

[SS 27] (synthes+ or syngas) and gas and (combust+ or burn+) and fuel and (carbonace+ or organic) and (purif+ or treatment) and (natural or crude or hydrogen or gasifier or steam or reform+)

Results in EPODOC 43

[SS 28] 28 and (steam or hydrogen or crude or natural)

Non-existent or invalid SS number(s).

- Check with the command ..HI. When searching for numbers, use quotes e.g. "4" W WHEEL? ERROR (-100803)

[SS 28] 27 and (steam or hydrogen or crude or natural)

Results in EPODOC 35

[SS 29] 28 and (coke or coal or charcoal or lignite or petcoke or asphalt+ or gasif+)

Results in EPODOC 21

[SS 30] 29 and pd<20141010

Results in EPODOC 20

[SS 31] ..li



1/20 © EPODOC / EPO

PN - [UA96098](#) C2 20110926

PR - UA20100012161 20101014

AP - UA20100012161 20101014

DT - I

PA - DO RES AND PRODUCTION ASS SYMVOL [UA]

TI - METHOD OF RECYCLING CARBONACEOUS WASTE

AB - The present invention relates to recycling technology of **carbonaceous** waste at producing **fuel** based on waste **gasification** to produce **synthesis gas** and subsequent conversion of **synthesis gas** into liquid motor oils. A method of recycling **carbonaceous** wastes includes a stage of thermal **gasification** of **carbonaceous** wastes to produce **synthesis gas**, a cooling stage and **purifying synthesis gas**, a catalytic **synthesis** stage of hydrocarbons on the base of **synthesis gas** to produce liquid **fuel**, generation of thermal and electrical energy using associate **combustible** gases as a **fuel**. In the case the **synthesis gas** after cooling and **purifying** is divided into two flows. In the first flow of **synthesis gas** its composition is subject to adjustment by **steam** conversion of a part of carbon monoxide into carbon dioxide up to reaching the ratio of **hydrogen** to carbon monoxide in the **synthesis gas** within the range of 1.8-2.4 followed by **synthesis gas** feed to the stage of catalytic **synthesis** of hydrocarbons. In the second flow of **synthesis gas**

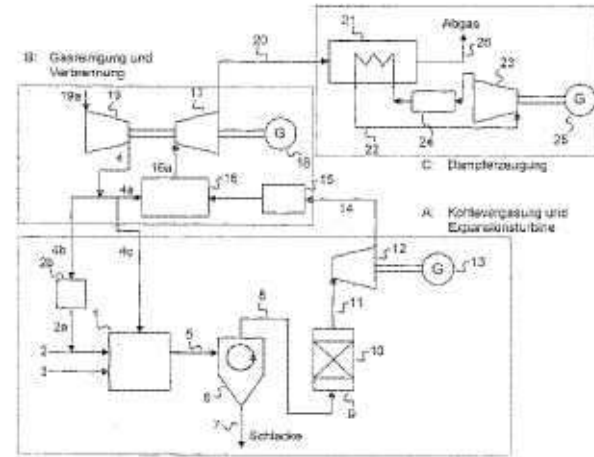
carbon monoxide is subject to full **steam** conversion into carbon dioxide and **hydrogen**, carbamide is **synthesized** on the base of carbon dioxide, and **hydrogen** is used as a **fuel** to generate thermal and electrical energy. Due to deeper processing raw materials improved waste management, diversification of end useful products and reduction of their cost price are provided.

2/20 © EPODOC / EPO

PN - [RU2477421](#) C1 20130310
 PR - RU20110146925 20111121
 AP - RU20110146925 20111121
 DT - I
 CT - || STSE (C1)
[RU2303192](#) C1 20070720 [] (AKTSIONERNAJA PERSPEKTIVA O ME [RU]);
[RU2174611](#) C1 20011010 [] (POLIAKOV VIKTOR IVANOVICH);
[SU1452490](#) A3 19890115 [] (KRAFTWERK UNION AG [DE]);
[DE3114984](#) A1 19820204 [] (GEN ELECTRIC [US]);
[US4074981](#) A 19780221 [] (SLATER WILLIAM L)
 CCI - [F01K13/00](#) ; [F22B33/18](#) ; [F23G5/006](#)
 CCA - [Y02E20/12](#) ; [Y02E20/14](#) ; [F23G5/027](#)
 PA - SILANT EVA LARISA JAKOVLEVNA [RU]
 TI - POWER GENERATING SYSTEM
 AB - FIELD: power industry.SUBSTANCE: system includes a loading device, a power generating unit, a **gasification** reactor with water and **steam** boilers, with **gas burning** and regeneration and atmospheric air warm-up zones, a **steam**-air mixture mixing and warm-up chamber, a separator - ID fan and a stabilising cooler. In addition, the system is equipped with a **fuel treatment** unit with a **fuel treatment** and transportation system, with a gaseous **fuel** source and a viscous **fuel** heater, which are connected through an additional **burner** device to a **burner** of primary ignition of **gasification** reactor; a reserve separator - ID fan installed parallel to the operating one, the inlet of which is connected through the **gas** duct to the zone of **gasification**, regeneration and **synthesis** of **gasification** reactor, and the outlet of which is connected through the stabilising cooler, to inlets of the power generating unit and a hydrocarbon **synthesis** unit.EFFECT: possibility of generating energy carriers with minimum energy consumption from outside at environmentally non-waste processing of any **organic** raw material.2 cl, 1 dwg

3/20 © EPODOC / EPO

- PN - [CN102149795](#) A 20110810
- PR - WO2009EP03470
20090515; DE20081026267
20080602
- AP - CN20098120636 20090515
- DT - I
- CCI - [C01B3/32](#) ; [C10J3/52](#) ;
[C10K1/026](#) ; [C10K1/32](#) ;
[F02C3/28](#) ; [F02C6/18](#)
- CCA - [Y02E20/16](#) ; [Y02E20/18](#) ;
[C01B2203/0244](#) ;
[C01B2203/025](#) ; [C01B2203/04](#) ;
[C01B2203/042](#) ;
[C01B2203/0465](#) ;
[C01B2203/147](#) ; [C01B2203/84](#) ;
[C10J2300/1606](#) ; [C10J2300/165](#) ;
[C10J2300/1653](#) ;
[C10J2300/1675](#)
- CUA - [Y02E50/11](#)
- PA - UHDE GMBH
- TI - Modified **gas** and **steam** turbine
process having integrated **coal**
gasification under pressure
- AB - The invention relates to a
method for producing, **purifying**,
and **burning syngas** for
generating electrical energy.
The **syngas** is generated from a
solid, **carbonaceous fuel** using an
oxygenic **gas** and **purified** by slag
extraction and alkali extraction.
After **purifying**, the **syngas**
produced enters an expansion
turbine, where the pressure
energy is used for generating
electricity. The expansion
turbine is protected against
corrosion and mechanical attack
by the **purification** and alkali
separation. The expanded **syngas**
is then **burned** under pressure,
and the **combustion** is used for
generating electricity in a
combined cycle process using
a **gas** turbine, **steam** generation,
and a **steam** turbine. The process
thus has a high level of



efficiency. The invention further relates to a device for performing the method according to the invention.

