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(54) **GAS GENERATOR**

GASGENERATOR

GENERATEUR DE GAZ

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Description

[0001] The invention relates to a gas generator comprising a substantially cylindrical gasifier vessel, a grate on which the solid fuel being combusted is fed, a gasifier throat forming in the gasifier vessel a portion with a cross section narrower than that of the other portion of the gasifier and combustion air injection nozzles adapted above the gasifier throat to the gasifier vessel.

[0002] In conventional gas generators, the throat portion of gasifier vessel has a constant cross-sectional area. As to the generation of clean product gas, however, this is not an optimal situation. This is because the gasifier throat should at the maximum capacity demand conditions preferably be capable of passing a larger volumetric gas flow than in the minimum capacity operating situation.

[0003] One prior-art gas generator embodiment is described in FI Pat. No. 60,884.

[0004] Further, US-A-5226927 discloses a substantially cylindrical gasifier and the following elements: a grate located at the bottom of the vessel, a gasifier throat with a narrower cross-section than that of the other portion of the gasifier, nozzles located above the throat portion and an element which is concentric with the central axis and which tapers in an upward direction.

[0005] It is an object of the invention to provide a gas generator facilitating the cross-sectional area of its gasifier throat to be controllable to an optimal combustion value during the gasifier operation. In the invention the variable cross-sectional area is implemented by means of a vertically movable control element, particularly a throttle cone. When the throttle cone is in its upper position, the volumetric gas flow through the gasifier throat is reduced to a value corresponding the minimum capacity of gas generator operation. Respectively, having the throttle cone driven into its preset lower position, a larger volumetric gas flow is allowed to pass unrestrictedly to the reducing layer of coal thus facilitating the operation of the gas generator at its maximum capacity.

[0006] The gas generator in accordance with the invention is particularly characterized in that at the gasifier throat, substantially concentric with the center axis of the cylindrical gasifier vessel, is adapted an upward tapering control element of the gasifier throat cross-sectional area, the tapering control element being supported by a shaft adapted to extend through the underlying gasifier grate, and that the control element is adapted movable in vertical direction.

[0007] A preferred embodiment of the gas generator according to the invention is **characterized in that** the control element is a throttle cone, the support shaft of which is adapted to pass through the gasifier grate.

[0008] Another preferred embodiment of the gas generator according to the invention is **characterized in that** the support shaft of the throttle cone is connected to the gasifier grate and that the support shaft is adapted rotatable with simultaneous rotation of the gasifier grate.

[0009] A still another preferred embodiment of the gas generator according to the invention is **characterized in that** the vertical movement of the support shaft of the control element is implemented by hydraulic means.

5 [0010] Hence, the gasifier of the gas generator according to the invention is made adjustable to cope with the actual gasifier output demand so as to maintain at all times an optimum volumetric gas flow rate and temperature in the gasifier throat, whereby proper conditions are created for the generation of a product gas at maximized quality.

10 [0011] In the following, the invention is examined in more detail with the help of a preferred exemplary embodiment by making reference to the attached drawing showing a vertically sectional view of a gasifier according to the invention suitable for use in a gas generator.

15 [0012] Referring to the diagram, therein is shown designated by reference numeral 1 a gasifier vessel that basically has a straight cylindrical shape with the exception of the gasifier throat 6, wherein the cross-sectional area of the vessel is constricted distinctly smaller than elsewhere in the gasifier vessel. The gasifier throat 6 is situated above the gasifier grate 2. In the gasifier is combusted solid fuel 8. Reference numeral 3 designates a gasifying coal bed and reference numeral 4 designates combustion air injection nozzles that are distributed evenly about the periphery of the gasifier vessel. The gasifier combustion zone 7 operates above the combustion air injection nozzles 4.

20 [0013] In the middle of the gasifier, at the gasifier throat 6 in a position concentric with the vertical center axis of the gasifier is adapted a controllable throttle cone 5 of the gasifier throat. The shape of the throttle cone is made upward tapering. Advantageously being made of a metallic or ceramic material, the throttle cone is supported by a shaft 9 adapted to extend through the underlying gasifier grate 2. To the support shaft 9 is advantageously connected a hydraulic actuator mechanism that moves the throttle cone 5 in the vertical direction thus accomplishing the control of the open cross-sectional area in the gasifier throat. In the upper position of the throttle cone, the volumetric flow rate of gas passing via the throat is controlled to a minimum value corresponding to the smallest output of the gas generator. Conversely, in a preset lower position of the throttle cone a larger volumetric flow of gas is permitted unobstructedly to the reducing coal bed thus facilitating maximum output from the gas generator.

