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The invention relates to a method for gasifying fuel in the fuel channel of a gasifying generator, the fuel channel having a combustion area for fuel combustion and one or more oxidation pipes for supplying oxidation gas to the combustion area. The invention also relates to a gasifying generator used in the method.

The fuel is supplied to the upper part of the gasifying generator, from which it flows by means of gravity through the pyrolysis, combustion and reduction areas. The heat required for gasification is obtained by burning fuel, whereby a pyrolysis area is formed between the combustion area and the fuel, in which the volatile materials are separated from the fuel. These volatile materials form the product gas of the gasifying generator together with the gases generated in the reduction area.

The oxidation pipes are movable inside the fuel channel. This adjustment possibility has been made for enabling the adaptation of the gasifying generator for different fuels. The location of the oxidation pipes is not changed during the combustion event. An attempt is made to control the combustion event by adjusting the amount of oxidation gas getting into the oxidation pipes. According to the specification, the advantage achieved by the possibility of moving the pipes is that the oxidation pipes can be installed at different heights in the fuel channel. Adjusting the temperature of the combustion event is cumbersome with the method described in the specification. In addition, oxidation pipes coming from above cause additional friction in the fuel flow, and the oxidation gas may form flow channels in the vicinity of the surface of the oxidation pipe.

In EP 1,148,295 A1, a gasification furnace is disclosed having a vertically movable furnace chamber along the axis of the furnace and adapted to blow off a combustion sustaining gas downward into the furnace.

In the gasifying generator disclosed in the patent specification FI 113781 B, the horizontal cross-section of the throat is adjusted by an adjusting cone moving in the vertical direction, the movements of which control the flow of the gas and thus control the operation of the generator. In patent specification FI 112798 B, there is disclosed a method having fixed feed connections of the oxidizing gas to different parts of the gasifying generator, and the use of water vapor to restrain the combustion. A similar solution has also been found in patent specification US 5226927, in which oxidizing gas is fed to the combustion area from apertures in the casing of the gasifying generator. Although these methods improve the gasification result, the combustion event itself and its temperature cannot be regulated accurately.

In GB 884,740, a gas producer is disclosed comprising a lance passing through the center of the reaction chamber for the supply of oxygen-containing air.

It is an objective of the invention to accomplish a method for gasifying fuel in a gasifying generator and a gasifying generator, by which the disadvantages and deficiencies related to the prior art can be substantially reduced. Especially the combustion temperature can be well controlled in the invention.

The method and equipment according to the invention are characterized in what is set forth in the independent claims. Some preferred embodiments of the invention are set forth in the dependent claims.

In the gasifying generator used in the method according to the invention there is a body, a fuel channel for fuel feed and the gasification processes, and one or more oxidation pipes for feeding the oxidation gas to the fuel channel. The oxidation gas discharge ends of the oxidation pipes are movable within the fuel channel in such a way that the point of oxidation can be moved in the gasification process.

The temperature of the combustion area is controlled by moving the oxidation pipes against the fuel stream or in the direction of the fuel stream. The oxidation pipes can be moved either separately or in groups. The number of oxidation pipes can be selected according to the size of the gasifying generator and the desired control accuracy of the combustion process. Each oxidation pipe can have its own combustion area, but they have a common fuel feed and lower combustion area.

The fuel channel of the gasifying generator has a narrowing, which restrains the free flow of the fuel. The combustion area is located at this narrowing. The temperature of the combustion area is measured by a thermometer. The thermometer is preferably connected to the first actuator, which controls the oxidation pipes and
especially their oxidation gas discharge ends within the fuel channel. The first actuator adjusts the location of the oxidation pipes on the basis of readings obtained from the thermometer according to predetermined instructions. This first actuator may be computer-controllable, automated in some other way or manually controllable. In the method, the temperature is given a desired set value, which is given to the first actuator or some device controlling it. If the measured temperature is higher than the set value of the temperature, the first actuator moves the oxidation gas discharge end of the oxidation pipes in the direction of the pyrolysis area, whereby the combustion area receives less oxidation gas, combustion slows down in the combustion area, and the temperature thus falls. Correspondingly, if the measured temperature is lower than the set value, the oxidation gas discharge end of the oxidation pipes is moved towards the combustion process, whereby the combustion in the combustion area accelerates and the temperature rises. It has been found experimentally that the best results with regard to the gasification processes and the product gas are obtained when a temperature exceeding 850°C is chosen as the set value of the temperature.