4/20 © EPODOC / EPO

- PN - [CN102061196](#) A 20110518
- PR - CN2011129554 20110127
- AP - CN2011129554 20110127
- DT - I
- CT - || STSE (A)
[CN1621743](#) A 20050601 [X] (INST OF MECHANICS CAS [CN])
[X] 1,3-17
权利要求2,说明书第5页第13 17行
[CN1420155](#) A 20030528 [A] (GUNANGZHOU INST OF ENERGY CONV [CN])
[A] 权利要求1-17
权利要求1-6
[GB2331128](#) A 19990512 [A] (MAGNOX ELECTRIC PLC [GB])
[A] 1-17
权利要求1-23
- CCA - [Y02E20/14](#) ; [Y02T10/16](#) ; [Y02P20/129](#)
- PA - INST OF MECHANICS CAS
- TI - Power generation method and device adopting plasma **gasification** of household garbage and biomass
- AB - The invention discloses a power generation method and device adopting the plasma **gasification** of household garbage and biomass. The power generation device comprises a plasma torch and the working **gas** can be nitrogen, argon, water vapor or air. A plasma reactor converts household garbage or biomass to a **synthesis gas**, thus a defined amount of air or oxygen-enriched **gas** can be used to partly release the calorific value of the **organic** matter. The **synthesis gas** is cooled fast with a specially designed **gas**-water heat exchanger and **steam** can also be produced. The **purification treatment** of the **synthesis gas** adopts the dry process deacidification, the semi-dry process deacidification or the wet process deacidification while a bag filler is used for dedusting, or a small-scale reinforced wet-process spraying deacidification device is used in one device to complete deacidification and dedusting at the same time. An activated carbon adsorption bed is arranged after the deacidification and dedusting devices and used to adsorb heavy metals and dioxin **organic** pollutants. The clean **synthesis gas** and an internal **combustion gas** engine, small-scale **gas** turbine, **steam** turbine or centralized generator set are used for power generation; and the combined cycle of cogeneration can be adopted to produce liquid **fuel**.

5/20 © EPODOC / EPO

PN - [CA2725503](#) A1 20091210

PR - DE20081026267
20080602; WO2009EP03470
20090515

AP - CA20092725503 20090515

DT - I

CCI - [C01B3/32](#) ; [C10J3/52](#) ;
[C10K1/026](#) ; [C10K1/32](#) ;
[F02C3/28](#) ; [F02C6/18](#)

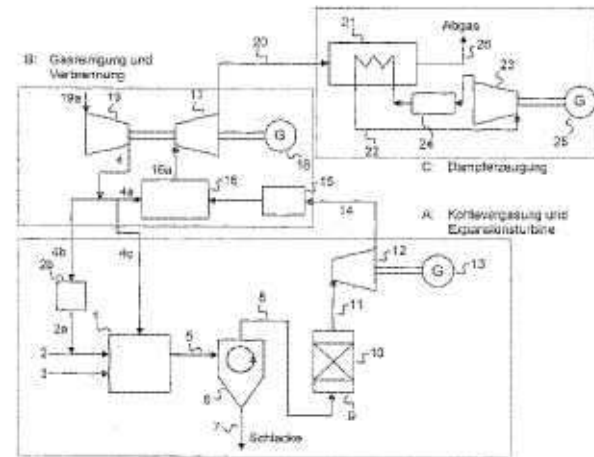
CCA - [Y02E20/16](#) ; [Y02E20/18](#) ;
[C01B2203/0244](#) ;
[C01B2203/025](#) ; [C01B2203/04](#) ;
[C01B2203/042](#) ;
[C01B2203/0465](#) ;
[C01B2203/147](#) ; [C01B2203/84](#) ;
[C10J2300/1606](#) ; [C10J2300/165](#) ;
[C10J2300/1653](#) ;
[C10J2300/1675](#)

CUA - [Y02E50/11](#)

PA - UHDE GMBH [DD]

TI - MODIFIED **GAS** AND **STEAM**
TURBINE PROCESS HAVING
INTEGRATED **COAL GASIFICATION**
UNDERPRESSURE

AB - The invention relates to a
method for producing, **purifying**,
and **burning syngas** for
generating electrical energy.
The **syngas** is generated from a
solid, **carbonaceous fuel** using an
oxygenic **gas** and **purified** by slag
extraction and alkali extraction.
After **purifying**, the **syngas**
produced enters an expansion
turbine, where the pressure
energy is used for generating
electricity. The expansion
turbine is protected against
corrosion and mechanical attack
by the **purification** and alkali
separation. The expanded **syngas**
is then **burned** under pressure,
and the **combustion** is used for
generating electricity in a
combined cycle process using
a **gas turbine**, **steam** generation,
and a **steam turbine**. The process



thus has a high level of efficiency. The invention further relates to a device for performing the method according to the invention.

6/20 © EPODOC / EPO

PN - [DE102008059182](#) A1 20100610

PR - DE20081059182 20081127

AP - DE20081059182 20081127

DT - *; Rep

CT - || STSE (A1)
[DE102006003411](#) A1 20070726 [] (LINDE AG [DE])

CTNP - [] HENRICH,E., DINJUS,E., MEIER, D.: Hochwertige Biomassenutzung durch Flugstrom-Druckvergasung von Pyrolyseprodukten, 13. Intern. Sonnenforum, Berlin, 12.-14.09.2002
 [] KLOSE,W., HO,J.: Modellierung und experimentelle Validierung eines Biomasse-Rohrvergasers, DGKM-Fachbereichstagung "Energetische Nutzung von Biomassen", 14.-16.04.2008

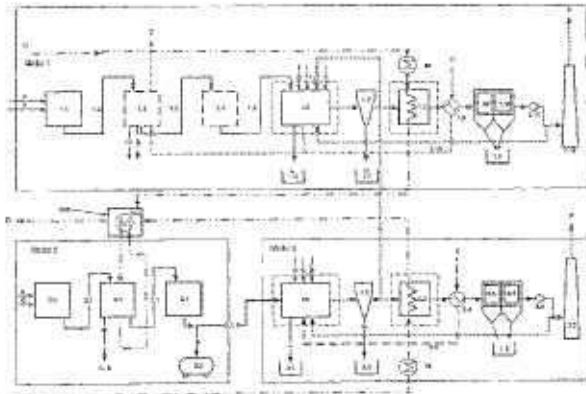
CCI - [C10L3/08](#) ; [C10L5/46](#)

CCA - [Y02E50/10](#) ; [Y02E50/30](#)

PA - SCHAAD PAUL [DE]

TI - Locally recycling biogenic substitute fuels such as sewage sludge, comprises generation heat energy carrier in energy generation module, and drying the substitute fuels to selected dry substance content in substitute **fuel** processing module

AB - The method comprises generation a heat energy carrier in a first energy generation module 1 for drying the biogenic substitute fuels, drying the



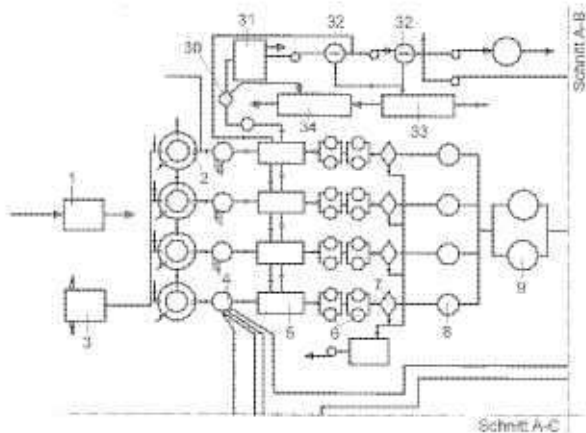
biogenic substitute fuels to a selected dry substance content in a substitute **fuel** processing module 2 using the heat energy carrier of the module 1, and introducing the dried substitute **fuel** from the module 2 into a thermal recycling plant in a sewage sludge recycling module 3 under the production of **combustible** product **gas**. The energy generation in the module 1 is carried out by a biomaterial treating process consisting of **gasification** process. The method comprises generation a heat energy carrier in a first energy generation module 1 for drying the biogenic substitute fuels, drying the biogenic substitute fuels to a selected dry substance content in a substitute **fuel** processing module 2 using the heat energy carrier of the module 1, and introducing the dried substitute **fuel** from the module 2 into a thermal recycling plant in a sewage sludge recycling module 3 under the production of **combustible** product **gas**. The energy generation in the module 1 is carried out by a biomaterial treating process consisting of **gasification** process, pyrolysis process, **combustion** process (furnace **combustion**, reciprocating grate **combustion**, incineration **combustion**, rotary kiln **combustion** and fluidized bed **combustion**) under **steam** generation and discharging process of the heat energy occurred during the heat **treatment** . The module 1 is an incinerating plant, **coal**-fired power plant, **lignite-coal** power plant, cement factory, steel plant, geothermal plant or solar

