IN Sergey; Zoya and Alexander, Kosmodemyanskaya
Street 27/95, 125130 Moscow (RU).

(74) Agent: KORMOS, Ágnes; Váci út 66. FSZT 3, H-1132
Budapest (HU).

(81) Designated States (unless otherwise indicated, for
every kind of national protection available): AE, AG, AL, AM,
AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY,
BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM,
DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,
HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP,
KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD,
ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI,
NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU,
RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ,
TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, ZA, ZM,
ZW.

(84) Designated States (unless otherwise indicated, for
every kind of regional protection available): ARIPO (BH, GM,
GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ,
UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ,
TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,
EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV,
MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,
SLO, TR, TT, UA, UK, US, UZ), South American (BR, CO,
EC, GS, GT, PY, SA, UY, VE, ZA, ZM, ZW), Transcaucasian
(AZ, GE, GE, GR, LA, ME, MO, RO).

(51) International Patent Classification:
F23G 5/00 (2006.01) F02C 3/28 (2006.01)
C10J 3/00 (2006.01) F01K 13/00 (2006.01)

(21) International Application Number:
PCT/HU2013/000023

(22) International Filing Date:
4 March 2013 (04.03.2013)

(25) Filing Language:
English

(26) Publication Language:
English

(30) Priority Data:
P1200629 5 November 2012 (05.11.2012) HU

(71) Applicants: INT-ENERGIA KFT. [HU/HU]; Hun U.13,
1135 Budapest (HU). OKT KFT. [HU/HU]; Juna Ipari
Park 22A, 6750 Algys (HU).

(72) Inventors: BELOPOTATOVI Oleg; 5 MKR 1/20/20,
140082 Lytkarino (RU). KUDRINSKI ALEXEY, Natash-
a Kovsoyov Utea 15/42, 119361 Moscow (RU).
POTASHNIK Evgeni; 5 MKR 1/7/163, 140082 Lytkarino
(RU). POTASHNIK LAZAR; Hun U.13/B 1EP/6/1, 1135
Budapest, (HU). POTASHNIK, Mikhail; Region So-
lovets 22A, 390021 Ryanz (RU). SULIMOV DANIL,
Sibirskaia Street 48/2/41, 614007 Perm (RU). VOSCHIN-

(54) Title: STRUCTURAL CONFIGURATION AND METHOD FOR ENVIRONMENTALLY SAFE WASTE AND BIOMASS
PROCESSING TO INCREASE THE EFFICIENCY OF ENERGY AND HEAT GENERATION

(57) Abstract: The present invention relates to the method and structural configuration for environmentally safe waste and biomass processing to increase the efficiency of energy and heat generation. In the structural configuration of the invention solid municipal and industrial waste as well as biomass are loaded and milled and afterwards they are subject to pyrolysis and gasification. The produced pyrolysis gas is cooled, cleaned and carbon dioxide is captured from it, pyrolysis gas is compressed and accumulated together with syngas and they are used for electric power and heat generation and this generated electric power and heat is supplied to external consumers. During pyrolysis and gasification, melting occurs and basalt-like slag is produced which is processed and used for production of a heat- insulation material or granulated slag, additional electric power is further generated from the heat occurred as a result of pyrolysis gas cooling. Carbon dioxide captured from exhaust gases occurs as a result of electric power and heat generation, is compressed and accumulated together with carbon dioxide recovered from pyrolysis gas, and after distribution and dosing, first, it is sent to plasma torches as plasma-forming gas, second, it is used for production of marketable products using carbon dioxide for external consumers, third, it is fed as a nutrient to cultivate algae; herewith, seed material is loaded and algae is cultivated using heat source and carbon dioxide and thus algae biodiesel and biomass production is provided. Produced biodiesel is cleaned, accumulated and used for generation of electric power and heat. Biomass extraction

[Continued on next page]
is returned to the beginning of the process, algae biomass and oil received as a result of liquid biofuel production are supplied to external consumers as marketable products. In addition, for the purpose of processing waste range expansion, coal dust is loaded simultaneously at the beginning of the process afterwards syngas is generated using heat then it is compressed and together with pyrolysis gas it is accumulated and used for generation of electric power and heat.
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
INV. F23G/00 C10J3/00
ADD. F02C3/28 F01K13/00

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)
F23G F01K C01B C10J F02C F25J

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

Electronic database consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category*</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>WO 2010/065137 A1 (GLOBAL EN LLC [US]; JURANITCH JAMES CHARLES [US]) 10 June 2010 (2010-06-10) figure 1 pages 3-6</td>
<td>1,4-14</td>
</tr>
</tbody>
</table>

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
  *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
"A" document member of the same patent family

Date of the actual completion of the international search: 28 April 2014

Date of mailing of the international search report: 09/05/2014

Name and mailing address of the ISA/
European Patent Office, P.B. 5818 Patentlaan 2
NL-2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax. (+31-70) 340-3016

Authorized officer: De Meester, Reni
<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>US 2012/193925 A1 (JURANITCH JAMES CHARLES [US] ET AL) 2 August 2012 (2012-08-02) figures 1,5</td>
<td>1-14</td>
</tr>
<tr>
<td>A</td>
<td>US 2011/291425 A1 (JURANITCH JAMES CHARLES [US]) 1 December 2011 (2011-12-01) figure 5</td>
<td>1-14</td>
</tr>
</tbody>
</table>