The cross-sectional area of the fuel channel can be changed by one or more movable adjuster(s) for adjusting the fuel flow and for determining the size of the combustion area. These adjusters are in compliance with the prior art as such. One possible way of implementing the adjusters is to place in the fuel channel two heat-resistant plates perpendicular to the main axis of the fuel channel, which move towards each other from the opposite sides of the fuel channel and thus reduce the cross-sectional area of the narrowing. In order to increase the cross-sectional area of the fuel channel, the plates are moved away from each other.

The thermometer measuring the temperature of the combustion area is connected to the second actuator, which changes the position of the movable actuators that adjust the cross-sectional area of the fuel channel. Then the second actuator controls the position of the adjusters on the basis of readings obtained from the thermometer in accordance with predetermined instructions. When the cross-sectional area is reduced, the amount of materials evaporated in the pyrolysis area is reduced and more carbon is burnt in the combustion area, in which case the temperature rises. When the cross-sectional area is increased, the temperature of the combustion area can be reduced, because the pyrolysis phase accelerates and more material to be heated gets to the combustion area. When the temperature of the combustion process rises too much, combustion can be restrained by this increasing of the cross-sectional area, in addition to by moving the oxidation pipe, and thus the temperature be lowered. In a corresponding way, when the temperature is too low, the combustion process can be accelerated by reducing the above mentioned cross-sectional area. This second actuator may be computer-controllable, automated in some other way or manually controllable. Adjusting the cross-sectional area thus also changes the size of the combustion area. This can be used for adjusting the power of the gasifying generator and for compensating for the properties of the fuel.

In the method according to the invention, by adjusting the location of the oxidation pipes in the fuel channel and the adjusters that change the cross-sectional area of the fuel channel either together or separately by the first and the second actuator, the combustion process of the gasifying generator can be controlled and its temperature caused to remain within the desired limits.

The invention also relates to equipment for applying the above described method. The equipment comprises a gasifying generator with a body, a fuel channel for fuel feed and the gasification processes, and one or more oxidation pipes, by which oxidation gas is fed to the combustion area. The oxidation pipes are movable within the fuel channel for feeding the oxidation gas to the desired point in the fuel channel.

In a preferred embodiment of the equipment according to the invention, the oxidation pipes are arranged to be adjusted separately or in one or more groups.

There is a narrowing in the fuel channel of the gasifying generator, with a thermometer for measuring the temperature of the combustion area. The thermometer is preferably connected to the first actuator, which has been programmed to adjust the location of the oxidation gas discharge end of the oxidation pipes within the fuel channel in accordance with the measurement results obtained from the thermometer.

The gasifying generator has an oxidation pipe essentially parallel with the longitudinal axis of the fuel channel, to which the oxidation gas has been directed and from the discharge end of which the oxidation gas flows out to the desired area. The fuel channel is vertical and fuel is arranged to be fed to the upper part of the fuel channel. The pipe moving mechanism is a solution suitable for the purpose, which may be, for example, a hydraulic or motorized solution. The movement of the end of the pipe takes place between the pyrolysis and the combustion areas. The flow of the gas is accomplished either by over- or underpressure.

The discharge end of the oxidation pipe has been formed in such a way that the oxidizer gas coming from it remains in the desired place and does not disturb the movements of the fuel flow. In a preferred embodiment of the invention this has been done by adding to the discharge end of the oxidation pipe an oxidizer gas controller, which guides the gas to the near environment of the oxidation pipe to an area in which the oxidizer gas is wanted to have an effect. There are also other possible solutions for shaping the end of the pipe. For example, the pipe can be closed and have holes made in it, which direct the discharge of the oxidizer gas in the desired direction. In these embodiments, the oxidation pipes can have rotatable discharge ends for guiding the oxidizer gas.