thermal power plant, combined heat and power plant with an **organic** rankine cycle-process or a power heat coupling plant with a **gas** engine drive. The heat **treatment** of the biogenic **fuel** in the module 1 is carried out by a multi-stage **gasification** system, where one stage is a primary stage **gasification** system and the **combustion** of the produced product **gas** is carried out in a second stage. The heat **treatment** in the module 1 takes place in parallel operation when the power-heat coupling is used for generating the electrical and thermal energy. The heat energy carrier is produced in the module 1 as low-temperature heat carrier up to 90[deg] C in the form of hot water, middle temperature heat carrier up to 150[deg] C in the form of hot **steam** or high-temperature heat carrier over 150[deg] C than thermal oil and is stored under others for drying the residual material in the module 2. The product **gas** from module 1 and 3 is partially recycled by a plant consisting of low nitrogen oxide (NOx) **burner** or Flox(RTM: Flameless oxidation for heating closed or enclosed spaces) **burner**, continuous air staging (COSTAIR) **burner** or **fuel** cell, methanol **synthesis** plant, methane **synthesis** plant, Fischer-Tropsch plant, drying- and vaporizing system, latent heat carrier, **gas** engine in the combined heat and power plant operation and a plant for an **organic** rankine cycle-process of a power-heat-coupling/**steam** turbine drive, **gasification** system, pyrolysis system,

solid **combustion** and secondary **combustion** chamber and is partially recycled as **fuel** in module 1. The produced carrier heat energy from module 3 is stored into module 2 for drying the residual material. A phosphorus recovery is carried out after module 3. The waste heat of the module 1, module 2 and module 3 is converted into kinetic or electrical energy by a module 4 connected to the module with an upwind plant. An independent claim is included for a plant for locally recycling biogenic substitute fuels such as sewage sludge.

7/20 © EPODOC / EPO

- PN - [WO2010006584](#) A2 20100121
- PNFP - WO2010006584 A3 20100722
- PR - DE20081032957 20080712
- AP - WO2009DE00958 20090709
- DT - **
- CT - |EP| ISR (A3)
[US2005250862](#) A1 20051110
 [I] (BAYLE JEROME [FR], et al)
 [I] 1-5
 * figure 1; claims 1,3,8 *;
[US6869979](#) B1 20050322 [I] (RICH JR JOHN W [US])
 [I] 1-5
 * figure 1; claim 1 *;
[WO2008025493](#) A1 20080306
 [A] (THERMOSELECT AG [LI], et al)
 [A] 1-5
 * claim 1 *
 * page 5, lines 7-18 *
 * page 5, line 32 - page 6, line 4 *
 * page 6, lines 25-36 *;
[WO0063141](#) A1 20001026
 [A] (REEMA INTERNAT CORP [US])
 [A] 1-5
 * figure 1; claim 1 *;
[EP0672446](#) A2 19950920
 [A] (KANSAI ELECTRIC POWER CO [JP], et al)



[A] 3

* claim 1 *;

[WO2008034424](#) A1 20080327

[A] (DINANO ECOTECHNOLOGY LLC

[DE], et al)

[A] 1-5

* figure 1; claim 1 *;

[WO9847985](#) A1 19981029

[A] (EBARA CORP [JP], et al)

[A] 1-5

* figure 4; claims 1,10 *

- CCI - [C10J3/00](#) ; [C10K1/004](#) ;
[C10K1/005](#) ; [C10K1/024](#) ;
[C10K1/026](#) ; [C10K1/101](#) ;
[C10L1/08](#) ; [C10G2/332](#)
- CCA - [Y02E50/13](#) ; [Y02E50/32](#) ;
[C10J2300/0906](#) ; [C10J2300/0946](#) ;
[C10J2300/1621](#) ; [C10J2300/1659](#)
- PA - (A2 A3)
DINANO ECOTECHNOLOGY LLC [DE];
PIASTUNOVICH THEODORE [IL];
GRAUR OLEG [MD]; PELZ ECKART A
[DE]
- TI - (A2 A3)
PROCESS FOR OBTAINING
SYNTHETIC DIESEL
- AB - (A2 A3)
A process for obtaining synthetic
diesel from any
desired **carbonaceous** feedstocks
such as, e.g., domestic refuse,
rubber wastes and biogenic
material. Particularly high yields
are achieved in the case of
utilization of high-calorie
fractions of refuse and scrap tyres.
The feedstocks are **burnt** at 86 to
90 kPa initially at 1200-1450°C
with addition of an oxygen-**steam**
mixture and subsequently **gasified**
at 1100-1200°C. The **gas** formed
thereby is **purified** and subjected
to a three-stage Fischer-
Tropsch **synthesis**. In each stage,
diesel is separated from
the **synthesis** products. The
remaining **synthesis** products are
subjected to

further **combustion/gasification**.

The required process water is generally completely obtained from the feedstocks. Dirty process water is reprocessed. Sulphur and CO₂ which occur in the process are separated, **purified** and stored. In the process, no waste products are formed, apart from ash from the mineral fraction of the feedstocks. The diesel **fuel** obtained is of high quality and can be used without problems for operating vehicles.

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PN - [CN101560408](#) A 20091021

PNFP - CN101560408B B 20120919

PR - CN20081215023 20080903

AP - CN20081215023 20080903

DT - I

CCA - [Y02E50/32](#)

PA - (A)
KAIGEN ZHOU [CN]

- (B)
KAIGEN ZHOU

TI - (A B)
Gasification system of garbage and **organic** waste and device thereof

AB - (A B)
The invention discloses a **gasification** system of garbage and **organic** waste and a device thereof, and relates to a garbage **treatment** device. The **gasification** system mainly consists of a blast drier, a **gas** phase circulation **gasification** furnace, a dusting/**purification** device, a compressor, a **gas** receiver and connection pipelines, wherein, the **gasification** furnace is equipped with a baking zone, a pyrolysis zone, a first **gasification** zone, a second **gasification** zone, a **burnout** zone and a heat storage chamber, a recirculating blower and a recirculating wind pipeline form a **gas** phase circulation loop outside the furnace. In the system, a discharge port of the blast drier is connected to a feed inlet of the **gasification** furnace, a **synthesis gas** output interface of the **gasification** furnace is connected to the dusting/**purification** device by an induced draft fan, the dusting/**purification** device is connected to the compressor, and the compressor is connected to the **gas** receiver. The system utilizes a technical measure of arranging the heat storage chamber in a **gas** phase circulation **gasification** furnace to enhance **gasification** rate and quality of refuse **fuel** and decompose dioxin with severe toxicity and eliminate **coke** tar, convert garbage and **organic** waste into secondary clean energy which comprises producer city **coal gas**, **hydrogen**, methanol and dimethyl ether liquefied **gas**.

