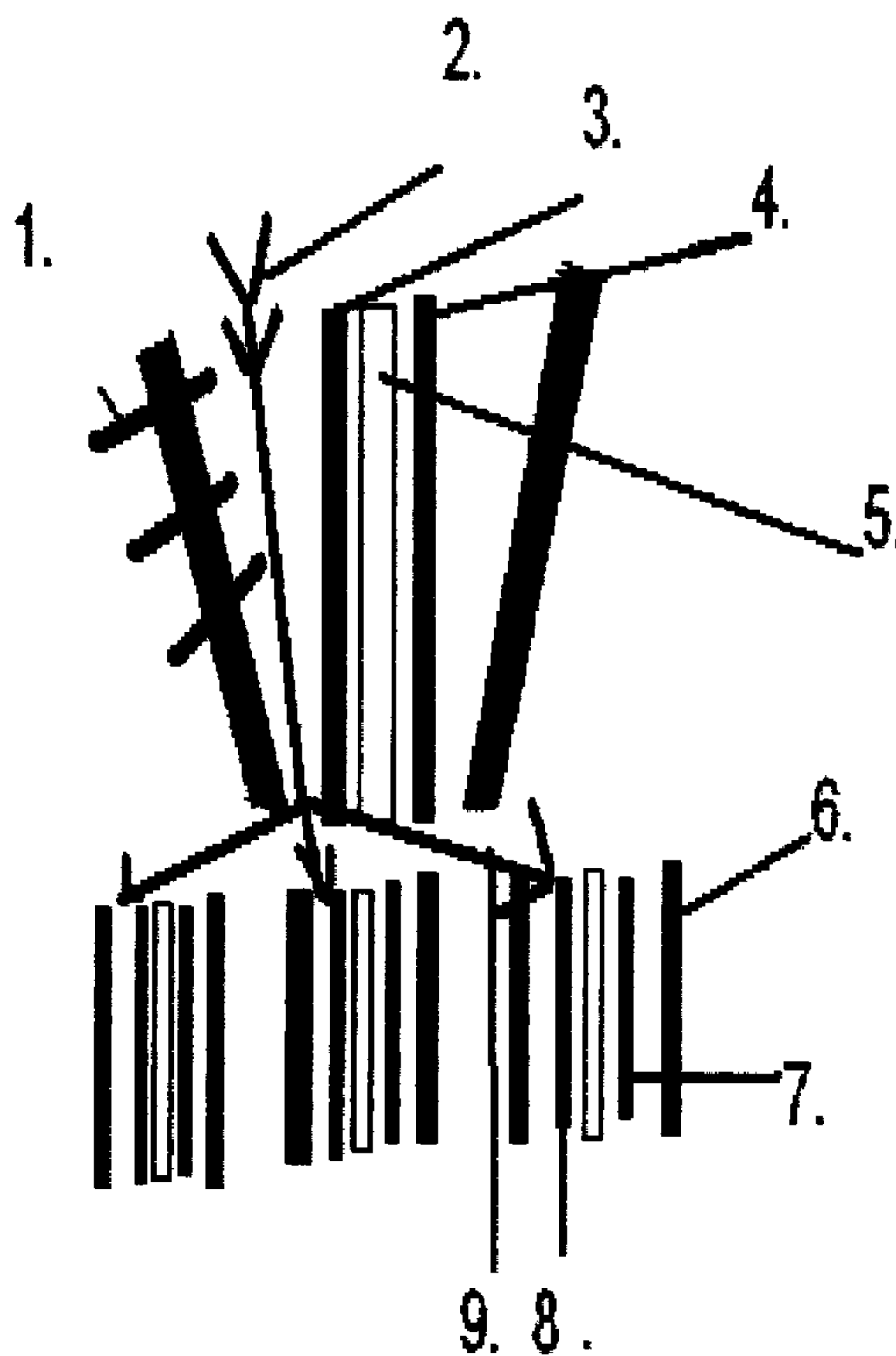




(22) Date de dépôt/Filing Date: 2010/03/18  
(41) Mise à la disp. pub./Open to Public Insp.: 2011/09/18