The place of oxidation can be controlled in many
different ways. For example, there can be a number of pipes like the one described above, and they can all be adjusted separately or in groups. The pipe or pipes may come from the sides of the body of the gasifying generator, for example, and can be directed threerom to the desired point, or the pipes are otherwise entirely outside the body, but their discharge ends coming to the fuel channel have been shaped in a way that their movements can be used to guide the oxidation gas jets in the fuel channel.

[0023] In a preferred embodiment of the method of the invention there is a lower combustion area in the lower part of the gasifying generator, in which the carbonized residue formed in the gasification processes is burnt up. Oxidizer gas is led to this lower combustion area by its own, separate feed connection. This lower combustion causes the reduction area to flow downwards, and the ash created in the actual combustion area cannot thus block the fuel channel. This also reduces the amount of ash created.

[0024] The product gas of the gasifying generator according to the invention can be led out from the gasifier for the desired purpose. The gas created can also be combusted in the gasifier itself after the reduction area, in which case the gasifying generator according to the invention can be used for heat production, for example.

[0025] The materials of the parts used in the gasifying generator described are preferably metallic, ceramic or other materials that withstand high temperatures.

[0026] The invention has the advantage that it improves the purity and quality of the product gas. It has been found in analyses that the composition of the product gas obtained by the method according to the invention is, on the average, 21 % CO, 15% H₂, 11 % CO₂, 2% CH₄, while the rest is mainly nitrogen, which is a relatively good result. The purity of the product gas enables its use in a versatile manner. In addition, it simplifies and makes the costs of manufacture and use of the equipment lower than earlier. The purification process of the product gas is also substantially simplified.

[0027] Furthermore, the invention has the advantage that the temperatures are accurately controlled, and thus the gasification reactions also remain under control and do not produce undesired ingredients, such as tar compounds, which could harm the processes and the operation of the gasifying generator by accruing onto the inner surface of the fuel channel, for example.

[0028] In addition, the invention has the advantage that the fuel will thus be used as efficiently as possible, and the process becomes more economical than the earlier solutions.

[0029] In the following, the equipment and method according to the invention will be described more closely with reference to the accompanying drawing, in which Fig. 1 shows a cross-section of a preferred embodiment of a gasifying generator according to the invention.

[0030] Fig. 1 shows an example of a gasifying generator according to the invention, in a vertical position, in cross-section. The gasifying generator has a cylindrical body 1, inside which there is a fuel channel 2, which mostly follows the shape of the body. In the upper part of the fuel channel there is fuel feed equipment 3. The feed equipment 3 is closed by an airtight cover 25, which is only opened when fuel is added. The fuel channel 2 can be divided into the following areas: the area of uncombusted fuel 4, pyrolysis area 5, combustion area 6, reduction area 7 and the lower combustion area 8. When the gasifying generator is in the vertical position shown in Fig. 1, the area 4 of uncombusted fuel is uppermost and the lower combustion area 8 is the lowest. Inside the fuel channel there is an oxidation pipe 10, in the first upward pointed end of which there is a discharge end 11, from which the oxidizer gas is directed to the combustion area 6. The oxidation pipe 10 runs in the fuel channel 2 in the direction of its longitudinal axis. One end of the oxidation pipe extends through the bottom of the fuel channel to the chamber 13 in the lower part of the body.

[0031] The oxidation gas transport system belonging to the gasifying generator also comprises oxidation gas transport piping 12 running around the fuel channel 2, the first end of which opens outside the body 1 and the second end of which leads to a chamber 13 in the lower part of the body. The oxidation gas is pumped through the transport piping to the chamber, in which overpressure is formed. The second end of the oxidation pipe 10 extending to the chamber 13 has been connected to the first actuator 14, by which the oxidation pipe can be moved in the up and down directions within the fuel chamber. The oxidation pipe 10 is surrounded at its lower part by a casing pipe 9 fixedly installed to the body 1, which penetrates through the bottom of the body 1 of the gasifying generator, and the upward pointed aperture of which has been sealed so that when the oxidation pipe 10 is moving, no oxidation gas gets to the fuel channel from the overpressurized oxidation gas chamber 13.