30 [0014] According to a preferred embodiment, the gasifier grate 2 can be made rotatable, whereby the rotating movement is advantageously accomplished through the rotation of the cone support shaft 9. Such rotating movement of the shaft can be implemented using any appropriate actuator construction well known to a person skilled in the art. Alternatively, the rotating movement can be imposed directly on the grate, whereby the grate in turn rotates the throttle cone.

35 [0015] To a person skilled in the art it is obvious that

the invention is not limited to the exemplary embodiment described above, but rather, can be varied within the scope of the appended claims. For instance, the actuator mechanisms connected to support shaft 9 are not shown inasmuch as suitable implementations of such arrangements may be considered to be readily available.

Claims

1. A gas generator comprising

- a substantially cylindrical gasifier vessel (1),
- a grate (2) on which solid fuel (8) being combusted is fed,
- a gasifier throat (6) forming in the gasifier vessel (1) a portion with a cross section narrower than that of the other portion of the gasifier, and
- gasification air nozzles (4) adapted above the gasifier throat (6) to the gasifier vessel (1), **characterized in that**

at the gasifier throat (6), substantially concentric with the center axis of the cylindrical gasifier vessel (1), is adapted an upward tapering control element (5) of the gasifier throat cross-sectional area, the tapering control element being supported by a shaft (9) adapted to extend through the underlying gasifier grate (2), and that the control element is adapted movable in vertical direction.

2. The gas generator of claim 1, **characterized in that** the control element (5) is a throttle cone, the support shaft (9) of which is adapted to pass through the gasifier grate.

3. The gas generator of claim 2, **characterized in that** the support shaft (9) of the throttle cone (5) is connected to the gasifier grate (2) and that the support shaft is adapted rotatable with simultaneous rotation of the gasifier grate.

4. The gas generator of any one of claims 1 - 3, **characterized in that** the vertical movement of the support shaft (9) of the control element (5) is implemented by hydraulic means.

5. The gas generator of any one of claims 1 - 4, **characterized in that** the control element (5) is made of a metallic or ceramic material.

Patentansprüche

1. Ein Gasgenerator umfassend

- ein im Wesentlichen zylindrisches Vergasungsgefäß (1),

- ein Gitter (2), auf welchem Festbrennstoff (8) zur Verbrennung zugeführt wird,
- einen Vergasungshals (6), welcher in dem Vergasungsgefäß (1) einen Abschnitt mit einem Querschnitt ausgebildet, der enger als der des anderen Abschnitts des Vergasers ist, und
- Gasifizierungs- Luftdüsen (4), die oberhalb des Vergasungshalses (6) an dem Vergasungsgefäß (1) angepasst sind, **dadurch gekennzeichnet, dass**

bei dem Vergasungshals (6), im Wesentlichen konzentrisch zu der Mittenachse des zylindrischen Vergasungsgefäßes (1) ein nach oben zulaufendes Steuerelement (5) des Vergasungshals-Querschnittsbereichs angepasst ist, wobei das zulaufende Steuerelement durch eine Welle (9) getragen wird, die dahingehend angepasst ist, sich durch den darunter liegenden Vergasungsgrill (2) zu erstrecken, und dass das Steuerelement in Vertikalrichtung beweglich angepasst ist.

2. Gasgenerator nach Anspruch 1, **dadurch gekennzeichnet, dass** das Steuerelement (5) ein Drosselkonus ist, dessen Tragwelle (9) dahingehend angepasst ist, durch den Vergasungsgrill zu verlaufen.

3. Gasgenerator nach Anspruch 2, **dadurch gekennzeichnet, dass** die Tragwelle (9) des Drosselkonus (5) an dem Vergasungsgrill (2) angeschlossen ist und dass die Tragwelle mit simultaner Rotation des Vergasungsgrills drehbar angepasst ist.

4. Gasgenerator nach irgendeinem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** die vertikale Bewegung der Tragwelle (9) des Steuerelements (5) durch hydraulische Mittel ausgeführt wird.

5. Gasgenerator nach irgendeinem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** das Steuerelement (5) aus einem metallischen oder einem keramischen Material hergestellt ist.

