BLEIWENZ

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Technology for the Preservation
our Environment

WORLD NOVELTY

The latest technology for garbage recycling and disposal with minimalised toxic residues

UNIT DESCRIPTION

**Development and Production Company
For
Energy-Recovery Units**

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Description

For the combustion of the domestic waste, there are known a multitude of waste combustion plants of more or less expensive construction. To the combustion furnace plants are added purification plants by means of which the flue gas will be dedusted and detoxicated. But such purification plants have a complicated construction and are of large dimensions which can exceed possibly the dimensions of the combustion furnace many times over. Furthermore they are generally expensive regarding the purchase cost and regarding the maintenance.

The rest material low temperature carbonisation plant, in particular for the thermal treatment of waste, such as waste low temperature carbonization or the like, consists of a furnace housing with oil or gas burner in which are installed a burning chamber and a low temperature carbonizing chamber with a continuous steel plate conveyor of highly refractory steel where will be burnt the waste.

It is known that, because of the drastical shortage of waste dumping pit room, there are many problems with the continuously rising waste-appearance. Already 40 % of the domestic waste will be burnt in Germany, nevertheless there must be made further efforts **for increasing the disposal capacity in future too.**

The target is to reduce the required dumping pit room and to use the waste profitably, e.g. **for the heat recovery and energy recovery.**

For eliminating in the exhaust gas the sour components (**gases**) such as e.g. **HCl**, there has been used a simple but effective method, a purification by means of quick lime in the exhaust gas flow as well as a filter for fine dust. The lime is to be exchanged according to the “degree of saturation”.

The invention is based on the task that for the thermal treatment of waste is to be made available a furnace in which the exhaust gases and residual ashes of the same have a lower burden of noxious matters.

This problem will be solved so that a low temperature carbonizing chamber adjacent to the burning chamber will be installed, separately, into the furnace housing. The low temperature carbonization gases, arising from the heating of waste in a continuous operation and having a partially high thermal value, will be sucked off by the low temperature carbonizing chamber and will be pressed simultaneously into the turbo-burning chamber again where will be realized - through a stay- down- time of 4-5 seconds - **a complete incineration and detoxication.**
The rest material (waste) doesn´t have direct contact with the burnerflame - it has only indirect contact with this flame. By means of radiating heat will be realized the “spontaneous ignition”

As safety that the ignition of the charge will be executed really, there is installed a small propane igniter burning always with a small flame.
This construction of the furnace has the essential advantage that the waste will not be burnt, It carbonises at low temperatures. Because of this the exhaust gases arising here are cleaner than those arising from the combustion process.

The heating will be realized through an automatically regulated burner burning in a burning chamber from which a heating system will be heated horizontally over the steel plate conveyor. Through the lost heat of the heating system, the waste, being given as dosage onto the steel plate conveyor, will be heated slowly, in a continuous operation, until the spontaneous ignition and a natural low temperature carbonization begins through the regulated air supply.

The burner flame in the burning chamber will be regulated through a fuel-air-mix automatically so that there is always a temperature of approx. 800 °C to 850 °C.

This measure permits a simple combustion of the low temperature carbonization gas with minimum production of noxious matters, up to 30% below the EU standard. Because of the low temperature carbonization of the rest materials (waste), there is only left ash without noxious matters.

At the end of the steel plate conveyor, the ash comes to the output and can be used as admixture in the manufacturing concrete industry. Because of the heat value existing in the rest materials (**waste**), the temperature curve in the furnace will be maintained simultaneously so that there will be realized a controlled connection and disconnection of the additional energy (**burner**).

The plant is controlled electronically so that It can be adapted to every type of rest material (waste) for guaranteeing always a natural combustion.

A natural combustion can only be realized if and when:

1) **the hurnabfe material will he heated slowly to the temperature of combustion.**
2) **a sufficient quantity of air (oxygen) will be supplied to the burnable material so that it can incinerate on natural way.**

- Because of that, there will not be produced solid ash (**no slag**). In this case we mean **loose** ash (without noxious matters) which can be used in the concrete and street construction.
- After the incineration, the ash will be sucked off by a blower so that the **metallic particles** not being overheated and "**so not being destroyed**" can be recycled.

