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(54) **A METHOD AND A FEEDING APPARATUS FOR CONTROLLING MIXING CONDITIONS IN A COMBUSTION OR GASIFICATION PLANT**

ZUFUHRVERFAHREN UND VORRICHTUNG ZUR REGELUNG DES MISCHUNGSZUSTANDES IN EINER VERBRENNUNGS- ODER VERGASUNGSANLAGE

PROCEDE ET DISPOSITIF D'ALIMENTATION SERVANT A REGULER DES CONDITIONS DE MELANGE DANS UNE INSTALLATION DE COMBUSTION OU DE GAZEIFICATION

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WO-A-91/00134 **WO-A-93/25850**
DE-C- 509 959 **FI-B- 87 014**
US-A- 4 883 003

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Description

Field of Invention

[0001] The present invention concerns a method of the kind stated in Claim 1.

[0002] The invention also concerns a feeding apparatus for implementing the method.

[0003] With different types of actual combustion and gasification processes there exists an increasing demand for quality and quantity gas analysis. Nitrogen oxides are at present the most exposed flue gas components, especially when considering tariff which has been introduced in Sweden for plants larger than 10 MW and with an annual energy production greater than 50 GWh.

[0004] These effect and energy limits, respectively, will most probably be reduced while at the same time greater demands will be made on the measurement of other types of flue gas components, i.e. CO and N₂O (laughing-gas).

[0005] The large majority of existing combustion systems are so designed that a minimum quantity of all unwanted flue gas components is very difficult to attain simultaneously. In other words "compromise agreements" e.g. high CO-concentrations - low NO-concentrations are unavoidable in these systems.

[0006] The fuel composition often varies from one operation condition to another, particularly with regard to different types of waste fuels and also wood fuels.

[0007] Examples of ash and/or slag enriched fuels comprise wood fuels, straw, waste such as industrial, municipal, hazardous and chemical waste and also hard coal, lignite, peat, lime sludge and black liquor. Also crematories and cement kilns are included in this category of combustion/gasification systems.

[0008] "Ash" is a term which designates an inorganic and unburnable substance which is originally within the fuel.

[0009] "Slag" is a term which designates "additives" of inorganic and unburnable substances, such as metals, ceramics, glass, stone etcetera. "Ash" is often considered contained within the term "slag". Examples of not ash and/or slag enriched fuels are oil, natural gas, LPG and certain biofuels.

[0010] Fuel price is another important parameter for optimization of flue gas or gas parameters. Sulphur content and to a certain degree also nitrogen content in the fuel are directly proportional to the emission level ahead of a flue gas cleaning system. This of course has the consequence that the fuel price becomes higher when i.e. the nitrogen content in the fuel is lower. Of course also the economical result is influenced by the market price and this will sometimes change quickly.

[0011] Trade in emission rights according to so called bubble models are systems which are expected to have a break-through on the market in the future.

[0012] The above parameters show a future need of flexible combustion/gasification systems which can be

quickly adjusted to attain an optimal economical operation point on each occasion.

[0013] When using an optimization of this kind the perforated tubes in the combustion or gasification chamber are fed by a fluid comprising a gas or a liquid or possible solid particles. Examples of gas are air, oxygen, oxygen-enriched air, flue gas, inert gas (CO₂, N₂ etc), fuel for reburning (LPG, natural gas, ethanol, etc) NO_x reducing substances (NH₃, urea etc) and steam with an optimal flow, pressure and temperature. Examples of liquids are water, NH₃, urea, ethanol and other organic solution agents, etc.

[0014] Examples of solid particles are powder from biofuel including peat, coal and waste (plastic etc). These can be used as a reburning fuel.

[0015] Actual oxidizing agents, e.g. air, shall oxidize unburnt gases, e.g. CO, while reducing agents, e.g. NH₃ or for example LPG, shall reduce for example NO at different occasions in a desired optimal degree.

[0016] The tube or the tubes is/are suitably positioned in the combustion/gasification plant to present optimal conditions.

[0017] In for example a grate fired boiler with "over combustion", where the air beneath the fuel makes the flue gas move upwards, the tube or tubes can be placed over the grate in connection with the first draught of the boiler. For a combustion process with so called "under combustion" the reverse will apply.

[0018] In for example a fluidized bed with variable pressure the tube or tubes can be positioned in the combustion chamber, for instance above the bed in a bubbling bed.

Background Art

[0019] Today combustion/gasification of fuels takes place in a variety of different apparatus and plants in the form of kilns, furnaces etc with burners, grates, fluidized and/or bubbling beds etc.

[0020] One characteristic of kilns and furnaces such as these is that the flue gas emissions of CO, C_xH_y (hydrocarbons), NO_x, SO₂, N₂O, dioxine, PAH among others often are high due to poor combustion optimized plants. Some plants are also equipped with different types of flue gas cleaning systems, e.g. electrostatic precipitators or textile filters, SCR, scrubbers etcetera which are positioned after the combustion/gasification apparatus, which reduces the emission level in the subsequent stack/gas channel.

[0021] As an example of well known apparatuses to minimize emission levels EP-0 286 077 A2 (Müllverbrennungsanlage Wuppertal) describes a method of burning waste in which the flue gas is drawn out of the furnace and made to make a swirling movement by the addition of secondary air. The secondary air is fed through nozzles in such a way that the flow of flue gases is slowed down in a uniform temperature zone in the furnace and then allowed to remain there for approximately

8 seconds.