[0032] The lower combustion area 8 in the lower part of the fuel channel 2 gets its oxidation gas along the oxidizer pipe 15. The ash and other material accumulated on the bottom of the fuel channel 2 are removed by an ash removal system 16, which leads the ash to the container 17. This technique is known as such.

[0033] The fuel channel 2 has a narrowing 18, which has been implemented by shaping the fuel channel at this point to the shape of a narrowing and opening funnel. At the point of the narrowing in the fuel channel there is a thermometer 20 and movable adjustors 19 for changing the cross-sectional area of the fuel channel. The movable adjustors 19 that change the cross-sectional area of the fuel channel are controlled by the second actuator 21.

[0034] The thermometer 20 and the first and the second actuators 14 and 21 of the cross-sectional area control means are connected to a control unit 22, which controls their operation. This control unit is preferably a com-
The product gas created in the fuel channel 2 is led out from the gasifying generator to the product gas outlet pipe 23. The processing of the product gas in the generator and the method for bringing it outside the body depend on the purpose of use of the product gas and the generator.

In the method according to the invention, the gasification process takes place in the following manner: Inside the body 1 of the gasifying generator there is a fuel channel 2, in which the gasification processes take place. The fuel is fed to the upper part of the fuel channel 2 by fuel feed equipment 3. The fuel flows by means of gravity to the pyrolysis area 5 heated by the combustion area 6, where volatile materials are separated from the fuel. The fuel flows further to the combustion area 6, in which it participates in the combustion reaction, which is maintained by the oxidation gas coming from the discharge end 11 of the oxidation pipe 10. The combustion gases, carbonized residue and ash created in the combustion area 6 are moved to the reduction area 7, where the combustion gases are reduced. The carbonized residue created in the reactions mentioned above is burnt up in the lower combustion area 8, to which oxidation gas is fed from the pipe 15. The combustion waste created can be removed by ash removal equipment 16, which leads the waste to the container 17. The product gas generated in the process exits from the gasifying generator along the discharge pipe 23.

In the method according to the invention, the temperature of the combustion area 6 is measured by a thermometer 20. The measurement results given by the thermometer are read by the control unit 22. If the measured temperature is higher than the temperature set value given to the control unit 22, the first actuator 14 raises the oxidising pipe 10. Then the discharge end 11 of the oxidation pipe 10 moves towards the pyrolysis area 5, whereby the amount of oxidation gas in the combustion area 6 is reduced, the combustion process slows down and the temperature falls. When required, the control unit 22 can also be used to control second actuator 21, which, when it is desired to lower the temperature measured by the thermometer 20, increases the cross-sectional area of the fuel channel 2 by adjustors 19, whereby the pyrolysis reactions accelerate and more material to be heated comes to the combustion area, and thus the temperature of the combustion area falls. When it is found by the control unit 22 that the temperature of the combustion area 6 measured by the thermometer 20 is too low compared to the set value, the oxidation pipe 10 is lowered by the first actuator 14. Then the discharge end 11 of the oxidation pipe directs more oxidation gas to the combustion area 6, causing the combustion process to accelerate and the temperature to rise.

In addition, by closing the adjustors 19 for the cross-sectional area of the fuel channel 2 by the second actuator 21, the pyrolysis reaction is attenuated and thus more carbon, which can participate in the combustion, comes to the combustion area 6. Thus the combustion reaction is intensified. By the functions described above, the temperature of the combustion area 6 can be made to stay within the desired limits. The adjustment of the temperature of the combustion process is mainly accomplished by moving the oxidation pipes 10.

The system according to the invention can also be implemented in ways that differ from those described above. Some adjustments can be implemented manually or automatically according to predetermined programming. Only one oxidation pipe is shown in the preferred embodiment of the gasifying generator in Fig. 1. There can naturally be more than one oxidation pipe, and they can be moved either each one separately or in groups.