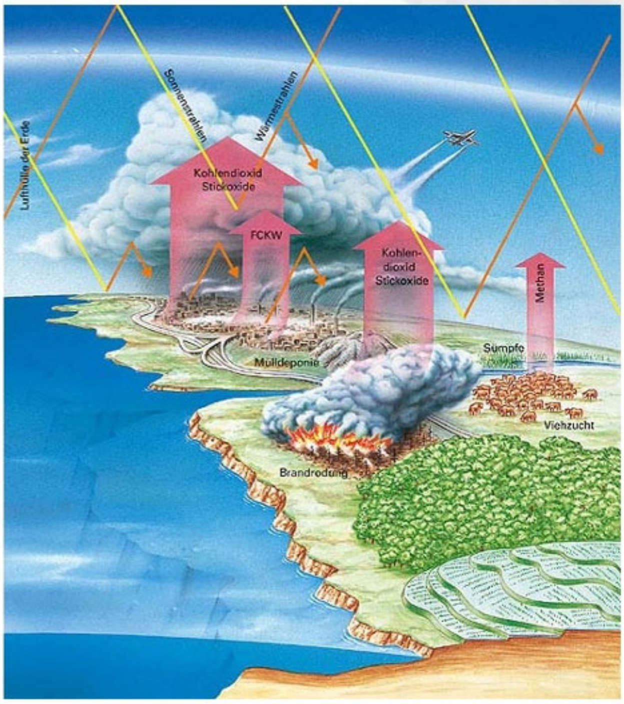
Example/comparison: cigarette

The ash of a cigarette is always loose ash because the glow or the burning of the cigarette **only takes up as much** air (oxygen) as required for a complete incineration. But the "low temperature carbonization gases" of the cigarette will not be burnt completely (**destroyed**), they stay toxic and get into the lungs of the human body and into the atmosphere where they disintegrate and degrade slowly.

If the low temperature carbonization gases of the cigarette would be led through the "Re-incineration Bleickert System", they -would be detoxicated completely.

Every residual waste has natural components which can only be degraded (**detoxicated**) on natural way completely.

A metallurgy-conscious thinking is absolutely necessary as the residual waste can contain all sorts of valuable substances, such as, for example, small metallic particles which will not be determined in spite of series-connected metal detector.



For being able to incinerate without any noxious matters the resisual materials with metallic particles according to the valid EU standards, there must be given the following condictions:

- The residual waste must never be overheated in such a manner that 400° - 500° will be exceeded, because in case of higher temperatures would be destroyed the structure of the various metallic particles being part of the residual waste. As consequence, there would be produced, because of oxidations, high-grade poison gases which mix and which only could be degraded **naturally** with great difficulties.
- The various metallic particles, such as, for example, copper, steel, aluminium, etc. must be separable from the ash so that they can be recycled.
- The low temperature carbonisation gases being produced during the low temperature carbonization of the rest material (**waste**) will be re-burnt and detoxicated in the re-burning chamber with approx. 800 °C - 850 °C within a stay-down time of approx. 4 - 5 seconds.

The Bleickert type range ERAD 250-1000F for dangerous and liquid explosive rest materials.

is a further technical development of the type range ERAD 250-2000.

The thermal technology is always the same, but the steel plate conveyor is equipped with pans so that the liquid stays dosed and that there can be realized a specific degassing in the passage of the furnace.

For ensuring an immediate ignition of the liquid at the inlet to the furnace, there has been installed a propane pilot burner which burns permanently with small flame. So, a detonation cannot happen.

Through a dosing plant, the liquid will be dosed, outside of the furnace, into the pans onto the pan-type plate conveyor. Immediately after the pans have entered the furnace, the liquid ignites forcibly.

Poison gases such as, for example, dioxines/ furanes will only be produced through improper combustion such as through too quick heating and overhearing (shock effect) = no natural combustion.