[0022] SE,C,139 072 (Larsson) describes a furnace, especially in a heating boiler or for connection to similar boilers' fire rooms in which intakes for the primary air are located on the side of the furnace, said intakes leading to one or several fixed tubes along the furnace, which in their turn contain a rotatable tube which regulates the outlet area for air by twisting the tube about its axis and/or axial displacement of the tube.

[0023] DE,C,107 755 (Lindemann) describes an apparatus for supplying air over a layer of fuel, which apparatus has a tube grid with a net-like arrangement of tubes, one over the other and with openings pointing to the side so that several air jets cross one another.

[0024] SE,C,115 046 (Sinding) describes an apparatus for preheating and adjusting the supply of secondary air to furnaces, which apparatus is furnished with concentric tubes positioned close together and extending into a preheating chamber to supply air to the chamber and are mutually rotatable so that its openings can be set at an angle to one another for the adjustment of the area of passage and thereby the air supply.

[0025] Feeding apparatuses in the shape of a perforated tube which injects into a combustion chamber are known, for example through WO-A1-91/00134 (Fuel Tech Europe), US-A-4 883 003 (Hoskinson) and SE,C, 139 563 (Svenska Maskinverken).

[0026] Further examples of prior art are to be found in SE,C,45 212 (Reck) and SE,B,458 147 (Lantmännen ODAL).

[0027] FI-B-87014 (Tampella) describes an apparatus for feeding granular lime with the aid of a gas stream to a fire-place. To feed the lime there is used a nozzle mounted at the end of a tubular arm to which a means for displacing the nozzle is coupled. The lime is fed to a place in the fire-place having a suitable position in the flue gas stream with regard to temperature. The preamble of the attached Claim 1 concerns a method of this kind which is deemed to constitute the closest prior art.

[0028] None of the above-mentioned methods and plants permits a careful optimization of the combustion process in the sense that a reliable adaption or adjustment to the variations of the process in the combustion or gasification chamber can be obtained.

[0029] Neither does any of the known systems permit an influence or effect on the mixing condition or mixing ratio between the combustion gases and/or between these and the fluid or fluids supplied or fed to the combustion chamber.

Objects of Invention

[0030] On the basis thereof one object of the invention is to minimize inherent disturbances in known methods of combustion and gasification including associated plants, thereby increasing the efficiency and reducing the emission levels in the combustion and gasification processes, respectively.

[0031] Another object is to increase the flexibility of the method and the plant in order to, if so required, make possible a quick and simple adjustment from one desired emission level (e.g. high CO- low NO-concentration) to another (e.g. low CO- high NO-concentration) depending on the economical output.

[0032] Yet another object is to achieve a method of minimizing disturbances and a feeding apparatus, respectively, which simplifies and cheapens cleaning of the tubes, thereby achieving an increased yield of the combustion and gasification processes, respectively.

[0033] Another object is to accomplish a method and a plant, respectively, which renders it possible to continuously or at least almost continuously operate the combustion process, i.e. without having it to be stopped for soot removal or cleaning of the tubes for example feeding secondary air, and being contained in the combustion or gasification chamber, respectively.

Summary of the Invention

[0034] These and other objects are accomplished by a method according to this invention which is of the above mentioned type and the main features of which are stated in Claim 1.

[0035] The stated displacement of at least one of the tubes results in that the mixing of the supplied fluid in the combustion gases will be more effective which makes a more efficient combustion and an optimization of current flue gas or gas parameters possible. With the invention it is, thus, possible in every combustion process to choose the best possible mixing condition or ratio.

[0036] The same or different fluids, e.g. of the kind mentioned above, can be supplied via the tubes which mutually coact in the way stated. For instance a reburning fuel can be supplied which improves the prerequisites for controlling the temperature profile in the combustion chamber.

[0037] To improve mixing it is preferred that the pipes to change the speed, flowing picture and direction of the fluid in addition are rotated about their longitudinal axis.

[0038] Then it is preferred that the pipes are displaced and/or rotated at impulse from transmitters positioned outside of the chamber and which sense the state of combustion.

[0039] Different types of transmitters may be used for the said purpose, e.g. transmitters for temperature, pressure, flow, present flue gas components etcetera. Also optical transmitters may be used for the purpose.

[0040] Signals generated by the transmitters can in addition be used to regulate the supply of fluid and solid particles, respectively, to the tubes, said supply possibly being performed by jerks or intermittently. The rotation of the perforated tubes can ascertain that the supply, if so desired, takes place at predetermined, varying angles within the combustion chamber.

[0041] In practice it is preferred that the pipes are displaced by holding and drive means positioned outside

of the chamber and preferably engaging their ends so that the pipes are completely withdrawable from the chamber.

[0042] Then it will be possible to combine the withdrawal movement with a cleaning operation, preferably so that mechanical brushes or other corresponding means engage the outside of the tubes so that they are cleaned from soot and other adhering particles in connection with the withdrawal movement.

[0043] According to one embodiment the tubes are withdrawn to an inactive position outside of the chamber at impulse from one or several different transmitters activating the withdrawal mechanism at for instance power failure or failure of cooling fluid supply to the plant.

[0044] Further, the pipes are preferably mounted replaceable at the holder and drive means positioned outside of the chamber. Then a very simple adaption to different operation conditions for the plant will be possible which, thus, can be accomplished by a simple replacement of one or more of the supply tubes. It is realized that the arrangement also facilitates preparation and service of the plant which is also made more cheap.