Claims

1. A method for gasifying fuel in the fuel channel of a gasifying generator operating on the cocurrent principle, the fuel channel (2) having a pyrolysis area (5) and a combustion area (6) for the combustion of the fuel and the fuel is fed to the upper part of the fuel channel and one or more movable oxidation pipe(s) (10) for feeding oxidation gas to the combustion area (6) and said pipe or pipes are movable within the fuel channel (2) substantially in the direction of the longitudinal axis of the fuel channel and oxidation pipe or pipes (10) have discharge ends (11) and the temperature of the combustion area (6) is measured by a thermometer (20), characterized in that in the fuel channel a narrowing for restraining the flow of the fuel and the combustion area is formed at the narrowing and the oxidation pipe or pipes are moved within the fuel channel during the combustion process for feeding oxidation gas to the desired point in the fuel channel and the movement of the discharge ends takes place between the pyrolysis and the combustion areas, and the oxidation pipes (10) are moved on the basis of the measured temperature in accordance with predetermined instructions for maintaining the temperature of the combustion area (6) in the desired range by moving the oxidation pipes and discharge ends against the fuel flow when temperature is too high and in the direction of the fuel flow when temperature is too low and the cross-sectional area of the fuel channel (2) is changed by movable adjustors (19) on the basis of the measured temperature of the combustion area according to predetermined instructions for keeping the temperature of the combustion area (6) within the desired range.

2. A method according to Claim 1, characterized in that each oxidation pipe (10) is moved independently.

3. A gasifying generator operating on the cocurrent
principle, comprising a body (1), a fuel channel (2) having a pyrolysis area (5) and a combustion area (6) where in said fuel channel fuel feed and the gasification processes are arranged to take place, and fuel is arranged to be fed to the upper part of the fuel channel and one or more movable oxidation pipes (10) which is arranged to feed oxidation gas to the fuel channel and said pipe or pipes are movable within the fuel channel (2) substantially in the direction of the longitudinal axis of the fuel channel, and oxidation pipe or pipes (10) have discharge ends (11) and in the fuel channel is a thermometer (20) which is arranged to measure the temperature of the combustion area (6), characterized in that in the fuel channel is a narrowing (18) for restraining the flow of the fuel, and the combustion area (6) is located at said narrowing, and the oxidation pipe or pipes (10) are movable during the combustion process within the fuel channel to feed the oxidation gas to the desired point in the fuel channel and the movement of the discharge ends takes place between the pyrolysis and the combustion areas and the oxidation pipe or pipes are arranged to be movable on the basis of the measured temperature in accordance with predetermined instructions for maintaining the temperature of the combustion area (6) in the desired range where the oxidation pipes and discharge ends are arranged to be movable against the fuel flow when temperature is too high and in the direction of the fuel flow when temperature is too low and there are movable adjustors (19) in the fuel channel (2) which are arranged to change the cross-sectional area of the narrowing (18).

4. A gasifying generator according to Claim 3, characterized in that the oxidation pipe or pipes (10) are movable within the fuel channel (2) substantially in the direction of the longitudinal axis of the fuel channel.

5. A gasifying generator according to any one of the Claims 3 to 4, characterized in that the oxidation pipe or pipes (10) are arranged to come to the fuel channel (2) substantially from below.

6. A gasifying generator according to any one of the Claims 3 to 5, characterized in that the oxidation pipe or pipes (10) have discharge ends (11), which have been shaped to direct the oxidation gas to the fuel channel (2) in the desired manner.

7. A gasifying generator according to Claim 6, characterized in that the discharge ends (11) of the oxidation pipe or pipes (10) have been shaped so as to prevent flows in the direction of the fuel flow.

8. A gasifying generator according to any one of the claims 3 to 7, characterized in that it additionally comprises a first actuator (14) which is arranged to move the oxidation pipe or pipes and a control unit (22) which is arranged to control the first actuator.

9. A gasifying generator according to Claim 3, characterized in that there is a narrowing (18) in the fuel channel (2) which is arranged to form a combustion area (6) in the fuel channel.