Advantages of the Bleickert System Plant:

* **Rest material disposal in situ**
* **Minimum energy supply, gas or oil**
* **Simple construction**
* **Optimum energy utilisation**
* **Total environmental-friendly combustion**
* **Complete delivery - Putting into operation after short time**
* **Very easy to maintain**
* **Very low-noise - under 70 dB (A)**
* **No openings are necessary in the buildings because of compact construction**
* **No special foundation will be necessary**

* **Plants for the heat and energy recovery can be added**
* **The furnace plant can be designed for stationary or mobile application (change of location).**

Ranges of application:

The plants can be used in situ, there where the rest material (waste) is arising directly, such as for example :

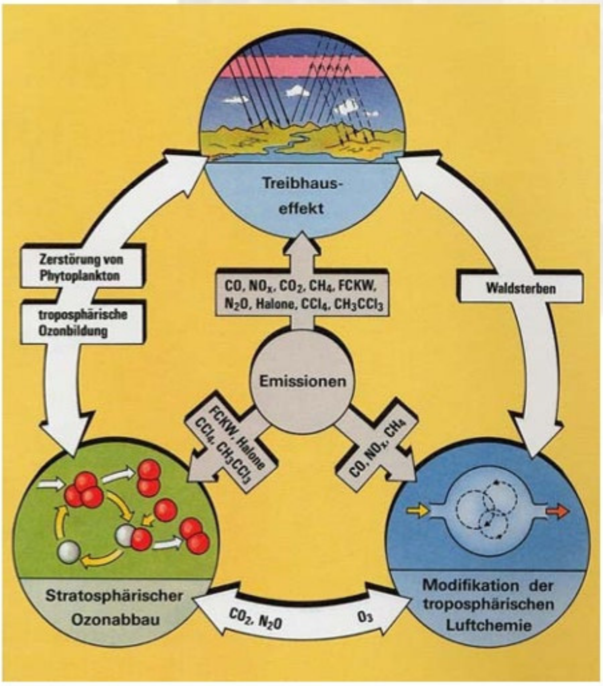
Firms, harbours, airports, towns, municipalities, supermarkets, department stores, hotels, housing estates, parks, motor car workshops, recycling factories, hospitals, sewage works, etc.

- for toxic earth's surfaces
- for explosive and toxic liquids
- for computer scrap and for electro-scrap

The exhaust gas heat can be used energetically:

1. If can be series-connected at the existing heating system.
2. To the plant can he added heat exchangers “Air-Water”, “Air-Air" as well as refrigerating plants.
3. It can be expanded for the current supply.

So, a complete energetic utilisation of the plant is impossible.



Description of the process
According to the basis flow chart with current generation

The individual operating states

1. **Start**
   (Duration approximately 1,5 hours)

   Service personnel: 2 persons

   By means of light oil (as alternative gas) being burnt through the thermo-regulator burner in the burning chamber, the plant will be heated to the working temperature in the individual reaction zones. In this operating state are already running both radial flow compressors conducting so the hot combustion gases through the burning chamber, the heat transfer chamber, the re-burning and the following exhaust gas purification.
   The chain conveyor will also be put into operation. The shutter at the feeding hopper will be kept closed and the conveyor belt is out of action.
   As soon as the temperature detectors indicate that the operating temperatures have been reached in the reaction zones and that the ash roller container is ready for operation, there will be opened the shutter at the feeding hopper and there will be put into operation the conveyor belt, the roller mill and material feeding.

   a. **reaction area of the low temperature carbonization zones 1-3, heating, low temperature carbonisation, incineration**

      In this area are arising the easy-to-burn low temperature carbonization gases with a high portion of total carbon, as a result of decomposition of the organic materials by heat and through the bond breaking ofaliphatic bonds and of the carbon compounds under oxygen deficiency, at a maximum temperature of 400°C.
      The first reaction area comprises the complete length of the conveying track in the reactor and is divided such as follows :

1st zone: Pre-heating 20 °C - 400 °C until the spontaneous ignition, through controlled heat transmission from the low temperature carbonization gas combustion (reaction area T2)
2nd zone: Low temperature carbonization 400 °C - 450 "C, i.e. combustion under oxygen deficiency. Here are arising the low temperature carbonization gases which will be sucked off upwards by means of radial flow compressors and conducted into the turbo-burning chamber.
3rd zone: Incineration 450 °C - 300 °C and complete burn-out of the ash residues.

b. Reaction area of the combustion of the low temperature carbonisation gases, turbo-reburning chamber