[0045] In general use the inventive method can be put into practice on existing as well as new combustion/gasification plants. New boilers and furnaces, respectively, can be manufactured with a smaller furnace volume due to a more effective mixing of the gases, which reduces costs. The best operation possible with optimal emission level at every separate occasion can more simply be obtained than with systems known heretofore.

[0046] Further, a cooling fluid can be added to reduce the temperature of the jacket of the tube to make slag and other dust deposition of such a kind that the cleaning operation is facilitated or the number of such operations minimized.

[0047] Such a cooling fluid can possibly be supplied separately, possibly intermittently and preferably in connection with withdrawal of the pipes. It is preferably supplied via a ring column around each tube. Due to the cooling, slag and other dust deposition on the tubes become less glass-like or sticky whereby the cleaning operation will be simplified and speeded up.

[0048] The invention also refers to a feeding apparatus for controlling the mixing condition or ratio in a combustion or gasification plant by means of the supplied fluid for optimizing flue gas or gas parameters, the essential features of said feeding apparatus being stated in Claim 8.

[0049] Advantageous embodiments of the feeding apparatus are defined in the following Claims.

[0050] Further characteristics and advantages, respectively, of the method and the feeding apparatus according to the invention will be given in the following description of some preferred embodiments of the invention. The description refers to the attached drawings.

Short Description of the Drawing Figures

[0051] Fig. 1 is a partly cut-away perspective view of a combustion plant for solid fuels having a feeding apparatus in accordance with the invention.

[0052] Fig. 2 is a side view showing a feeding means according to the invention comprising a perforated tube and means for displacing, rotation, controlling and cleaning the tube positioned outside of the combustion chamber. The figure shows the feeding means in inserted position in the combustion chamber.

[0053] Fig. 3 is a side view corresponding to Fig. 2 with the feeding means completely withdrawn from the combustion chamber.

[0054] Fig. 4 is a sectional view along the line IV-IV in Fig. 3.

[0055] Fig. 5 is a sectional horizontal view through the combustion chamber and shows three coacting feeding means at one level thereof for increasing the action of intermixing the fluid in the combustion gases.

[0056] Fig. 6 is a schematic vertical sectional view through an alternative embodiment in which a number of different feeding devices for fluid are received in a "revolver-holder" positioned outside of the combustion chamber for optional, alternative insertion into the combustion chamber.

Description of preferred embodiments

[0057] In fig. 1 the digit 1 denotes a combustion plant comprising a furnace 2 for combustion of solid fuels with a grate 3 and an upper combustion chamber 4.

[0058] The fuel can be fed intermittently or continuously and combustion air in the form of primary air is blown from below and up through the grate 3.

[0059] Secondary air is fed through a number of feeding apparatuses according to the present invention entering the combustion chamber 4 through special ports in the furnace wall 5 and further described below. The secondary air is supplied via said feeding apparatuses in order to complete the combustion of formed reaction products in the shape of gas and solid particles.

[0060] Particles in the flue gas above the grate 3 consist of ash, slag and/or unburnt fuel. These can together form bigger particles, so called agglomerates, or be reduced to smaller, more or less clean ash particles. Slag enriched fuels often offer higher concentrations of dust and slag in the flue gas.

[0061] Some of the particles form deposits on the inside of the combustion chamber which is often equipped with tubes 6 with an external insulation. Dust particles also deposit on the tubes 13 where the holes 13a for feeding secondary air are entirely or partially blocked thereby affecting the feed of secondary air, alternatively coating will occur directly on the mantle of the tube.

[0062] This causes an incomplete combustion which is not optimal with further inherent problems of the mentioned type.

[0063] Poor mixing conditions in the gas chamber of this kind render the combustion plant a lower combustion efficiency. This is especially evident when steps are taken to reduce NO_x when concentrations of unburnt gases/particles are higher than before the adjustment. Throttling down air supply and/or flow gas recirculation reduces the temperature in the combustion zone and, further, creates reducing conditions which lead to lower NO_x concentrations and higher concentrations of unburnt gases and particles. The demand for efficient admixing of secondary air becomes even more important which in turn leads to a demand of frequent cleaning or soot removal of the secondary air tubes.

[0064] In the plant shown in fig. 1 the feeding tubes 13 for a fluid, e.g. secondary air, are arranged forming a curtain system comprising a number of tubes 13, some of which are parallel, at one or more levels in the combustion chamber 4. The tubes 13 are equipped with perforations 13a alongside the mantle surface of the entire tubes. The holes can be equally distributed and a row of holes can be positioned on each side of the tubes.

[0065] The through-flow area of the holes 13a determines the flow of the fluid at a given pressure. When the speed profile over the actual cross section in a combustion or gasification plant, where the apparatus shall be installed, often varies, a compensation must be made when supplying the fluids.

[0066] A fluid, e.g. secondary air at high pressure, is supplied via a fan 10 connected to a collecting box 11, to which flexible tubes 12 are connected, which with quick-couplings are connected to the end flanges 13b of the tubes 13. The opposite ends of the tubes can be plugged or provided with outlet openings (not shown).

[0067] Depending on the actual combustion process the tubes 13 are inserted and withdrawn from the chamber 4 in an axial direction at longer or shorter periods of time. In such a way the emission level of the combustion process can be maintained optimal.

