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Declaration under Rule 4.17:

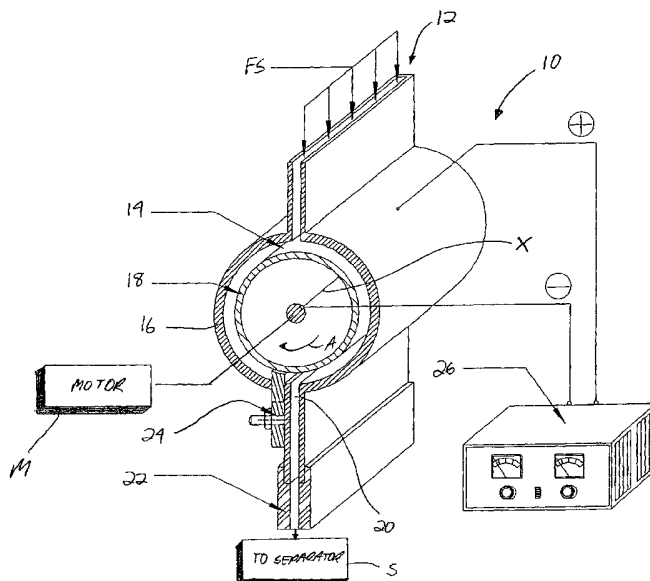
— of inventorship (Rule 4.17(iv)) for US only

Published:

— with international search report

[Continued on next page]

(54) Title: ELECTROSTATIC PARTICLE CHARGER, ELECTROSTATIC SEPARATION SYSTEM, AND RELATED METHODS



(57) Abstract: In one aspect of the invention, a charger (10) for use in a system for separating particles from a fluid flow is disclosed. In one embodiment, the charger (10) comprises a body including an inlet (12) for receiving the particles, a chamber (14) in which the particles are received, and an outlet (20) for discharging the particles. A rotor (18) having a generally non-permeable surface is positioned in the chamber (14) and rotated for contacting and charging the particles. In another aspect of the invention, grid electrodes (116) with elongated fingers (120) are proposed for use in novel separation system. Related methods of charging and separating particles are also disclosed.



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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/17292

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : B01J 19/08; B03C 7/00

US CL : 422/186.04; 361/230; 209/129

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)

U.S. : 422/186.04; 361/230; 209/129

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 00/56462 (GATES et al.) 20 September 2000, see abstract and Figs 1, 2 and 8.	1-8, 9, 11, 16, 18 and 19

Y		8 and 10

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* 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
"B"	earlier application or patent 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		

Date of the actual completion of the international search

22 December 2004 (22.12.2004)

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/17292

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
Please See Continuation Sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: 1-11, 16, 18 and 19

Remark on Protest

☐
☐

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.

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BOX III. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claim(s) 1-11, 16, 18 and 19, drawn to a device and method thereof.

Group II, claim(s) 12-15, 17, 20 and 21, drawn to another device and method thereof.

The inventions listed as Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: Both groups are directed to an apparatus and method for separating particles of a mixture, but each group has a different special technical feature not shared by the remaining group. Group I is directed to an apparatus and method which has the special technical feature of a rotatable motor not shared by the second group. Group II is directed to an apparatus and method which has the special technical feature of first and second electrodes, each having a plurality of fingers, and the intended use of each of the electrodes not shared by the first group.