The low temperature carbonization gases sucked off out of the reaction area of the low temperature carbonization will be burnt and detoxicated in the turbo-reburning zone at 820 °C - 860 °C. There are provided thermo-elements for a continuous temperature detecting, being indicated at the control desk and informing the regulating unit for the burner control. The burner control is adjusted so that the minimum temperature of 800 °C will be guaranteed.
The additional burner is only provided for regulating the temperature within the re-buming area.

c. Reaction area of the heat transmission zone and re-burning

Together with the hot exhaust gases of the thermo-regulator burner, the hot combustion gases (maximally 860 °C) will be led in counterflow in a helical channel around the exhaust gas escape tube and then conducted into the heat transfer chamber.
During the escape through the exhaust gas escape tube, the exhaust gas flow will be heated again to 650° C. This temperature level permits an optimum energetic utilisation of the waste heat. Immediately after the escape of the exhaust gas flow the same will be purified by means of a fine dust double filter. The filter will be changed-over and cleaned automatically time controlled. For eliminating sour components, such as **HCL**, from the exhaust gases, a dry purification by means of quick lime (**HCl filter**) has been placed ahead before entering the exhaust chimney.
The equipment being necessary for realizing this procedure is very simple (investment cost). The operation requires relatively low expenses. **The cleaning effect is very high**, such as in this case, if and when the components to be absorbed are known. The lime is then to be exchanged according to the “saturation degree”.

2. Shut-down
(Duration approxoximately 1,5 hours)

The plant will be shut down if the chain conveyor is completely empty. For guaranteeing that, the feeding belt conveyor will be switched off and then will be closed the shutter at the feeding hopper. Until the batch on the chain conveyor has been transported through the reactor, there are passing 20 – 35 minutes in dependence on the speed controller of the chain conveyor.

After this time it is sure that no material will be in the reactor.

Additional inspection through an inspection glass at the end of the reactor.

3. Standstill

The standstill can apply to the individual units and to the complete plant because there is a separate fuse protection for the individual units.

a) Standstill of individual radial flow compressors
b) Standstill of the chain conveyor
c) Standstill of the feeding belt conveyor
d) Standstill of the thermo-regulator burner

4. Emergency-Stop

The emergency-stop can be actuated from various places being relevant for the operating and working safety.

a) Feeding area **(feeding belt, hopper, opening flap)**
b) Thermo-regulator burner **(ash roller container, inspection glass)**
c) Control desk, at overload of the chain conveyor **(foreign particles obstruct or choke the feeding area)**

5. Purification
The purification of the plant comprises only the exchange of the ash roller container and the elimination of conglutinations in the feeding area.

6. Inspection
When inspecting the plant, there is to be paid attention to wear phenomenon's of the steel plate conveyor, the proportioning nozzle of the burner is to be checked, the function of the temperature sensors is to be tested and the air guiding conduits are to be checked for tightness.
During the experimental stage, the inspection is to be realized in intervals of 14 days.

7. Repair work

Repair work will only be realized in case of standstill and after the cooling down of the plant components.

8. Operating troubles
For preventing a total failure in case of operating troubles, the individual units are fused separately.

Description of current veneration

The low temperature carbonization plant produces continuously hot smell-free exhaust gases at approx. 650 °C. These exhaust gases will be led into a **new type of steam boiler with better and quicker utilisation of heat.**

The steam arising in the steam boiler will be conducted, with approx. 5-10 bar, into a **new-developed steam-operated rotor engine.**
Through the steam pressure, the rotor will be brought to rotate in the engine casing and so the steam pressure will be converted into mechanical energy.

This mechanical energy (**rotation**) drives a generator which generates current.

The exhaust steam escaping out from the rotor engine will be re-condensed to water by means of a condenser. Forth the steam generation, the water will be pressed, through a piston pump, into the steam boiler.

Only through this new and well-though-out technology it is possible to close the cycle without any losses of energy.
By means of this new technology it is possible that the extremely high steam consumption will be reduced to approx. 1/10 of the previous consumption for steam turbines and that the efficiency will be increased.
Because of the lower steam consumption it will be possible to convert the steam back to water by means of re-condensation.

Considerable saving of water.