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PN - [WO2009146784](#) A2 20091210

PNFP - WO2009146784 A3 20110106

PR - DE20081026267 20080602

AP - WO2009EP03470 20090515

DT - **

CT - |EP| ISR (A3)

[GB1587490](#) A 19810401

[Y] (COAL INDUSTRY PATENTS LTD)

[Y] 1-19

* figure 1 *

* example 2 *;

[US4920898](#) A 19900501

[Y] (SOLBES ALBERT [US], et al)

[Y] 1-19

* figure 3 *

* column 4, lines 52-68 *

* column 6, line 68 - column 7,
line 2 *

* column 7, lines 56-58 *

* column 9, lines 5-21,49-58 *

* column 13, lines 41-46 *;

[US2006045827](#) A1 20060302

[Y] (SPOUSE KENNETH M [US])

[Y] 1-19

* figure 2 *

* paragraph [0031] *;

[US4340399](#) A 19820720

[A] (LUTHRA KRISHAN L, et al)

[A] 1-19

* figure 1 *;

[WO03099965](#) A2 20031204

[A] (MFG & TECH CONVERSION

INT INC [US])

[A] 1-19

* figure 7 *;

[US3762134](#) A 19731002 [A] (CYR

L, et al)

[A] 1-19

* figures 1,2 *

* example 8 *;

[WO9914473](#) A1 19990325

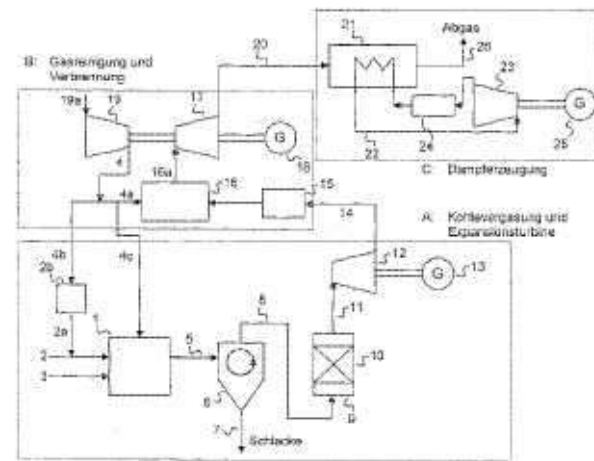
[A] (TEXACO DEVELOPMENT CORP

[US], et al)

[A] 1-19

* figures 1-4 *

CCI - [C01B3/32](#) ; [C10J3/52](#) ;



	C10K1/026 ; C10K1/32 ; F02C3/28 ; F02C6/18
CCA	- Y02E20/16 ; Y02E20/18 ; C01B2203/0244 ; C01B2203/025 ; C01B2203/04 ; C01B2203/042 ; C01B2203/0465 ; C01B2203/147 ; C01B2203/84 ; C10J2300/1606 ; C10J2300/165 ; C10J2300/1653 ; C10J2300/1675
CUA	- Y02E50/11
PA	- (A2 A3) UHDE GMBH [DE]; ABRAHAM RALF [DE]; PAVONE DOMENICO [DE]
TI	- (A2 A3) MODIFIED GAS AND STEAM TURBINE PROCESS HAVING INTEGRATED COAL GASIFICATION UNDER PRESSURE
AB	- (A2 A3) The invention relates to a method for producing, purifying , and burning syngas for generating electrical energy. The syngas is generated from a solid, carbonaceous fuel using an oxygenic gas and purified by slag extraction and alkali extraction. After purifying , the syngas produced enters an expansion turbine, where the pressure energy is used for generating electricity. The expansion turbine is protected against corrosion and mechanical attack by the purification and alkali separation. The expanded syngas is then burned under pressure, and the combustion is used for generating electricity in a combined cycle process using a gas turbine, steam generation, and a steam turbine. The process thus has a high level of efficiency. The invention further relates to a device for performing the method

according to the invention.

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PN - [CN201276542Y](#) Y 20090722

PR - CN20082208232U 20080903

AP - CN20082208232U 20080903

DT - I

CCA - [Y02E50/32](#) ; [Y02P20/129](#)

PA - KAIGEN ZHOU [CN]

TI - **Gasification** system and apparatus for garbage and **organic** wastes

AB - The utility model discloses **gasification** system and equipment for refuse and **organic** wastes and relates to refuse **treatment** equipment. The **gasification** system mainly comprises an air dryer, a **gas** phase circulation **gasification** furnace, dust-removing / **purifying** equipment, a compressor, a **gas** holder and a connection pipeline; wherein, the inner part of the **gasification** furnace is provided with a drying zone, a pyrolyzing zone, a **gasification** first zone, a **gasification** second zone, a **burnout** zone and a heat storage cavity; the outer part of the furnace is provided with a **gas** phase circulation loop which is composed of a circulation fan and a circulation wind pipe. In the system, a discharging outlet of the air dryer is connected to a feeding inlet of the **gasification** furnace; a **synthesis gas** output interface of the **gasification** furnace is connected to the dust-removing / **purifying** equipment by a **gas** inducing fan; the dust-removing / **purifying** equipment is connected to the compressor which is connected to the **gas** holder. By adopting the technical measure of arranging the heat storage cavity in the **gas** phase circulation **gasification** furnace, the system is beneficial to increase the **gasification** rate and improve the quality of the refuse **fuel**, meanwhile, the violent toxic dioxins are disintegrated and the tar is removed effectively, the refuse and the **organic** wastes are changed into secondary clean energy, including the **coal gas**, **hydrogen**, methanol and dimethyl ether liquefied **gas** used in the city.

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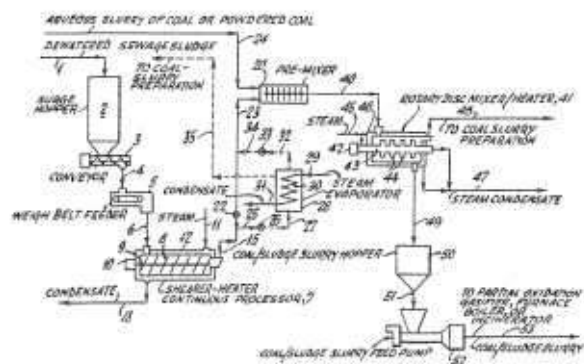
PN - [US5266085](#) A 19931130

PR - US19920980024
19921123; US19910762186
19910919

AP - US19920980024 19921123

DT - *; Rep

CT - || STSE (A)
[US3687646](#) A 19720829 [
] (BRENT ALBERT, et al);
[US3823921](#) A 19740716 [
] (BRENNAN A, et al);
[US4358293](#) A 19821109 [
] (MARK SEYMOUR);
[US4762527](#) A 19880809 [
] (BESHORE DAVID G [US], et al);
[US4933086](#) A 19900612 [
]



] (MCMAHON MATTHEW A [US],
 et al);
[US4983296](#) A 19910108 [
] (MCMAHON MATTHEW A [US],
 et al);
[US5039708](#) A 19910813 [
] (CONLAN JOHN T [US], et al)

CCI - [C02F1/048](#) ; [C02F1/50](#) ;
[C02F11/10](#) ; [C02F11/18](#) ;
[C10J3/00](#) ; [F23K1/02](#)

CCA - [C10J2300/0903](#) ;
[C10J2300/0906](#) ; [Y10S48/07](#) ;
[Y02W10/40](#)

PA - TEXACO INC [US]

TI - Process for disposing of sewage
 sludge

AB - A process for disposing of
 sewage sludge comprising the
 steps of, (1) dewatering the
 sewage sludge to produce an
 aqueous slurry of sewage sludge
 having a solids content of about
 10 to 30 wt. %; (2)
 simultaneously heating and
 shearing said dewatered sewage
 sludge at about 150 DEG F. to
 210 DEG F. in the absence of air
 for 0.5 seconds to 60 minutes
 while being continuously passed
 through a tubular-shaped
 processing means containing a
 plurality of rotating agitators,
 thereby producing a pumpable
 slurry having a viscosity of less
 than about 2000 centipoise; (3)
 dewatering the sewage sludge if
 necessary; (4) mixing at a
 temperature in the range of
 about ambient to 180 DEG F. in a
 ribbon or in-line static mixer the
 slurry of sewage sludge from (2)
 and/or (3) with a supplemental
 solid **carbonaceous fuel** e.g. **coal**
 and/or petroleum-**coke** to
 produce a pumpable aqueous
 slurry of sewage sludge and
 supplemental **fuel** having a
 solids content in the range of

about 50 to 60 wt. %; (5) mixing the slurry of sewage sludge and supplemental **fuel** from (4) in a **steam** jacketed continuous rotary disc mixer at about 180 DEG F. to 250 DEG F. while removing **steam** to produce a pumpable slurry of dewatered sewage sludge and solid **fuel** having a solids content of 50 to 65 wt. % and a HHV of 6,000 to 18,000 BTU/LB; and (6) **burning** said pumpable slurry from (5) in a partial oxidation **gasifier**, furnace, boiler, or incinerator to produce an effluent **gas** stream. In a preferred embodiment, the effluent **gas** stream is cleaned and **purified** and non-contaminating ash and slag are separated. By this process, noxious sewage sludge may be disposed of without contaminating the environment. By-product **synthesis gas**, reducing **gas**, or **fuel gas** may be produced.