[0068] Figs 2 and 3 illustrate the mechanisms that have been used for displacing the tubes 13 into and out from, respectively, the combustion chamber 4 and for their rotation, guiding and cleaning.

[0069] The tubes 13 are received in a casing 14 supporting some of the stated mechanisms. To displace a tube an electric motor 16 is used the output axes of which drives a disc 17. An endless belt or chain 20 is led around the disc and also around rollers 18, 19. To the belt 20 is secured a holder in the shape of a trolley 25 engaging the end of the tube 13 so as to form a bed 25b to make the tube at the same time rotatable around its longitudinal axis. The holder 25 is displaceably guided via a guide 26.

[0070] Fig. 2 shows the tube 13 in inserted position in the combustion chamber whereas fig. 3 shows the tube completely withdrawn from the chamber. The holder 25 is then so adapted that simple replacement of tubes 13 can take part in the withdrawn position.

[0071] An electric motor 27 drives a belt 28 which ex-

tends over a number of rollers 29 engaging the periphery of the tubes 13 to turn it around.

[0072] As appears from fig. 4 the holder 25 is provided with forked legs 25a supporting the bed 25b in which the tube 13 rests. The holder or the trolley 25 is displaceably guided on the guide 26.

[0073] In its forward end the casing 14 is connected to a housing 30 which receives the opposite guide rollers 15 for the tube and also an arrangement of steel brushes 21 between which the tubes pass when being withdrawn and thereafter inserted. These brushes 21 perform an efficient cleaning of the tubes, so that they are released from dust and slag depositions.

[0074] It appears that the shown arrangement considerably simplifies the cleaning of the tubes and that the tubes can be withdrawn one by one or a few at the same time thereby allowing the combustion process to continue, due to the fact that secondary air is fed via remaining tubes in the combustion chamber.

[0075] Alternatively or additionally an automatic shaking device (striking tool or similar, not shown) or acoustic sootblower (infrasound or ultrasonics) can be connected for continuous or intermittent slag removal.

[0076] Fig. 5 shows how the flow picture of a fluid supplied via adjacent tubes 13 can be changed, in part through displacement of one or more tubes to different positions in the combustion chamber 4 and in part through turning or rotation of one or more of the tubes. Further actuation of such a kind can also be obtained by changing the pressure, speed and/or flow of the supplied fluid. As appears from fig. 5 different intermixing conditions can be obtained as a result of that the flow of fluid from adjacent pipes can amplify or intensify each other, more or less extinct each other or present an action therebetween.

[0077] A reburning-fuel, such as ethanol, can be supplied via one, two or all tubes 13, whereby the temperature profile, i.e. the temperature in different zones of the chamber 4, can be controlled to give an optimal combustion process.

[0078] Fig. 6 shows a "revolver arrangement" in which casing 14 is replaced by a casing 14' which is rotatable on a shaft 40 and which receives a number of fluid supply tubes having different spacing and positions for perforations 13a thereon.

[0079] To cope with different combustion conditions in chamber 4 casing 14' is rotated so that the fluid supply tube 13 which is most suitable in the actual situation is inserted into the combustion chamber 4. Attached to the ends of the tubes 13 are bellows-shaped hoses 12' for the fluid supply to each tube.

[0080] In a plant used in practice the tubes 13 may have a length between 1 à 2 and 5 m and a diameter of 120-200 mm. The diameter of the perforations 13a may vary from 1 à 2 mm up to 2 à 4 cm and the distance between the perforations can amount to between 10 and 40 cm.

[0081] The regulation of fluid to each tube 13 can fur-

ther be made via output signals from transmitters for different gas parameters, gas concentrations, temperatures, pressure, flow etc (not shown). Said transmitters may also be used, e.g. via a computer, to decide when the cleaning or soot removal operations are to be initiated. As mentioned above there is then no need to stop the combustion process. In fig. 1 digit 42 denotes a sensor of this kind. 43, 44 denote presence of an optical sensor where 44 is a lens. At for instance power failure or failure on cooling fluid supply to the plant one or more transmitters are sensing this and give an impulse for withdrawal of the tubes to an inactive position outside of the chamber. This is a very important safety measure within the scope of the inventive concept.

[0082] With an application according to the invention in a combustion chamber a better combustion result will be achieved with lower concentrations of NO_x , CO, N_2O , hydrocarbons and unburnt particles as well as dioxine.

[0083] A plant with a feeding apparatus according to the invention is simple to install and therefore particularly suitable when converting furnaces, combustion and gasification plants which are operating or already existing on the market.

[0084] The tubes need not be oriented horizontally in the combustion chamber. One or more of the tubes may, thus, be inclined or extend vertically.

Claims

1. A method of controlling mixing conditions in a combustion or gasification plant by means of a fluid supplied via a feeding apparatus for optimizing flue gas or gas parameters, said plant having a combustion or gasification chamber (4) housing two or more perforated tubes through which the fluid is supplied to the chamber to maintain a combustion or gasification process therein, in which
at least one of the two or more perforated tubes (13) is displaced at longer or shorter intervals of time along its axis in the chamber (4) for predetermined, controlled influence on the intermixing of the fluid in the combustion gases by mutual cooperation between the tubes.
2. A method according to Claim 1, **characterized** by displacing the tubes by means of an outside the chamber (4) preferably at their ends engaging holder and drive means (25; 16, 20), so that the tubes are completely withdrawable from the chamber.
3. A method according to Claim 2, **characterized** by withdrawing the tubes (13) to an inactive position outside of the chamber at impulse from one or more transmitters activating the withdrawing mechanism at for instance power failure or failure on cooling fluid supply to the plant.