10. A gasifying generator according to Claim 9, characterized in that in connection with the narrowing (18) of the fuel channel (2) there is a thermometer (20), which has been connected to the control unit (22) which is arranged to move the oxidation pipes (10) on the basis of the temperature of the combustion area (6).

11. A gasifying generator according to any one of the Claims 3 to 10, characterized in that the oxidation pipe or pipes (10) have been arranged as independently movable.

12. A gasifying generator according to any one of the Claims 8 to 11 characterized in that the control unit (22) is a computer, to the memory of which the control program of the gasifying generator has been loaded.

Patentansprüche

1. Verfahren zur Vergasung von Brennstoff in dem Brennstoff-Kanal eines Vergasungsgenerators, der im Gleichstrom-Prinzip betrieben wird, wobei der Brennstoffkanal (2) einen Pyrolysebereich (5) und einen Verbrennungsbereich (6) zur Verbrennung des Brennstoffs und einen oder mehrere bewegliche Oxidationsrohr(e) (10) zum Zuführen von Oxidationsgas zu dem Verbrennungsbereich (6) aufweist, und wobei die genannte(n) Rohr(e) in dem Brennstoffkanal (2) im Wesentlichen in die Richtung der longitudinalen Achse des Brennstoffkanals beweglich sind und wobei die Oxidationsrohr(e) (10) Auslassenden (11) umfassen, und wobei die Temperatur des Verbrennungsbereichs (6) mit einem Thermometer (20) gemessen wird, dadurch gekennzeichnet, dass sich der Brennstoffkanal verengt zur Begrenzung des Flusses des Brennstoffs und dass der Verbrennungsbereich in der Verengung ausgebildet ist und dass die Oxidationsrohr(e) bewegt werden in dem Brennstoffkanal während des Verbrennungsprozesses zur Zuführung von Oxidationsgas zu dem gewünschten Punkt in dem Brennstoffkanal und dass die Bewegung der Auslassenden stattfindet zwischen dem Pyrolyse- und dem Verbrennungsbereich, und dass die Oxidationsrohre (10) bewegt werden auf Basis der gemessenen Temperatur des Verbrennungsbereichs (6) in Übereinstimmung mit vorbestimmten Instruktionen zur Beibehaltung
der Temperatur des Verbrennungsbereichs (6) im gewünschten Bereich durch Bewegung der Oxidationsrohre und der Auslassenden gegen den Brennstoffstrom wenn die Temperatur zu hoch ist und in Richtung des Brennstoffstroms wenn die Temperatur zu niedrig ist und dass der Querschnittsbereich des Brennstoffkanals (2) durch bewegliche Regulierungen (19) verändert werden kann auf Basis der gemessenen Temperatur des Verbrennungsbereichs in Übereinstimmung mit vorbestimmten Instruktionen zur Einhaltung der Temperatur des Verbrennungsbereichs (6) in dem gewünschten Bereich.

2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, dass jedes Oxidation Rohr (10) unabhängig voneinander bewegt wird.