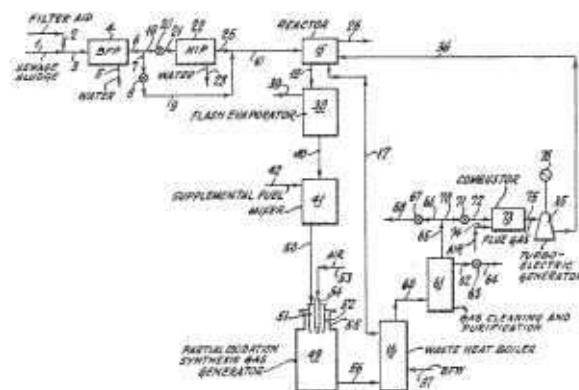
12/20 © EPODOC / EPO

- PN - [US5292442](#) A 19940308
- PR - US19920955007 19921001
- AP - US19920955007 19921001
- DT - *; Rep
- CT - || STSE (A)
[US3549524](#) A 19701222 [] (HALLER WOLFGANG)
[US4405332](#) A 19830920 [] (RODRIGUEZ LARRY A [US], et al)
[US4657681](#) A 19870414 [] (HUGHES WILLIAM L [US], et al)
[US4840736](#) A 19890620 [] (SANDER BRUNO [DE], et al)
[US4933086](#) A 19900612 [] (MCMAHON MATTHEW A [US], et al)
[US4983296](#) A 19910108 [] (MCMAHON MATTHEW A [US], et al)
[US5037561](#) A 19910806 [] (COPELAND BRIAN J [US])
[US5141526](#) A 19920825 [] (CHU HUMBERT H [US])
[US5188739](#) A 19930223 [] (KHAN MOTASIMUR R [US], et al)
[US5188740](#) A 19930223 [] (KHAN MOTASIMUR R [US])
[US5188741](#) A 19930223 [] (ZANG RICHARD B [US], et al)
[US5190672](#) A 19930302 [] (COENEN HUBERT [US], et al)
- CCI - [C02F11/10](#) ; [C02F11/121](#) ; [C10J3/46](#) ; [C10J3/466](#) ; [C10K1/002](#) ; [C10K1/004](#) ; [C10K1/005](#) ; [C10K1/101](#) ; [C10B53/00](#)

- CCA - [C02F11/123](#) ; [C02F11/127](#) ; [C10J2300/0906](#) ; [C10J2300/0923](#) ; [C10J2300/0926](#) ;
[C10J2300/1223](#) ; [C10J2300/1687](#) ; [C10J2300/1846](#) ; [C10J2300/1861](#) ; [C10J2300/1884](#) ;
[C10J2300/1892](#) ; [Y02W10/40](#) ; [Y02P20/145](#)
- PA - TEXACO INC [US]
- TI - Process for disposing of sewage sludge
- AB - A process for disposing of sanitary sewage sludge by producing a pumpable slurry of sewage sludge with or without solid **carbonaceous fuel** and **burning** said slurry as **fuel** in a partial oxidation **gas** generator, furnace, or boiler. The aqueous slurry of sewage sludge is concentrated by removing water by means of a conventional belt filter press, centrifuge, or hydroclone. The dewatered slurry of sewage sludge is heated by direct contact with **steam** while air and **organic** vapors are simultaneously removed, to reduce the pressure in the system; hydrothermally treated in two steps with indirect and direct heat exchange with **steam**; dewatered by flash evaporation and centrifuging; and **burned** with or without admixture with solid **carbonaceous fuel** in a partial oxidation **gasifier**, furnace, boiler, or incinerator to produce **synthesis gas** or a hot raw effluent **gas** stream. In a preferred embodiment, the effluent **gas** stream is cleaned and **purified** and non-contaminating ash and slag are separated. By this process, noxious sewage sludge may be disposed of without contaminating the environment. **Synthesis gas**, reducing **gas**, or **fuel gas** may be produced.

13/20 © EPODOC / EPO

- PN - [US5211724](#) A 19930518
- PR - US19910685339
19910415; CA19922086212
19921223; EP19930300425
19930121; JP19930051329
19930218
- AP - US19910685339 19910415
- DT - *; Rep
- CT - || STSE (A)
[US3166032](#) A 19650119 [(HUGO KLESER)
[US3544291](#) A 19701201 [(SCHLINGER WARREN G, et al)
[US3622511](#) A 19711123 [(PIZZO JAMES J, et al)
[US3650403](#) A 19720321 [(ALDRIDGE ANTHONY PETER)
[US3687646](#) A 19720829 [(BRENT ALBERT, et al)
[US3847564](#) A 19741112 [(MARION C, et al)
[US3926129](#) A 19751216 [(WALL CLARENCE J)
[US4052176](#) A 19771004 [(CHILD EDWARD T, et al)
[US4081253](#) A 19780328 [



	] (MARION CHARLES P) US4159684 A 19790703 [] (KIRKUP WILLIAM M) US4193206 A 19800318 [] (MAFFET VERE [US]) US4321151 A 19820323 [] (MCMULLEN FREDERICK G) US4875906 A 19891024 [] (APEL HOWARD L [US]) US4933086 A 19900612 [] (MCMAHON MATTHEW A [US], et al) US4983296 A 19910108 [] (MCMAHON MATTHEW A [US], et al) US4988442 A 19910129 [] (HIGHSMITH RONALD E [US], et al)
CTNP	- STSE (A) [] Perry s Chemical Engineers Handbook, McGraw Hill, Fourth Edition, 1963, pp. 19 50
CCI	- C01B3/36 ; C02F1/048 ; C02F11/10 ; C02F11/123 ; C10J3/466 ; C10J3/86 ; C10K1/101 ; C10L5/46
CCA	- Y02E50/10 ; Y02E50/30 ; C10J2300/0926 ; C10J2300/0996 ; C10J2300/1223 ; C10J2300/1606 ; C10J2300/165 ; C10J2300/1656 ; C10J2300/1671 ; C10J2300/1846 ; Y10S48/07 ; Y02W10/40 ; Y02P20/145
PA	- TEXACO INC [US]
TI	- Partial oxidation of sewage sludge
AB	- An improved process for the low- cost disposal of noxious sewage sludge in a safe way without polluting the environment. In the process, sewage sludge having a solids content of about 0.5 to 20 wt.% is concentrated by pressing in a belt filter press, optionally followed by pressing in a high intensity press. It was

unexpectedly found that the morphology of the resulting dewatered sewage sludge is changed by such mechanical **treatment** so that slurries with higher concentrations of solids are achieved. The dewatered sewage sludge is heated, flash evaporated and/or centrifuged, and mixed with a supplemental **fuel** e.g., liquid hydrocarbonaceous and/or solid **carbonaceous fuel** to produce a pumpable **fuel** slurry having a total solids content in the range of about 50 to 70 wt.% and comprising about 10 to 40 wt.% dewatered sewage sludge and having a higher heating value in the range of about 5,000 to 14,000 BTU/Lb. The **fuel** slurry may be reacted by partial oxidation in a conventional **gasifier** to produce **synthesis gas** and/or **fuel gas**. The thermal energy in hot byproduct **steam** and flue **gas** streams are used to heat the dewatered sewage sludge. In one embodiment, the pumpable slurry of dewatered sewage sludge and supplemental **fuel** is **burned** by complete **combustion** in a furnace or incinerator for the production of **steam**.