(51) Cl.Int./Int.Cl. *H01M 8/00* (2006.01),  
*H01M 8/04* (2006.01)  
(71) Demandeur/Applicant:  
VOON, GERARD, CA  
(72) Inventeur/Inventor:  
VOON, GERARD, CA

(54) Titre : PILE A COMBUSTIBLE A REFORMAGE A LA VAPEUR AVEC TURBINE DE COGENERATION DE CHALEUR A PARTIR DE DECHETS, CHALEUR EN ENERGIE POUR CRISTAUX PYORELECTRIQUES ET/OU THERMOCOUPLES, TOUTE CHALEUR DE DECHETS EN TECHNOLOGIES ENERGETIQUES ET/OU NOUVELLE CONCEPTION DE CENTRALES A PILE A COMBUSTIBLE MACRO/MICRO  
(54) Title: STEAM REFORMATION FUEL CELL WITH WASTE HEAT COGENERATION TURBINE HEAT TO ENERGY PYROELECTRIC CRYSTALS AND/OR THERMO-COUPLING ANY AND ALL WASTE HEAT TO ENERGY TECHNOLOGIES AND/OR NEW MACRO-MICROS FUEL CELL POWER PLANT DESIGN



(57) **Abrégé/Abstract:**

Any all technologies including... MCFC and SOFC... Note our bio fuels to energy Super Fuel Cell do not use any combustion processes and therefore do not produce any green house gases. SUPER FUEL CELL Methane, Ethanol, Butane, Hydrogen...Any

(57) **Abrégé(suite)/Abstract(continued):**

and all fuels. Macro Upper Large Scale Fast and Mass Production per time. Probably Cheaper. 1. The nozzles that injects new unreacted fuel in the direction of the anode. Heat produced from the reaction can be used for turbine co-generation. 2. The direction of the fuel down the channels. 3. The Anode Electrode. 4. The Cathode (where oxygen enters and reacts). 5. The Electrolyte. Multiple Micro Scale Higher Yield per concentration of fuel left in the mixture ie. biogas is often contaminated with other gases present, therefore concentration per bulk/volume of the rest of the gases varies. By using multiple Micro Fuel Cells we 1. Maintain the same speed of throughput as the Macro part of the Super Fuel Cell Above so there is no backing up 2. Micro Fuel Cells are more efficient at reacting with the reactable fuels since the channel is thinner and therefore less fuel is exposed to more electrodes...meaning more of the reactable fuel molecules pass over the surface of the electrodes allowing for more fuel molecules access to the surface of the electrode(s) such that there is less dead space between the electrode and the outer walls of the channel...to capture the most fuel conversion, from the total mixture. 6. Cathode Outer Wall and Cathode Channel. 7. Cathode Electrode. 8. The Anode Electrode. 9. The Anode Outer Wall and Anode Channel. The bottom channel is narrowed to the optimal size for viable fuel cell stationary power plant capacity, then they feed into Multiple Micro fuel cells (possibly Proton Exchange Membrane – which are cheaper) the hot (high temperature) is run through waste heat to en energy (such as co-generation, pyroelectric crystals, thermo-coupling and any and all Heat to Energy Technologies) whereas the materials for MCFC and SOFC are expensive to replace and heavy. We might even use circular outer walls in the Multiple Micro technologies to redirect the secondary processed fuel and/or use smaller jets/sprays to get higher concentration of fuel into the depleted side facing the anode to replenish the side facing the electrode that has been depleted/spent from reacting with the anode. We do the opposite with the cathode side of the fuel cell. Additionally Biogas/Methane/CH<sub>4</sub> are also steam reformed directly inside the Anode Channel by the heat produced by the reaction. Excess heat can be used for: 1. Co-Generation. 2. Pyroelectric Crystals. 3. Thermo-Coupling. 4. Any and All Heat Waste to Energy Technologies. To deal with the problem of carbon deposits we could scrub biogas to remove the tar before entering the fuel cell, use cleanable electrodes and/or replaceable electrodes; we could also configure the each of the anode and cathode each in layers, an outer shield (made of less expensive materials) to allow deposit of carbon on its surface, and thick back (inner) anode that could produce a stronger current to increase efficiency (perhaps made of a more conductive material).