Revendications

1. Générateur de gaz comprenant

- un récipient de gazogène (1) globalement cylindrique,
- une grille (2) sur laquelle un combustible solide (8) à faire brûler est amené,
- un étranglement de gazogène (6) qui forme dans ledit récipient (1) une partie avec une section transversale plus étroite que l'autre partie du gazogène, et
- des injecteurs d'air de gazéification (4) installés sur le récipient de gazogène (1), au-dessus de

l'étranglement (6),

caractérisé en ce qu'il est prévu au niveau de l'étranglement de gazogène (6), globalement concentrique par rapport à l'axe central du récipient de gazogène cylindrique (1), un élément de commande (5), effilé vers le haut, de la zone de section transversale dudit étranglement, cet élément de commande effilé étant porté par une tige (9) apte à traverser la grille de gazogène (2) placée en dessous, et **en ce que** l'élément de commande est mobile dans le sens vertical.

2. Générateur de gaz selon la revendication 1, **caractérisé en ce que** l'élément de commande (5) consiste en un cône d'étranglement dont la tige de support (9) est apte à traverser la grille de gazogène.
3. Générateur de gaz selon la revendication 2, **caractérisé en ce que** la tige de support (9) du cône d'étranglement (5) est reliée à la grille de gazogène (2) et **en ce qu'elle** est apte à tourner, ladite grille tournant en même temps que la tige (9).
4. Générateur de gaz selon l'une quelconque des revendications 1 à 3, **caractérisé en ce que** le mouvement vertical de la tige de support (9) de l'élément de commande (5) est obtenu grâce à des moyens hydrauliques.
5. Générateur de gaz selon l'une quelconque des revendications 1 à 4, **caractérisé en ce que** l'élément de commande (5) se compose d'un matériau métallique ou céramique.

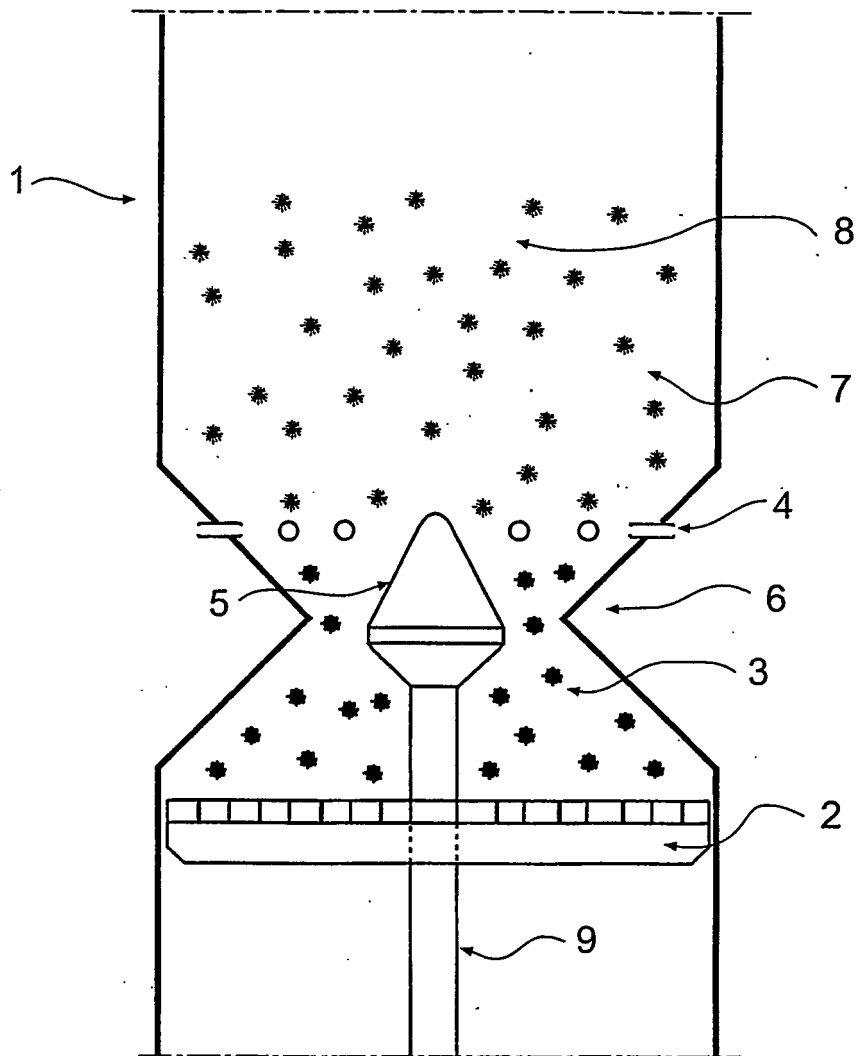


Fig. 1

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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- US 5226927 A [0004]