3. Vergasungsgenerator, der nach dem Gleichstromprinzip arbeitet, umfassend einen Grundkörper (1), einen Brennstoffkanal (2), welcher einen Pyrolysebereich (5) und einen Verbrennungsbereich (6) umfasst, wo in dem genannten Brennstoffkanal Brennstoffzufuhr und der Vergasungsprozess dazu ausgelegt sind stattzufinden, und es ist vorgesehen, dass Brennstoff in dem oberen Teil des Brennstoffkanals zugeführt wird, und ein oder mehrere bewegliche Oxidationsrohre(e), welches vorgesehen ist Oxidationsgas zum Brennstoffkanal zuzu führen und wobei die genannten Rohre oder das genannte Rohr im Brennstoffkanal im Wesentlichen in der Richtung der longitudinalen Achse des Brennstoffkanals beweglich sind, wobei das Oxidationsrohr oder die Oxidationsrohre (10) Auslassenden (11) aufweisen und in dem Brennstoffkanal ein Thermometer (20) angeordnet ist, welches zur Messung der Temperatur des Verbrennungsbereichs (6) ausgelegt ist, dadurch gekennzeichnet, dass in dem Brennstoffkanal eine Verengung (18) zur Verengung (18) ist zur Begrenzung des Flusses des Brennstoffs und dass der Auslassende in der Verengung ausgebildet ist und dass die Oxidationsrohr(e) bewegt werden in dem Brennstoffkanal während des Vergasungsprozesses zur Zufuhr von Oxidationsgas zu dem gewünschten Punkt in dem Pyrolyse- und dem Verbrennungsbereich, und dass die Oxidationsrohre (10) bewegt werden auf Basis der gemessenen Temperatur des Verbrennungsbereichs (6) in Übereinstimmung mit vorbestimmten Instruktionen zur Beibehaltung der Temperatur des Verbrennungsbereichs (6) im gewünschten Bereich wobei die Oxidationsrohre und Auslassenden derart angeordnet sind, dass sie gegen den Brennstoffstrom bewegbar sind wenn die Temperatur zu hoch ist und in die Richtung des Brennstoffstroms wenn die Temperatur zu niedrig ist, und dass bewegliche Regulierungen (19) in dem Brennstoffkanal angeordnet sind, welche ausgelegt sind zur Veränderung des Querschnittsbereichs der Verengung (18).

4. Vergasungsgenerator nach Anspruch 3, dadurch gekennzeichnet, dass die Oxidationsrohre (10) im Brennstoffkanal (2) in dem gewünschten Bereich beweglich sind, was die Steuerprogramm des Vergasungsgenerators ist, und dass bewegliche Regulierungen (19) in dem Bereich.

5. Vergasungsgenerator nach einem der Ansprüche 3 bis 4, dadurch gekennzeichnet, dass die Oxidationsrohre (10) derart angeordnet sind, dass sie im Wesentlichen von unten zum Brennstoffkanal (2) kommen.

6. Vergasungsgenerator nach einem der Ansprüche 3 bis 5, dadurch gekennzeichnet, dass die Oxidationsrohre (10) Auslassenden (11) aufweisen, die so geformt sind, dass sie das Oxidationsgas in ge wünschter Weise zum Brennstoffkanal (2) leiten.

7. Vergasungsgenerator nach Anspruch 6, dadurch gekennzeichnet, dass die Auslassenden (11) der Oxidationsrohre (10) so geformt sind, dass sie Ströme gegen die Richtung des Brennstoffstroms verhindern.

8. Vergasungsgenerator nach einem der Ansprüche 3 bis 7, dadurch gekennzeichnet, dass er zusätzlich ein erster Stellglied (14) aufweist, der ausgelegt ist zur Bewegung der Oxidationsrohre und eine Steuereinheit (22), welche ausgelegt ist, das erste Stellglied zu steuern.

9. Vergasungsgenerator nach Anspruch 3, dadurch gekennzeichnet, dass es eine Verengung (18) im Brennstoffkanal (2) gibt, welche ausgelegt ist, um in dem Brennstoffkanal einen Verbrennungsbereich (6) zu formen.

10. Vergasungsgenerator nach Anspruch 3, dadurch gekennzeichnet, dass er in Verbindung mit der Verengung (18) des Brennstoffkanals (2) ein Thermometer (20) aufweist, welches mit der Steuereinheit (22) verbunden ist, welche ausgelegt ist, um die Oxidationsrohre (10) auf der Basis der Temperatur des Verbrennungsbereichs (6) zu bewegen.

11. Vergasungsgenerator nach einem der Ansprüche 3 bis 10, dadurch gekennzeichnet, dass die Oxidationsrohre (10) unabhängig voneinander beweglich angeordnet sind.

