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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.

(54) Title: METHODS AND SYSTEMS FOR FILTERING UNWANTED NOISE IN A MATERIAL METERING MACHINE

(57) Abstract: Methods and systems for filtering an analog signal sampled at a very high frequency and outputting a digital signal that has a very low sampling frequency to drive a material metering machine. The high frequency digital input signal is input to a first decimation element, which filters out the noise in the signal introduced by an analog-to-digital (A/D) converter and reduces the sampling frequency of the digital signal to a lower sampling frequency of 1200 hertz. The reduced rate digital signal is input into a second decimation element that contains several decimation filters, which reject the 60 hertz line noise and its harmonics while simultaneously reducing the sampling frequency of the digital signal to 10 hertz. The output of the second decimation element is then passed to a bank of selectable filters with sub-hertz cutoff frequencies to remove the machine noise from the material metering machine.



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INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2004/000396

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H03H17/06

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 7 H03H

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 practical, search terms used)

EPO-Internal, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 579 247 A (KERTH DONALD A ET AL) 26 November 1996 (1996-11-26)	1-20, 38-45, 50-57
A	column 5, line 10 - line 35; figure 3	46-49, 58-61
P, A	----- US 6 603 812 B1 (OPRESCU FLORIN A) 5 August 2003 (2003-08-05) column 6, line 59 - line 67	1-20, 38-61
A	----- US 6 169 506 B1 (REMPFER WILLIAM C ET AL) 2 January 2001 (2001-01-02) column 7, line 6 - line 62; figures 4,6 column 6, line 15 - line 39 ----- -/-	1,9,38, 50

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"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)

"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

"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

"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

"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.

"&" document member of the same patent family

Date of the actual completion of the international search

5 October 2004

Date of mailing of the international search report

07.01.2005

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DE LA PINTA BALLESTE

INTERNATIONAL SEARCH REPORT

Inter lication No
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 349 352 A (SALEH FARID) 20 September 1994 (1994-09-20) column 2, line 18 - column 3, line 15 column 3, line 55 - line 68 column 5, line 60 - column 6, line 40 figure 11 -----	1,9,38, 50

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2004/000396

Box 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 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:

see additional 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.:

1-20, 38-61

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-20, 38-61

Filtering apparatus comprising a a decimator for reducing the sampling rate of a digital signal and the line noise at both 50 Hz and 60 Hz, and corresponding method

2. claims: 21-37, 62-76

Filter bank with selectable filters, each filter having a sub-hertz 3-dB cutoff frequency, and corresponding method

INTERNATIONAL SEARCH REPORT

Inter

PCT/US2004/000396

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