4. A method according to any of Claims 1-3, **characterized** by additionally turning the pipes around their longitudinal axis to change the pressure, flow structure and/or direction.

5. A method according to any of Claims 1-4, **characterized** by displacing and/or turning the pipes at impulse from one or more transmitters (42, 43, 44) positioned outside of the chamber and sensing the state of combustion in the chamber.

6. A method according to Claim 2, **characterized** by arranging the tubes interchangeable on the holder and drive means.

7. A method according to any of Claims 2-6, **characterized** by cleaning the tubes during their withdrawal.

8. A feeding means in a combustion or gasification plant for controlling mixing conditions by means of supplied fluid for optimizing flue gas or gas parameters, said plant comprising a combustion or gasification chamber (4) housing two or more perforated tubes through which the fluid is supplied to the chamber to maintain a combustion or gasification process therein,
in which

at least one of the tubes is displaceable along its axis (13) within the chamber (4);
holder and drive means (16, 20; 26; 15) engage one or more of the ends of the tubes (13) outside of the chamber (4) for predetermined, controlled displacement of the tubes for influencing the intermixing of the fluid in the combustion gases by mutual cooperation between the tubes; and
a means (e.g. 42-44) guides the displacement movements in dependence of time and/or in the chamber sensed state of combustion.

9. A feeding means according to Claim 8, **characterized** by a means (27, 28, 29; 21, 38, 39) for rotation and/or cleaning of the tubes.

10. A feeding means according to Claims 8 or 9, **characterized** in that the holder and drive means are adapted to permit a complete withdrawal of the pipes (13) from the chamber and displacement of the tubes.

Patentansprüche

1. Verfahren zur Regelung des Mischungszustandes in einer Verbrennungs- oder Vergasungsanlage, bei dem zur Optimierung des Gasflusses oder der

Gasparameter ein Fluid via eine Zuführvorrichtung zugeführt wird, wobei diese Anlage eine Verbrennungs- oder eine Vergasungskammer (4) hat, in welcher zwei oder mehr perforierte Röhren aufgenommen sind, durch welche das Fluid in die Kammer gelangt, um darin einen Verbrennungs- oder Vergasungsprozess aufrechtzuerhalten, bei welchem wenigstens eine der beiden oder der mehreren perforierten Röhren (13) in der Kammer (4) in längeren oder kürzeren Zeitintervallen entlang ihrer Achse verschoben werden, dies für einen vorbestimmten, gesteuerten Einfluss auf die Vermischung des Fluides in den Verbrennungsgasen durch eine gemeinsame Kooperation zwischen den Röhren.

2. Verfahren nach Anspruch 1, **gekennzeichnet** durch das Verschieben der Röhren durch Mittel auf der Aussenseite der Kammer (4), vorzugsweise durch an ihren Enden greifende Halter und Antriebsmittel (25; 16, 20), so dass die Röhren komplett aus der Kammer zurückgezogen werden können.

3. Verfahren nach Anspruch 2, **gekennzeichnet** durch das Zurückziehen der Röhren (13) in eine inaktive Position ausserhalb der Kammer, durch einen Impuls von einem oder mehreren Übertragern, welche den Zurückziehmechanismus aktivieren, wie zum Beispiel bei einem Netzausfall oder bei einem Ausfall der Kühlungsfluidversorgung zur Anlage.

4. Verfahren nach einem der Ansprüche 1 bis 3, **gekennzeichnet** durch zusätzliche Drehbarkeit der Röhren um ihre länglichen Achsen zwecks Änderung des Druckes, der Fluss-Struktur und/oder der Richtung.

5. Verfahren nach einem der Ansprüche 1 bis 4, **gekennzeichnet** durch Verschieben und/oder Drehen der Röhren durch Impulse von einem oder mehreren Übertragern (42, 43, 44), welche ausserhalb der Kammer angeordnet sind und den Zustand der Verbrennung in der Kammer messen.

6. Verfahren nach Anspruch 2, **gekennzeichnet** durch die auswechselbare Anordnung der Röhren am Halter und am Antriebsmittel.

7. Verfahren nach einem der Ansprüche 2 bis 6, **gekennzeichnet** durch eine Reinigung der Röhren, während sie zurückgezogen werden.

8. Zuführeinrichtung in einer Verbrennungs- oder Vergasungsanlage zur Regulierung der Mischungszustände, bei dem zur Optimierung des Gasflusses oder der Gasparameter ein Fluid zugeführt wird,

wobei diese Anlage eine Verbrennungs- oder eine Vergasungskammer (4) hat, in welcher zwei oder mehr perforierte Röhren aufgenommen sind, durch welche das Fluid in die Kammer gelangt, um darin einen Verbrennungsoder Vergasungsprozess aufrechtzuerhalten,

bei welchem wenigstens eine der Röhren (13) in der Kammer (4) entlang ihrer Achse verschiebbar ist, Halter und Antriebsmittel (16, 20; 26; 15) eines oder mehrere der Enden der Röhren (13) ausserhalb der Kammer (4) halten für eine vorbestimmte, gesteuerte Verschiebung der Röhren zur Beeinflussung der Vermischung des Fluides im Verbrennungsgas durch eine gemeinsame Kooperation zwischen den Röhren; und

ein Mittel (z.B. 42 - 44), welches die Verschiebewebewegungen in Abhängigkeit der Zeit und/oder dem in der Kammer festgestellten Zustand der Verbrennung ausführt.