**ABSTRACT**

Any all technologies including... MCFC and SOFC...

Note our bio fuels to energy Super Fuel Cell do not use any combustion processes and therefore do not produce any green house gases.

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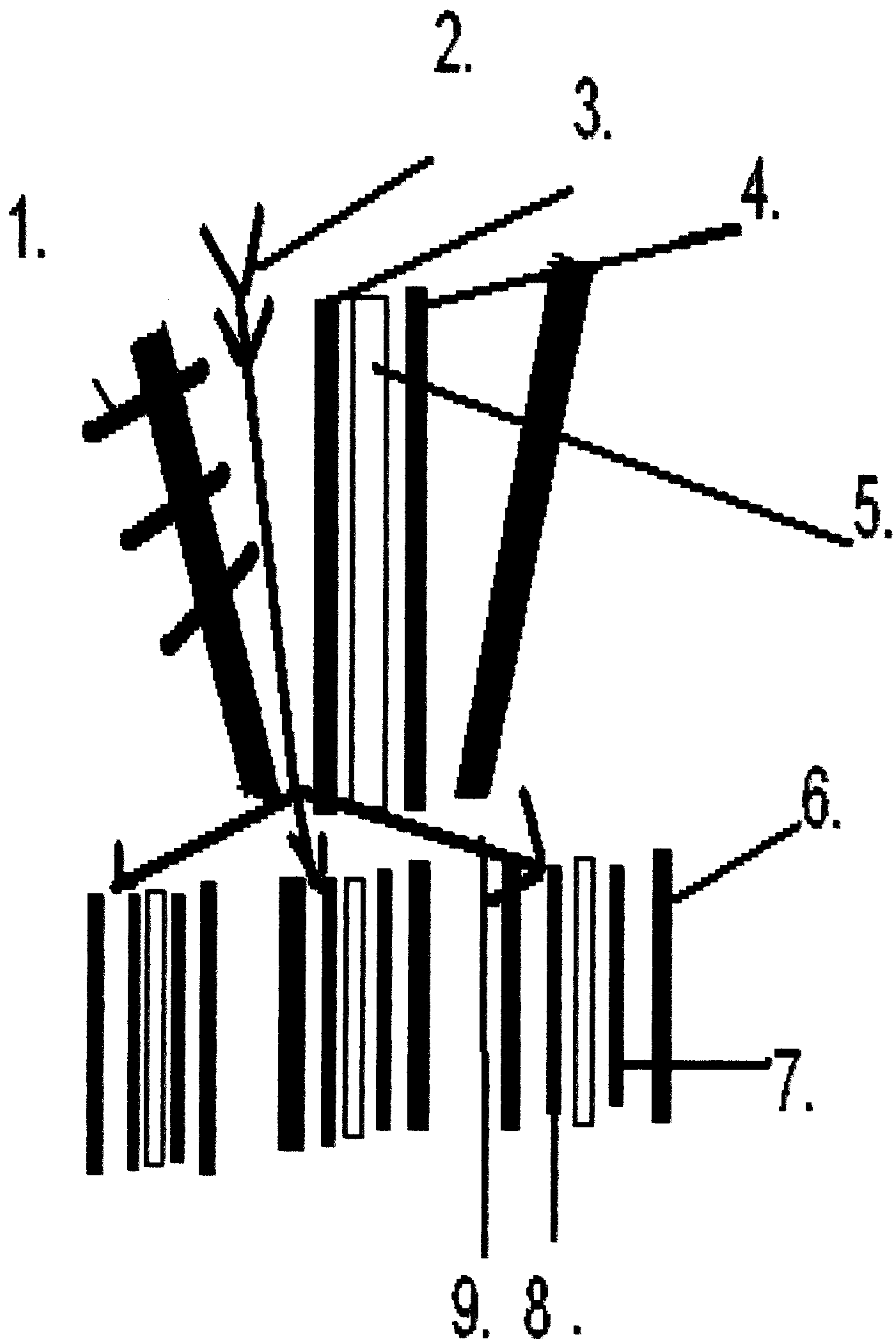
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DRAWING 1 of 1