14/20 © EPODOC / EPO
 PN - [JP2008208276](#) A 20080911
 PNFP - JP4658980B B2 20110323
 PR - JP20070048052 20070227
 AP - JP20070048052 20070227
 DT - I
 CT - (A)
[JP2002235090](#) A []; [JP2001240878](#) A [];
[JP2002285171](#) A []; [JP2002212574](#) A []

CCA - [Y02E50/30](#)

FI - B09B3/00&302G; C10J3/00&A+ZAB; C10L1/02

FT - 4D004/AA12; 4D004/AA50; 4D004/AC04; 4D004/BA03; 4D004/CA04; 4D004/CA22; 4D004/CA27; 4D004/CA42; 4D004/CB36; 4D004/CC03; 4D004/DA02; 4D004/DA09; 4H013/BA02

PA - (A)
MITSUBISHI HEAVY IND LTD

TI - (A)
SYSTEM FOR PRODUCING LIQUID FUEL OF **ORGANIC FUEL GASIFICATION**

AB - (A)
PROBLEM TO BE SOLVED: To provide a system for producing a liquid **fuel** of **organic fuel gasification**, which efficiently dries a biomass and uses a biomass, etc.
- SOLUTION: The system for producing a liquid **fuel** of **organic fuel gasification** is equipped with a dryer 12 for drying a biomass 11, a biomass **gasification** furnace 14 for **gasifying** the dried biomass, a high-temperature heat exchanger 16 and a low-temperature heat exchanger 18 for subjecting **steam** S being an oxidizing agent for **gasification** to heat exchange by using a produced **gas** 15, a dust collector 17 that is laid between the high-temperature heat exchanger 16 and the low-temperature heat exchanger 18 and removes ash dust in the produced **gas**, a **gas purification** apparatus 19 for removing impurities in the produced **gas**, a booster 21 for increasing the pressure of the **purified gas**, a liquid **fuel synthesis** apparatus 22 for **synthesizing** a liquid **fuel** by using a pressurizing **gas** 20B, a **gas-liquid** separator 25 for **gas-liquid** separation of the liquid **fuel** 23 and an exhaust **gas** 24 and a **combustion** furnace 26 for **burning** the **gas-liquid** separated exhaust **gas** 24. The exhaust **gas** 27 of **combustion** furnace from the **combustion** furnace 26 is used as a heat source of the dryer 12.
- COPYRIGHT: (C)2008,JPO&INPIT

15/20 © EPODOC / EPO

PN - [GB1470867](#) A 19770421

PR - US19730428980
19731227; US19730428981
19731227

AP - GB19740053692 19741212

DT - *; Rep

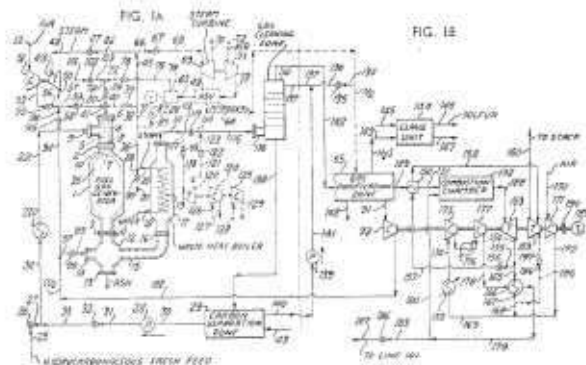
CCI - [C01B3/36](#) ; [F01K23/068](#) ;
[F02C3/20](#) ; [F02C3/34](#)

CCA - [Y02E20/18](#) ; [F05D2200/262](#) ;
[Y02P20/129](#)

PA - TEXACO DEVELOPMENT CORP

TI - **GAS TURBINE PROCESS**
UTILIZING **PURIFIED FUEL** AND
RECIRCULATED **FUEL GAS**

AB - 1470867 **Synthesis gas**
production TEXACO
DEVELOPMENT CORP 12 Dec



1974 [27 Dec 1973 (2)] 53692/74
Heading C5E [Also in Division F1]
A **gas** turbine plant includes
a **fuel gas** producer 1
producing **gas** at an autogenous
temperature of 1500 to 3500 F.
at a pressure of 10 to 180
atmospheres and composed of a
mixture of H₂, CO, CO₂ and H₂O
with one or more of N₂, CH₄,
COS, H₂S and Ar, and
particulate carbon and with a
mole ratio (CO/H₂) of at least
0.30, the **fuel gas** being cooled in
a waste-heat boiler 17 and
introduced into a **gas** cleaner
110 and **purifier** 65 from which
are obtained a stream 149 of
clean **fuel gas** of H₂ and CO with
one or more of N₂, CH₄, CO₂
and H₂O, a CO₂-rich **gas**
stream 91, a slurry stream 138
of particulate carbon in a liquid
vehicle, and a **gas** stream 143
rich in H₂S and COS; the
clean **fuel gas** stream 149 is fed
to a **combustion** chamber 152 in
which it **burns** with a gaseous
oxidizing stream 180 to produce
a stream 188 of clean flue **gas**
which is passed to the **gas**
turbine 153 to develop power
and to produce a clean exhaust
flue **gas** stream 154, a portion
168 of which is mixed with a free
oxygen containing **gas** 169, e.g.
air, oxygen-enriched air, or pure
oxygen, to produce the gaseous
oxidizing stream 180. The
gaseous oxidizing stream is also
fed via line 187, 101 to a central
passage in an annular **burner** 5
in the **fuel gas** producer, to
which **burner** is fed the
hydrocarbonaceous **fuel** 25.
The **fuel gas** is fed from producer
1 to a spherical chamber 12 to
which CO₂ is fed from the **gas**
purifier 65. The **steam** produced

in boiler 17 may be used to drive a turbine 49 driving a compressor 51 feeding air to the **gas** producer 1; it may be fed directly to the producer, or drive a turbine 69 of an air separation unit 42 delivering oxygen to the producer and nitrogen to the **gas purifier**. In the **gas** cleaner 110, the **fuel gas** is scrubbed by water or liquid hydrocarbon, the particulate carbon slurry being mixed with naphtha and decanted in a carbon separator 29. The carbon/ naphtha dispersion is then distilled with a heavy liquid hydrocarbon **fuel** oil and the naphtha removed while the liquid **fuel** and particulate carbon are fed to the **burner** 5. Water may be added to the **combustion** chamber. The clean exhaust flue **gas** 188 from the **combustion** chamber 152 is expanded in turbine 153, one part of the exhaust then passing through a heater 150 to preheat the **fuel gas** stream 149 and then being expanded in a turbine 159 and exhausted to atmosphere, or fed to line 101 to the **gas** producer. A second portion of the exhaust flue **gas** stream is mixed with air in line 169 and then heated and compressed and passed to the **gas** producer via line 101. Various other turbocompressors may be distributed along the flow path of the **fuel gas** between the producer 1 and **combustion** chamber 152, e.g. as at 120 between the boiler 17 and **gas** cleaner 110. Suitable feedstocks for the **gas** producer 1 include liquid and gaseous hydrocarbons (several examples given), **coke oven gas**, water **gas**, oxygen containing liquid

hydrocarbonaceous **organic** material (examples given) and slurries of solid **carbonaceous fuel** in water or liquid hydrocarbon.