9. Zuführeinrichtung nach Anspruch 8, **gekennzeichnet** durch ein Mittel (27, 28, 29; 21, 38, 39) für eine Rotation und/oder eine Reinigung der Röhren.

10. Zuführeinrichtung nach Anspruch 8 oder 9, **gekennzeichnet** durch den Halter und Antriebsmittel (25; 16, 20), welche derart ausgestaltet sind, dass mit ihnen ermöglicht ist, dass die Röhren (13) komplett aus der Kammer zurückgezogen und verschoben werden können.

Revendications

1. Méthode de contrôle des conditions de mélange dans une installation de combustion ou de gazéification au moyen d'un fluide fourni par l'intermédiaire d'un appareil d'alimentation pour l'optimisation des paramètres de gaz brûlés ou de gaz, ladite installation ayant une chambre de combustion ou de gazéification (4), logeant deux tubes perforés ou plus à travers lesquels le fluide est fourni à la chambre pour y maintenir un processus de combustion ou de gazéification, méthode dans laquelle

au moins un des deux tubes perforés (13) ou plus est déplacé à des intervalles de temps plus ou moins longs, le long de l'axe de la chambre (4), en vue d'une influence contrôlée prédéterminée sur le mélange du fluide dans les gaz de combustion par coopération mutuelle des tubes.

2. Méthode selon la revendication 1, caractérisée par le déplacement des tubes au moyen de moyens de support et d'entraînement (25; 16, 20) s'accouplant à l'extérieur de la chambre (4), de préférence à leurs extrémités, de sorte que les tubes puissent être

complètement retirés de la chambre.

3. Méthode selon la revendication 2, caractérisée par le retrait des tubes (13) jusqu'à une position inactive à l'extérieur de la chambre à la suite d'une impulsion provenant d'un ou de plusieurs transmetteurs activant le mécanisme de retrait en cas, par exemple, de coupure de courant ou de défaillance de l'alimentation en fluide de refroidissement à l'installation. 10
4. Méthode selon l'une quelconque des revendications 1-3, caractérisée par une rotation en plus des conduits autour de leur axe longitudinal pour changer la pression, la structure et/ou la direction de l'écoulement. 15
5. Méthode selon l'une quelconque des revendications 1-4, caractérisée par le déplacement et/ou la rotation des conduits à la suite d'une impulsion provenant d'un ou de plusieurs transmetteurs (42, 43, 44) placés à l'extérieur de la chambre et détectant l'état de combustion dans la chambre. 20
6. Méthode selon la revendication 2, caractérisée par l'agencement des tubes d'une manière interchangeable sur les moyens de support et d'entraînement. 25
7. Méthode selon l'une quelconque des revendications 2-6, caractérisée par le nettoyage des tubes pendant leur retrait. 30
8. Moyen d'alimentation dans une installation de combustion ou de gazéification en vue du contrôle des conditions de mélange au moyen d'un fluide fourni en vue de l'optimisation des paramètres de gaz brûlés ou de gaz, ladite installation comprenant une chambre de combustion ou de gazéification (4) logeant deux tubes perforés ou plus à travers lesquels le fluide est fourni à la chambre pour y maintenir un processus de combustion ou de gazéification, dans lequel
 - au moins un des tubes (13) peut être déplacé le long de son axe (13) au sein de la chambre (4); 45
 - les moyens de support et d'entraînement (16, 20; 26; 15) engagent une ou plusieurs des extrémités des tubes (13) à l'extérieur de la chambre (4) en vue d'un déplacement contrôlé prédéterminé des tubes en vue d'influencer le mélange du fluide dans les gaz de combustion par coopération mutuelle des tubes; et 50
 - un moyen (par exemple 42-44) guide les mouvements de déplacement en fonction du temps et/ou dans l'état de combustion perçu dans la chambre. 55

9. Moyen d'alimentation selon la revendication 8, caractérisé par un moyen (27, 28, 29; 21, 38, 39) pour la rotation et/ou le nettoyage des tubes.

10. Moyen d'alimentation selon les revendications 8 ou 9, caractérisé en ce que les moyens de support et d'entraînement sont adaptés de manière à permettre un retrait complet des conduits (13) de la chambre et un déplacement des tubes.

