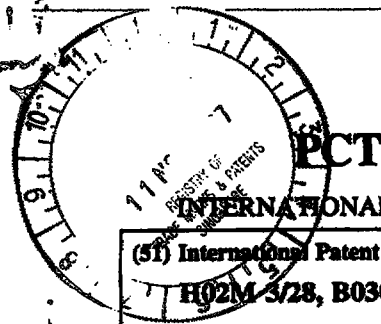


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(54) Title: HIGH VOLTAGE POWER SUPPLY HAVING MULTIPLE HIGH VOLTAGE GENERATORS

(57) Abstract

A high voltage power supply (40) having a plurality of high voltage generators (50a, 50b, ..., 50j) that produce a controlled current in a load (24) having a capacitive component. Each high voltage generator consists of a pulsewidth-modulated (PWM) inverter, a high voltage transformer, and a high voltage full bridge rectifier. The high voltage generators are divided into three groups: Group I, Group II, and Group III. During a driving mode of power supply operation, the Group I, Group II, and Group III high voltage generators produce an output voltage (V_{gen}) from the power supply which exceeds a voltage (V_c) across the capacitive component of the load, causing the current in the load to increase. When the current in the load reaches a desired value, the power supply enters a tracking mode of operation. During the tracking mode, the Group I and Group II high voltage generators produce an output voltage (V_{gen}) from the power supply which equals the voltage (V_c) across the capacitive component of the load. The current through the load remains constant while the power supply tracks the voltage across the capacitive component of the load. The driving mode and the tracking mode are repeatedly performed, as the high voltage generators are driven by a square wave voltage (V_{sw}) produced by a timing generator (66). A control circuit (56) is also provided in the power supply to enable or disable additional Group II high voltage generators in response to fluctuations in an input voltage and the voltage across the load.

