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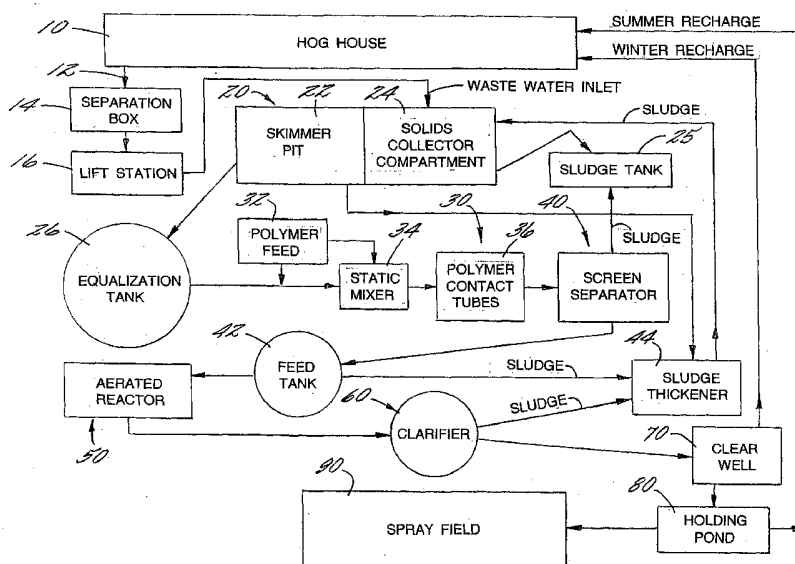
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 - (71) Applicant (for all designated States except US): HOG SLAT, INC. [US/US]; P.O. Box 300, Newton Grove, NC 28366 (US).
 - (72) Inventor; and
 - (75) Inventor/Applicant (for US only): HERRING, William, T., Sr. [US/US]; 1100 Whit Road, Newton Grove, NC 28366 (US).
 - (74) Agents: HILL, Donald, M., Jr. et al.; Alston & Bird LLP, Bank of America Plaza, 101 South Tryon Street, Suite 4000, Charlotte, NC 28280-4000 (US).
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[Continued on next page]

(54) Title: SYSTEMS AND METHODS FOR TREATING WASTE WATER



(57) Abstract: Systems and methods for treating waste water containing biological wastes such as animal waste generated in live-stock-raising operations, wherein the waste water is subjected to a series of operations to separate solids from the liquid phase of the waste water and to biologically treat the waste water to break down organic components. The separated solids are stored for further treatment or conversion into useful materials. The treated liquid phase can be put to various uses. In one embodiment, the treated liquid is recycled as flush water for flushing animal waste from an animal barn, whereby little or no liquid phase escapes the system into the surrounding environment.

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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/US2004/019155

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C02F9/00 C02F1/24 C02F3/02 C02F1/52
//C02F103:20

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 C02F C05F A01C

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, WPI Data, PAJ, COMPENDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category ° | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|------------------------|
| X | US 3 886 068 A (ERON ROBERT E) 27 May 1975 (1975-05-27) column 4 - column 5; figure 1 ----- | 1 |
| X | US 2002/030012 A1 (SULLIVAN JOHN MICHAEL ET AL) 14 March 2002 (2002-03-14) paragraphs [0020], [0021], [0029], [0030], [0033]; figure 1 ----- | 25 |
| A | GB 687 296 A (FRANCOIS LAURENTY) 11 February 1953 (1953-02-11) page 2, line 63 - line 115 page 3, line 21 - line 31 ----- | 2-4, 8-11, 26-29 |
| A | FR 2 240 193 A (GOVIGNON FERNAND) 7 March 1975 (1975-03-07) figure ----- | 1,25,30 |
| A | | 1,2,25, 26 |
| | -/-- | |

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

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Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Gonzalez Arias, M

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2004/019155

| C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT | | |
|--|--|-----------------------|
| Category ^o | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
| A | GB 1 593 132 A (PIELKENROOD VINITEX BV) 15 July 1981 (1981-07-15) page 2, line 31 - line 45; figure 1 ----- | 1,25 |
| A | US 6 054 044 A (HOFFLAND ROBERT O ET AL) 25 April 2000 (2000-04-25) figure 1 ----- | 2,26 |

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2004/019155

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.:

1-4, 9-11, 18, 19, 25-29

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: 1-4, 9-11, 18, 19, 25-29

System and method for treating wastewater

1.1. claims: 1, 8

equalization tank

1.2. claims: 1,13,14,20-24

feed tank for biological reactor

1.3. claims: 1,15-17

clarifier

2. claims: 1, 5-7, 30-35

skimmer

3. claims: 1,12,36

screening apparatus

INTERNATIONAL SEARCH REPORT

Information on patent family members

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| International Application No PCT/US2004/019155 |
|--|

| Patent document cited in search report | Publication date | Publication date | Patent family member(s) | Publication date |
|--|------------------|------------------|-------------------------|------------------|
| US 3886068 | A | 27-05-1975 | NONE | |
| ----- | | | | |
| US 2002030012 | A1 | 14-03-2002 | NONE | |
| ----- | | | | |
| GB 687296 | A | 11-02-1953 | NONE | |
| ----- | | | | |
| FR 2240193 | A | 07-03-1975 | FR 2240193 A1 | 07-03-1975 |
| ----- | | | | |
| GB 1593132 | A | 15-07-1981 | NL 7701608 A | 18-08-1978 |
| | | | AT 360448 B | 12-01-1980 |
| | | | AT 97678 A | 15-05-1980 |
| | | | AU 515362 B2 | 02-04-1981 |
| | | | AU 3297578 A | 09-08-1979 |
| | | | BE 864005 A2 | 16-08-1978 |
| | | | BR 7800917 A | 02-01-1979 |
| | | | CA 1113193 A1 | 24-11-1981 |
| | | | CH 626864 A5 | 15-12-1981 |
| | | | DE 2805461 A1 | 17-08-1978 |
| | | | DK 70778 A | 17-08-1978 |
| | | | ES 467000 A1 | 01-11-1978 |
| | | | FR 2380990 A1 | 15-09-1978 |
| | | | IT 1105861 B | 04-11-1985 |
| | | | JP 53103660 A | 09-09-1978 |
| | | | PT 67653 A ,B | 01-03-1978 |
| | | | SE 7801737 A | 16-08-1978 |
| | | | ZA 7800555 A | 27-12-1978 |
| ----- | | | | |
| US 6054044 | A | 25-04-2000 | NONE | |
| ----- | | | | |