16/20 © EPODOC / EPO

PN - [GB636206](#) A 19500426

PR - GB19470008718 19470331

AP - GB19470008718 19470331

DT - *

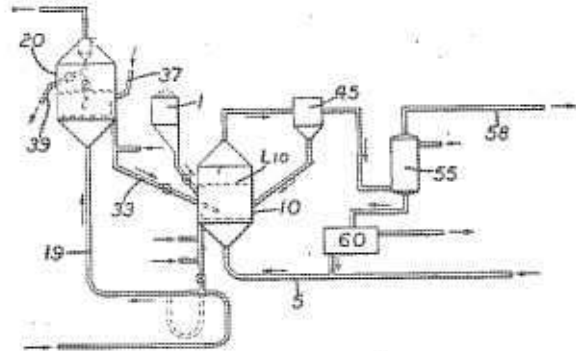
CCI - [C10J3/482](#)

CCA - [C10J2300/0933](#) ;
[C10J2300/0993](#)

PA - STANDARD OIL DEV CO

TI - Process for the production of carbon monoxide and **hydrogen**

AB - 636,206. **Gasifying** solid **carbonaceous** materials. ARNOLD, C. (Standard Oil Development Co.). March 31, 1947, No. 8718. [Class 55 (i)] In **gasifying** solid **carbonaceous** materials with **steam** to obtain H: CO mixtures the oxygen required for partial **combustion** of the **fuel** to provide heat for the reaction is supplied by finely divided metal oxides ; further heat is contributed by the reoxidized spent material. A water **gas** generator 10 fed with ground **coal** from a hopper 1 also receives from a regenerator 20 iron oxide of a particle size rather larger than that of the **coal**. **Steam**, preheated to 1200 -1600 F. particularly for starting, is supplied through line 5 at a velocity such that a dense ebullient mass is formed with a well defined upper level L10 and **coal** ash is carried off by the product gases. Classification of the solids into layers mainly of oxide, of reacting **coal** and oxide and of **coal** may be assisted by



Raschig rings &c. Spent oxide is conveyed by air through a pipe 19 to the regenerator in which an oxidizing temperature of 1500-2500 F. is maintained in the fluidized bed. Fresh oxide may be added through pipe 37 and fines discharged through pipe 39. Regenerated oxide is returned by pipe 33 to which **steam** is admitted. **Gas** from the generator passes through a solids separator 45, a water scrubber 55 and line 58 to **purification** equipment. Heavier material from a settler 60 receiving solids from the scrubber is returned to the generator through the **steam** line. Tail **gas** from the hydrocarbon **synthesis** of the product gases may also be returned as by line 5 to modify the composition of the water **gas**. Pressures up to about 400 lb. per sq. in., particularly if gases of increased methane content are required, may be applied in the generator, the regenerator being operated at atmospheric pressure. The **carbonaceous** material may comprise **coal**, **coke**, peat, oil shale heavy oil residues, cellulosic materials including lignin, and the oxides may be of iron, copper, nickel, vanadium, &c. which may be mixed with carrier materials e.g. kieselguhr, alumina or silica gels and bentonites.

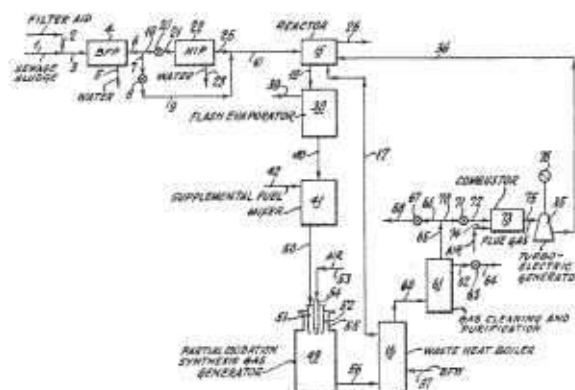
17/20 © EPODOC / EPO
 PN - [GB593910](#) A 19471029
 AP - GB19450001194 19450115
 DT - *; Rep
 CCI - [B01J23/866](#) ; [C07C1/0435](#)
 CCA - [C07C2521/08](#) ; [C07C2521/16](#) ; [C07C2523/755](#) ; [C07C2523/86](#)
 PA - STANDARD OIL DEV CO

- TI - Improved process for the catalytic **synthesis** of hydrocarbons from carbon monoxide and **hydrogen**
- AB - A catalyst comprising nickel chromite, used in the production of hydrocarbons containing more than one carbon atom per molecule from carbon monoxide (see Group IV) and **hydrogen**, is prepared by adding a solution of ammonium dichromate in water and ammonium hydroxide to an aqueous solution of nickel nitrate maintained at about 165 DEG F., the resultant precipitate being filtered, dried at 300 DEG F. and then calcined at 700 DEG F. Other nickel salts, e.g., the chloride, carbonate and sulphate may be employed. In the latter case any sulphate ions present in the catalyst should be removed. Chromic acid and ammonium hydroxide, ammonium chromate, or sodium and potassium chromates and dichromates may be employed instead of the ammonium dichromate. The nickel chromite may be pelleted or employed on a suitable carrier such as silica gel, alumina gel, diatomaceous earth, kieselguhr, activated **charcoal** and for this purpose the catalyst may be precipitated within the carrier and the catalyst impregnated carrier then calcined. The nickel chromite may also be coated on the carrier and calcined and reduced as a coating on the carrier. The catalyst either alone or on a porous or gelatinous carrier may be used in fluid operation. In two examples the catalyst employed in the reaction of carbon monoxide with **hydrogen** is prepared by reducing the nickel chromite obtained as above with a large excess of **hydrogen** at temperatures of 760 DEG F. and 750 DEG F. respectively. The nickel chromite reduced by **hydrogen** comprises a catalytic mixture of metallic nickel and chromium. ALSO: Hydrocarbons containing more than one carbon atom per molecule are produced by reacting carbon monoxide and **hydrogen** at temperatures of 300-450 DEG F. and at atmospheric or elevated pressures in the presence of a catalyst comprising nickel chromite and/or a mixture of metallic nickel and chromium obtained by reducing nickel chromite with **hydrogen**. The catalyst may be prepared (see Group III) by adding a solution of ammonium dichromate in water and ammonium hydroxide, to an aqueous solution of nickel nitrate and drying and calcining the resultant precipitate. Instead of ammonium dichromate, chromic acid and ammonium hydroxide, ammonium chromate or sodium and potassium chromates and di-chromates may be used. Other nickel salts, e.g. the sulphate, chloride and carbonate may be used, but when nickel sulphate is employed, precautions should be taken to remove any sulphate ions present in the precipitated catalyst. The catalyst may be pelleted or employed on a suitable carrier such as silica gel, alumina gel, diatomaceous earth, kieselguhr and activated **charcoal**. The nickel chromite may also be coated on the carrier and calcined and reduced as a coating on the carrier. The nickel chromite prepared by calcination of the nickel ammonium chromate complex is suitable for use in fluid operation and the catalyst has been found to fluidize readily when prepared on a carrier such as silica gel, alumina, clay, bauxite, silica-alumina gels and kieselguhr. The feed stock which should be freed from sulphur and sulphur compounds, e.g. by **treatment** with caustic alkali or tri-ethanolamine, may be supplied from such sources as water **gas**, gases obtained through the controlled hydrogenation of **coal** or by **gasification** of solid **carbonaceous fuel** such as **coke**, brown **coal** and mineral oil, or by the conversion of **natural gas**, by the reaction of methane with **steam** and/or carbon dioxide or subjecting hydrocarbon gases to controlled and incomplete **combustions**. In two examples, the catalyst prepared as above is reduced with a large excess of **hydrogen** at 760 DEG F. and 750 DEG F. respectively, and a mixture of carbon monoxide and **hydrogen** passed through a reactor containing the catalyst. The temperature of the reactor is about 360 DEG F. and the throughput is 118 volumes and 111-113 volumes of gaseous **synthesis** mixture per

volume of catalyst per hour respectively, liquid hydrocarbons being obtained.

