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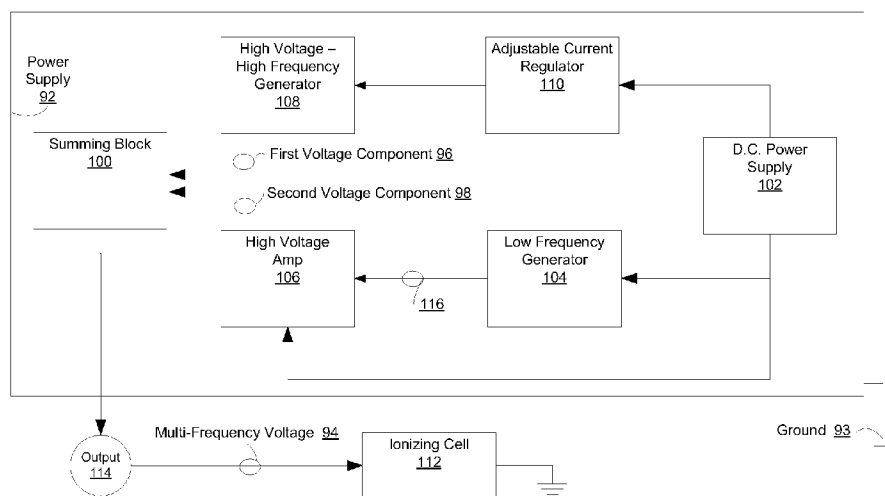
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(54) Title: MULTI-FREQUENCY STATIC NEUTRALIZATION



(57) Abstract: Static neutralization of a charged object is provided by applying an alternating voltage having a complex waveform, hereinafter referred to as a "multi-frequency voltage", to an ionizing electrode in an ionizing cell. When the multi-frequency voltage, measured between the ionizing electrode and a reference electrode available from the ionizing cell, equals or exceeds the corona onset voltage threshold of the ionizing cell, the multi-frequency voltage generates a mix of positively and negatively charged ions, sometimes collectively referred to as a "bipolar ion cloud". The bipolar ion cloud oscillates between the ionizing electrode and the reference electrode. The multi-frequency voltage also redistributes these ions into separate regions according to their negative or positive ion potential when the multi-frequency voltage creates a polarizing electrical field of sufficient strength. The redistribution of these ions increases the effective range in which available ions may be displaced or directed towards a charged object.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 07/65767

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - H05F 3/00 (2008.04)

USPC - 361/213

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC(8): H05F 3/00 (2008.04)

USPC: 361/213

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC: 361/212, 229-231 (text search)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

PubWEST(USPT,PGPB,EPAB,JPAB); Internet search via Google Web and Google Scholar search engines. Search Terms Used: corona static neutralize polarize ionization ion cloud frequency Hz kHz MHz GHz positive negative oscillation cycles electric field voltage potential electrode discharge

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2005/0225922 A1 (GEFTER et al.) 13 October 2005 (13.10.2005) para. [0001] through [0075], Fig. 1-7	1-42
A	US 2005/0236375 A1 (GEFTER et al.) 27 October 2005 (27.10.2005)	1-42
A	US 6,671,161 B2 (NILSSON) 30 December 2003 (30.12.2003)	1-42

Further documents are listed in the continuation of Box C.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier application or patent but published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

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Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774