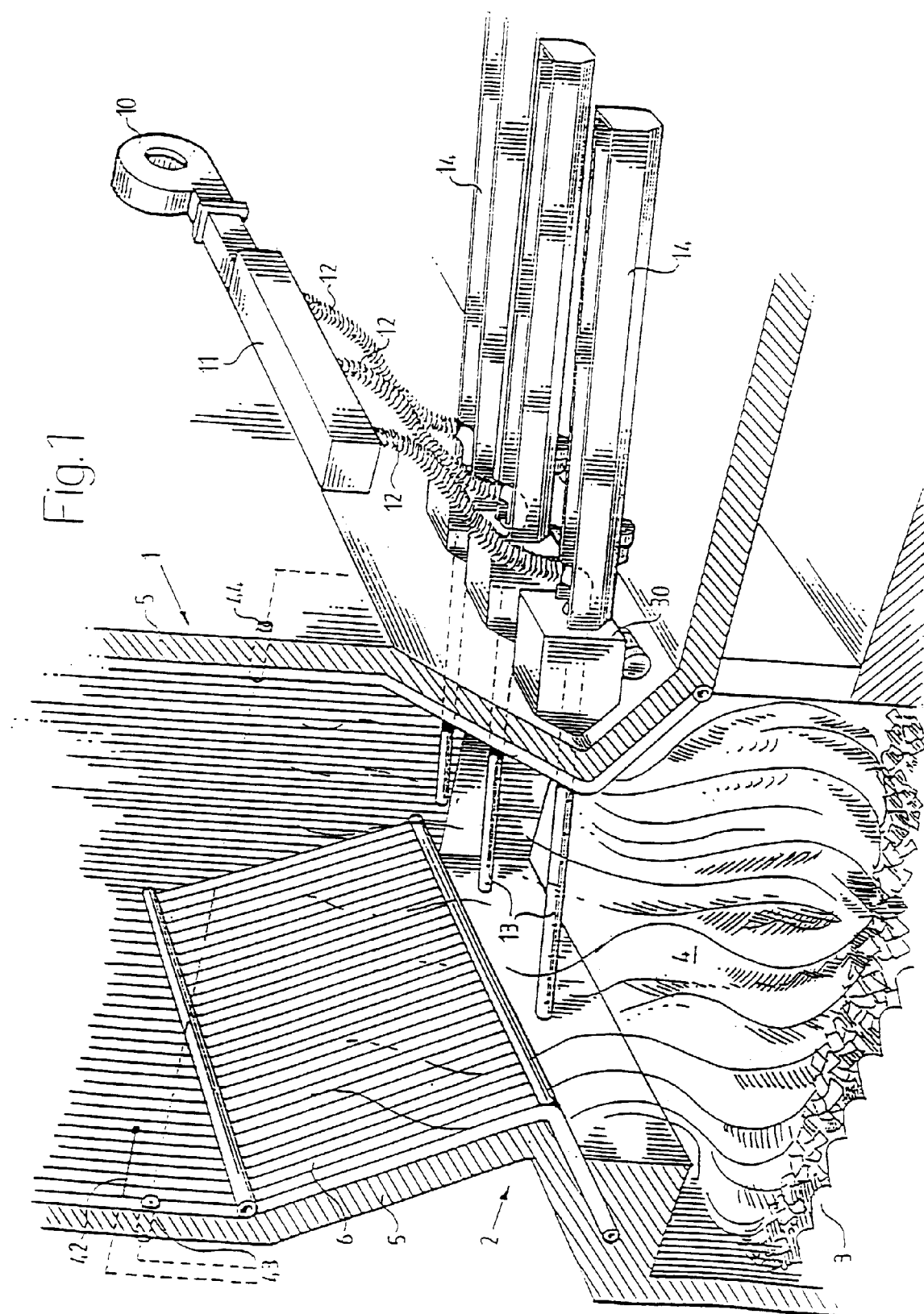


Fig. 2

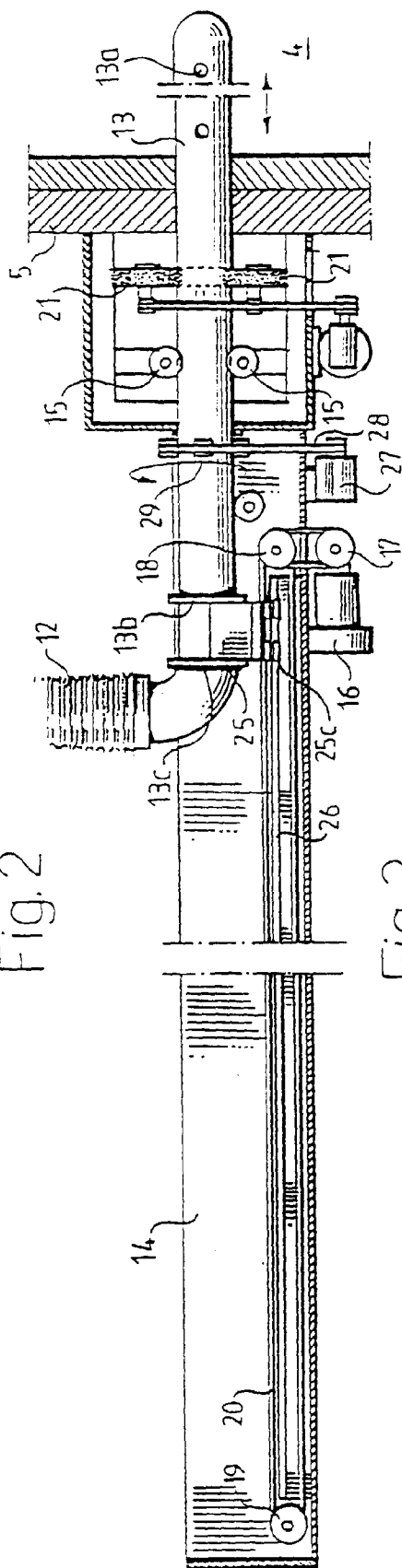


Fig. 3

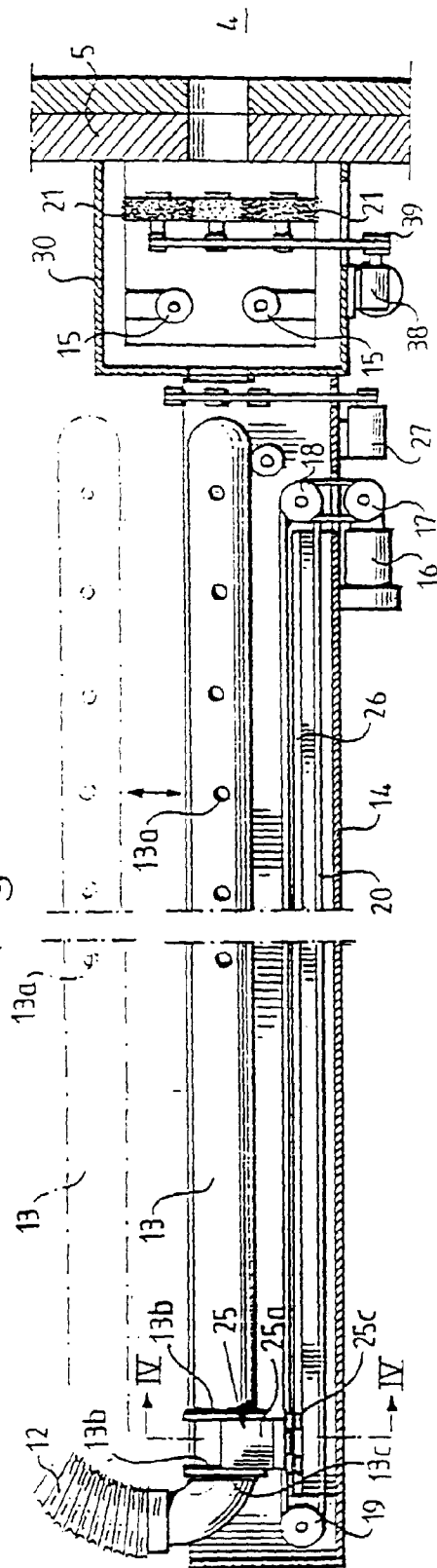