Advantages of the new development

- **The steam boilers can be ofsmaller dimensioning**
- **The cycle water-steam-water will be simpler and cheaper**
- **Efficiency of the steam-operated rotor engine approx. S5 % - in contrast to a steam turbine with only 30% - 40%.**
- **Low-cost construction**
- **This current supply can alwa)v keep abreast with the solar energy, as well as with wind power.**
  (No problems with the environment)
- **The future lies with this new low-cost technology.**

Development and Production Company For Energy - Recovery Units

BLEIWENZ

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State-of-the-art Technology

Comparative Representation

Other large-scale incineration plants don't operate satisfactorily over a longer periods of time.

They have the following inherent problems :

1 They cannot operate permanently under the regulations of the German Emission Limit required by law. The incineration process is subject to alterations through **shock effect** (overheating because of an unnaturally high burning temperature).

2 Through the **shock effect** and **overheating** of the waste in the incineration plant (sometimes up to 1.200 °C), the burning chambers (lining) as well as the flues for fumes will be destroyed by **oxidation** or blocked up, and thereby reduce the flow rate efficiency.

3 The construction of the plants is too complicated and expensive. Too many defects may occur.

4 No plant that we know of produces disintegrating ash in the output. The ash is always mixed with slag. From this evidence we conclude that the incineration process is imperfect. Therefore, the occurrence of so-called **"accidents"** is frequent.

- A company in Furth has constructed a large-scale incineration plant. This plant has to be pulled down now because of functional instability (**explosion hazard!**).
- Construction expenses for the plant had been estimated at Euro 150 mio . In the end real costs are believed to have been Euro 450 mio. About 100 engineers have been involved in the development of this technology.

- In Karlsruhe a newly built incineration plant seeks for official authorization (newspaper report).

The consequence is:

Stoppages for repairs are costly through high expenditure and lost production.

It is not our intent to belittle the achievements of our competitors but we believe that our technological advance in incineration technology has left them all behind. We draw your attention once more to our functional description. This explains why the reliable functioning of the ,,Bleickert" system offers a hitherto unreachable degree of efficiency.
We recommend the installation of plants at different locations in your town, (municipality). Whilst generating electricity, waste heat from the incineration process can be efficiently used to heat buildings of various types.

Further, high freight charges arising from the transport and disposal of waste will be reduced.

„Metallurgical information“ for the layman

Natural, ecologically neutral incineration can only be performed:

1 if the fuel is heated up **slowly** to smouldering temperature (“No shock effect”)

  and

2 that the fuel always has a **sufficient supply of air** (oxygen) so that smouldering can proceed in a natural way.

Dioxines and **furanes**. will be released if metallic components contained in the fuel – which is usually the case – are heated to temperatures exceeding 1200 °C,

Why?

Through the natural process of gasification which takes place when metals such as zinc, aluminium and magnesium alloys, etc. are heated up to and beyond boiling point such metals are completely eliminated, but simultaneously **highly poisonous gases (dioxins and furanes) are released.** At the same time deposits of corundum (crystallized alumina) precipitate on the lining of the flues for fumes. The exhaust channels are then reduced in diameter causing a progressive inefficiency

The consequence :

1 The plant has to be stopped and relined.
2 Constantly high repair costs.

The boiling point of water is 100 °C, then water transforms into steam.
The boiling point of zinc is 907 °C.
The boiling point of magnesium is 1.100 °C

The transformation to a gaseous state begins when metals, also common aluminium-magnesium alloys reach these temperatures. All directly fired incineration plants exceed these temperatures and therefore produce dioxin-contaminated dust. This represents a serious potential hazard for the environment.

It is a fact that liquid gold is the most toxic and most aggressive metal of all. Next in line follow aluminium, magnesium and zinc, which are always found in **residual waste**. Very poisonous and aggressive gases are released during the incineration process.

In accordance with nature's laws, we have developed a low temperature, smouldering carbonisation plant.

The accidental release of toxic residues cannot occur when using our new low temperature carbonisation technology.

Why?

1 Because the laws of biochemistry have been respected.

2 Low operating temperatures make fireproof linings unnecessary.

3 Highly refractory and corrosion-resistant steel is used for the burning chamber and for the conveyor belt.

4 As all areas of the burning chamber have a temperature between 800 °C and 850 °C, toxic exhaust gases will be destroyed within 4-5 seconds.

5 Residues and incrustations (slag) cannot form because of the guaranteed low temperature carbonisation mix with air and this means that the metals will never be overheated.

6 The insulation of the plant consists of common materials.