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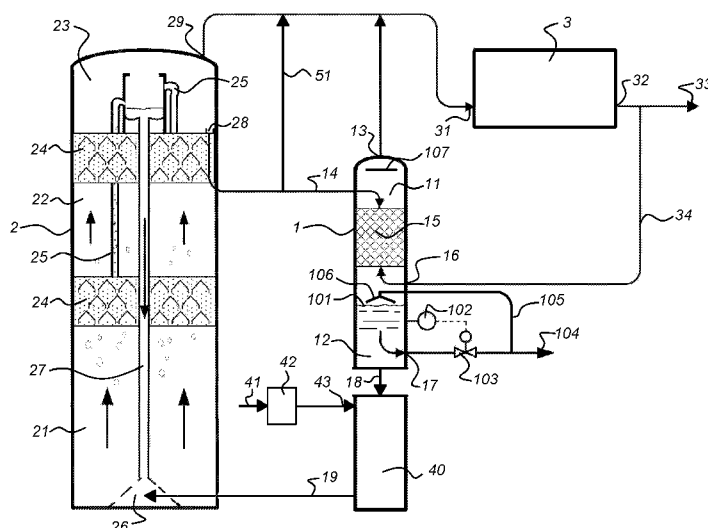
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[Continued on next page]

(54) **Title:** HYDROGEN SULFIDE REMOVAL FROM ANAEROBIC TREATMENT



(57) **Abstract:** Hydrogen sulfide can be removed from a liquid effluent of an anaerobic reactor, by subsequently: -contacting the effluent liquid in counter current with a treated product gas of the anaerobic reactor to absorb hydrogen sulfide in the gas, -collecting the desulfurised effluent liquid after said contacting, -discharging at least part of the collected desulfurised effluent recirculation liquid as a treated effluent. To a remaining part of the desulfurised effluent waste water can be added and mixed, and the mixed water can be fed to the anaerobic reactor. Spent gas of the contacting step can be combined with sulfide-containing product gas of the anaerobic reactor and treated by desulfurisation.



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- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))* (88) **Date of publication of the international search report:**
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INTERNATIONAL SEARCH REPORT

International application No
PCT/NL2013/050937

A. CLASSIFICATION OF SUBJECT MATTER
INV. C02F1/20 C02F3/28
ADD.

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)
C02F

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)

EP0-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 2 484 990 A2 (DEGREMONT [FR]) 24 December 1981 (1981-12-24) pages 1-4; figure; example	1-11, 14-16
X	----- WO 96/00191 A1 (TNO [NL]; LANGERWERF JOSEPHUS SYCHBERTUS [NL]) 4 January 1996 (1996-01-04) page 3; figure 1	1-11, 14-16
X	----- JP 2012 179571 A (KURITA WATER IND LTD) 20 September 2012 (2012-09-20) paragraphs [0008], [0018], [0021] - [0023], [0025] - [0027]; figure 1	1-11, 14-16
A	----- JP 2005 262182 A (SUMITOMO HEAVY INDUSTRIES) 29 September 2005 (2005-09-29) abstract; figure 1	1-11, 14-16
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☒ Further documents are listed in the continuation of Box C.

☒ See patent family 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 application or patent but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

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"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

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/NL2013/050937

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:

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 fees, this Authority did not invite payment of additional fees.
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.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☒ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No
PCT/NL2013/050937

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2004/080573 A1 (UNIV TEXAS [US]; ROCHELLE GARY [US]) 23 September 2004 (2004-09-23) figure 1	12,13,17

X	EP 2 319 805 A1 (MITSUBISHI HEAVY IND LTD [JP]) 11 May 2011 (2011-05-11) paragraph [0039] - paragraph [0048]; figure 1	12,13,17

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/NL2013/050937

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FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-11, 14-16

Process for removing hydrogen sulfide from a sulfide-containing liquid effluent of an anaerobic reactor and a unit comprising an anaerobic reactor and a stripper to perform said hydrogen sulfide removal

2. claims: 12, 13, 17

A downflow liquid stripper column