12. Vergasungsgenerator nach einem der Ansprüche 3 bis 10, dadurch gekennzeichnet, dass die Steuereinheit (22) ein Computer ist, in dessen Speicher das Steuerprogramm des Vergasungsgenerators
Générateur de gazéification fonctionnant sur le principe de cocourant, le canal de carburant (2) comportant une zone de pyrolyse (5) et une zone de combustion (6) pour la combustion du carburant, et le carburant est fourni à la partie supérieure du canal de carburant et à un ou plusieurs tuyaux d’oxydation mobiles (10) pour fournir un gaz d’oxydation à la zone de combustion (6) et le tuyau ou les tuyaux d’oxydation sont agencés pour avoir lieu dans le canal de carburant (2) sensiblement dans la direction de l’axe longitudinal du canal de carburant et le tuyau ou les tuyaux d’oxydation (10) ont des extrémités de décharge (11) et un thermomètre (20) qui est agencé pour mesurer la température de la zone de combustion (6) se trouve dans le canal de carburant, caractérisé en ce que [18] un rétrécissement existe dans le canal de carburant pour limiter l’écoulement du carburant et la zone de combustion est formée au niveau du rétrécissement et le tuyau ou les tuyaux d’oxydation sont déplacés dans le canal de carburant pendant le processus de combustion pour fournir le gaz d’oxydation au point souhaité dans le canal de carburant et le déplacement des extrémités de décharge a lieu entre les zones de pyrolyse et de combustion, et les tuyaux d’oxydation (10) sont déplacés sur la base de la température mesurée conformément à des instructions prédéterminées pour maintenir la température de la zone de combustion (6) dans la plage souhaitée en déplaçant les tuyaux d’oxydation et les extrémités de décharge à l’inverse de l’écoulement de carburant lorsque la température est trop élevée et dans la direction de l’écoulement de carburant lorsque la température est trop basse et il existe des dispositifs d ajustement mobiles (19) dans le canal de carburant (2) qui sont agencés pour modifier la section transversale du rétrécissement (18).

4. Générateur de gazéification selon la revendication 3, caractérisé en ce que le tuyau ou les tuyaux d’oxydation (10) peuvent être déplacés dans le canal de carburant (2) sensiblement dans la direction de l’axe longitudinal du canal de carburant.

5. Générateur de gazéification selon l’une quelconque des revendications 3 et 4, caractérisé en ce que le tuyau ou les tuyaux d’oxydation (10) sont agencés pour venir dans le canal de carburant (2) sensiblement à partir du dessous.

6. Générateur de gazéification selon l’une quelconque des revendications 3 à 5, caractérisé en ce que les extrémités de décharge (11) ont été formées pour diriger le gaz d’oxydation vers le canal de carburant (2) de la manière souhaitée.

7. Générateur de gazéification selon la revendication 6, caractérisé en ce que les extrémités de décharge (11) du tuyau ou des tuyaux d’oxydation (10) ont été formées de manière à empêcher des écoulements...
dans la direction de l’écoulement de carburant.

8. Génrateur de gazéification selon l’une quelconque des revendications 3 à 7, **caractérisé en ce qu’**il comprend en plus un premier actionneur (14) qui est agencé pour déplacer le tuyau ou les tuyaux d’oxydation et une unité de commande (22) qui est agencée pour commander le premier actionneur.

9. Générateur de gazéification selon la revendication 3, **caractérisé en ce qu’**il existe un rétrécissement (18) dans le canal de carburant (2) qui est agencé pour former une zone de combustion (6) dans le canal de carburant.

10. Générateur de gazéification selon la revendication 9, **caractérisé en ce que, en relation avec le rétrécissement (18) du canal de carburant (2), il y a un thermomètre (20), qui a été connecté à l’unité de commande (22) qui est agencée pour déplacer les tuyaux d’oxydation (10) sur la base de la température de la zone de combustion (6).**

11. Générateur de gazéification selon l’une quelconque des revendications 3 à 10, **caractérisé en ce que** le tuyau ou les tuyaux d’oxydation (10) ont été agencés pour pouvoir être déplacés de manière indépendante.

12. Générateur de gazéification selon l’une quelconque des revendications 8 à 11, **caractérisé en ce que** l’unité de commande (22) est un ordinateur, dans la mémoire duquel le programme de commande du générateur de gazéification a été chargé.
REFERENCES CITED IN THE DESCRIPTION

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