18/20 © EPODOC / EPO

- PN - [EP0607644](#) A1 19940727
- PNFP - EP0607644 B1 19970716
- PR - EP19930300425
19930121; CA19922086212
19921223; JP19930051329
19930218; US19910685339
19910415
- AP - EP19930300425 19930121
- DT - **
- CT - || STSE (A1)
[EP0515117](#) A1 19921125
[A] (TEXACO DEVELOPMENT CORP
[US]);
[EP0411881](#) A1 19910206
[A] (TEXACO DEVELOPMENT CORP
[US]);
[US4909899](#) A 19900320
[A] (KIISKILAE ERKKI J [FI])
- CCI - [C01B3/36](#) ; [C02F1/048](#) ;
[C02F11/10](#) ; [C02F11/123](#) ;
[C10J3/466](#) ; [C10J3/86](#) ;
[C10K1/101](#) ; [C10L5/46](#)
- CCA - [Y02E50/10](#) ; [Y02E50/30](#) ;
[C10J2300/0926](#) ;
[C10J2300/0996](#) ;
[C10J2300/1223](#) ;
[C10J2300/1606](#) ; [C10J2300/165](#) ;
[C10J2300/1656](#) ;
[C10J2300/1671](#) ;
[C10J2300/1846](#) ; [Y10S48/07](#) ;
[Y02W10/40](#) ; [Y02P20/145](#)
- PA - (A1 B1)
TEXACO DEVELOPMENT CORP [US]
- TI - (A1)
Partial oxidation of sewage
sludge.
(B1)
Partial oxidation of sewage
sludge
- AB - (A1)
An improved process for the low-
cost disposal of noxious sewage
sludge in a safe way without



polluting the environment. In the process, sewage sludge having a solids content of about 0.5 to 20 wt.% is concentrated by pressing in a belt filter press, optionally followed by pressing in a high intensity press. It was unexpectedly found that the morphology of the resulting dewatered sewage sludge is changed by such mechanical **treatment** so that slurries with higher concentrations of solids are achieved. The dewatered sewage sludge is heated, flash evaporated and/or centrifuged, and mixed with a supplemental **fuel** e.g., liquid hydrocarbonaceous and/or solid **carbonaceous fuel** to produce a pumpable **fuel** slurry having a total solids content in the range of about 50 to 70 wt.% and comprising about 10 to 40 wt.% dewatered sewage sludge and having a higher heating value in the range of about 5,000 to 14,000 BTU/Lb. The **fuel** slurry may be reacted by partial oxidation in a conventional **gasifier** to produce **synthesis gas** and/or **fuel gas**. The thermal energy in hot by-product **steam** and flue **gas** streams are used to heat the dewatered sewage sludge. In one embodiment, the pumpable slurry of dewatered sewage sludge and supplemental **fuel** is **burned** by complete **combustion** in a furnace or incinerator for the production of **steam**.

PN - [DE19848926](#) A1 20000531

PR - DE1998148926 19981023

AP - DE1998148926 19981023

DT - *

CT - [DE68907116T](#) T2 []

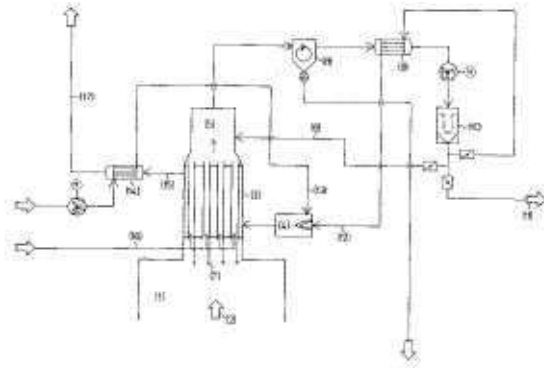
CCI - [B01D45/12](#) ; [F27D17/008](#)

CCA - [F23G2201/40](#) ; [F23G2206/202](#)

PA - JESCHAR RUDOLF [DE];
WASSMANN KURT [DE]

TI - Cracking apparatus for cracking condensable, impure gases obtained from **organic** wastes into non-condensable power generation gases, retains maximum of calorific value through indirect heating and heat recovery strategies

AB - Gases from degasification or **gasification** of **organic** solids or liquids, are cracked at 1200 deg C by indirect, tube furnace heating. Feedstock calorific value is conserved during conversion. Molten ash runs back into the previous process supplying the gases, to be removed with ashes from that process. Softened, but not molten hot fly ash, continues to a chamber for cooling by a cleaned **gas** supply, and is solidified for separation in a hot cyclone which follows. The process gases continue to a second integrated cooling stage (9), followed by cleaning, and **combustion** in **gas** engines or turbines producing electricity. Preferred Features: At the entrance of the cracking furnace tubes, **steam** (16) is introduced, promoting the endothermic water **gas** shift reaction, and accelerating cracking reactions. The gases alternatively flow in the tube interspaces. **Fuel** gases are **burned** in the tubes, for



radiative heating from them. Preheated **purified gas** from the process, is used for cracking furnace heating. Preheating is achieved in the second cooling stage of the plant. Hot gases from the furnace, preheat (14) air (13) for the same purpose. **Purified** product gas is used as **fuel gas** or **synthesis gas**. Sensible heat content in gases from the cracking furnace used to preheat **combustion** air, is recovered in other parts of the plant.

20/20 © EPODOC / EPO

PN - [CA2086212](#) A1 19940624

PR - CA19922086212
19921223; EP19930300425
19930121; JP19930051329
19930218; US19910685339
19910415

AP - CA19922086212 19921223

DT - **

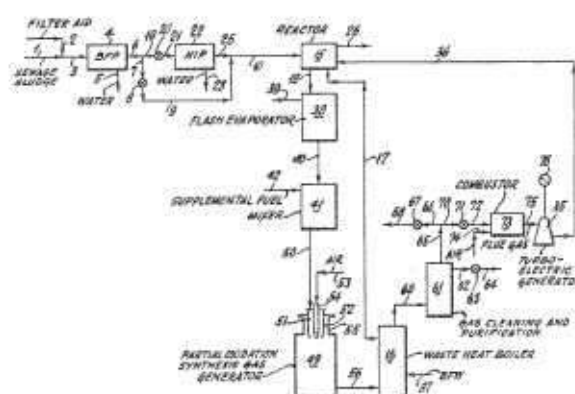
CCI - [C01B3/36](#) ; [C02F1/048](#) ;
[C02F11/10](#) ; [C02F11/123](#) ;
[C10J3/466](#) ; [C10J3/86](#) ;
[C10K1/101](#) ; [C10L5/46](#)

CCA - [Y02E50/10](#) ; [Y02E50/30](#) ;
[C10J2300/0926](#) ;
[C10J2300/0996](#) ;
[C10J2300/1223](#) ;
[C10J2300/1606](#) ; [C10J2300/165](#) ;
[C10J2300/1656](#) ;
[C10J2300/1671](#) ;
[C10J2300/1846](#) ; [Y10S48/07](#) ;
[Y02W10/40](#) ; [Y02P20/145](#)

PA - TEXACO DEVELOPMENT CORP [US]

TI - PARTIAL OXIDATION OF SEWAGE
SLUDGE

AB - PARTIAL OXIDATION OF SEWAGE
SLUDGE (D#79,359 -F) An
improved process for the low-
cost disposal of noxious sewage
sludge in a safe way without
polluting the environment. In the



process, sewage sludge having a solids content of about 0.5 to 20 wt.% is concentrated by pressing in a belt filter press, optionally followed by pressing in a high intensity press. It was unexpectedly found that the morphology of the resulting dewatered sewage sludge is changed by such mechanical **treatment** so that slurries with higher concentrations of solids are achieved. The dewatered sewage sludge is heated, flash evaporated and/or centrifuged, and mixed with a supplemental **fuel** e.g., liquid hydrocarbonaceous and/or solid **carbonaceous fuel** to produce a pumpable **fuel** slurry having a total solids content in the range of about 50 to 70 wt.% and comprising about 10 to 40 wt.% dewatered sewage sludge and having a higher heating value in the range of about 5,000 to 14,000 BTU/Lb. The **fuel** slurry may be reacted by partial oxidation in a conventional **gasifier** to produce **synthesis gas** and/or **fuel gas**. The thermal energy in hot byproduct **steam** and flue **gas** streams are used to heat the dewatered sewage sludge. In one embodiment, the pumpable slurry of dewatered sewage sludge and supplemental **fuel** is **burned** by complete **combustion** in a furnace or incinerator for the production of **steam**.