Fig.5

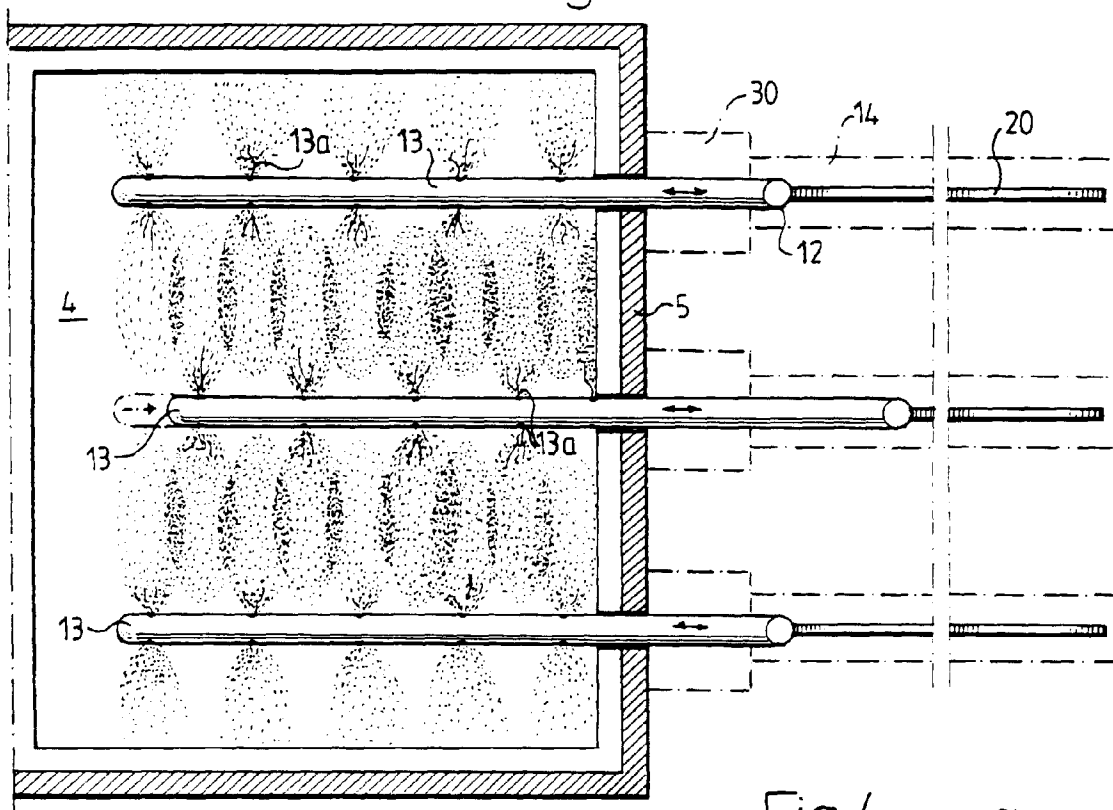


Fig.4

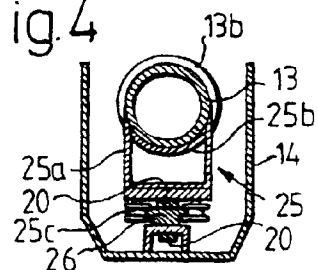


Fig.6

