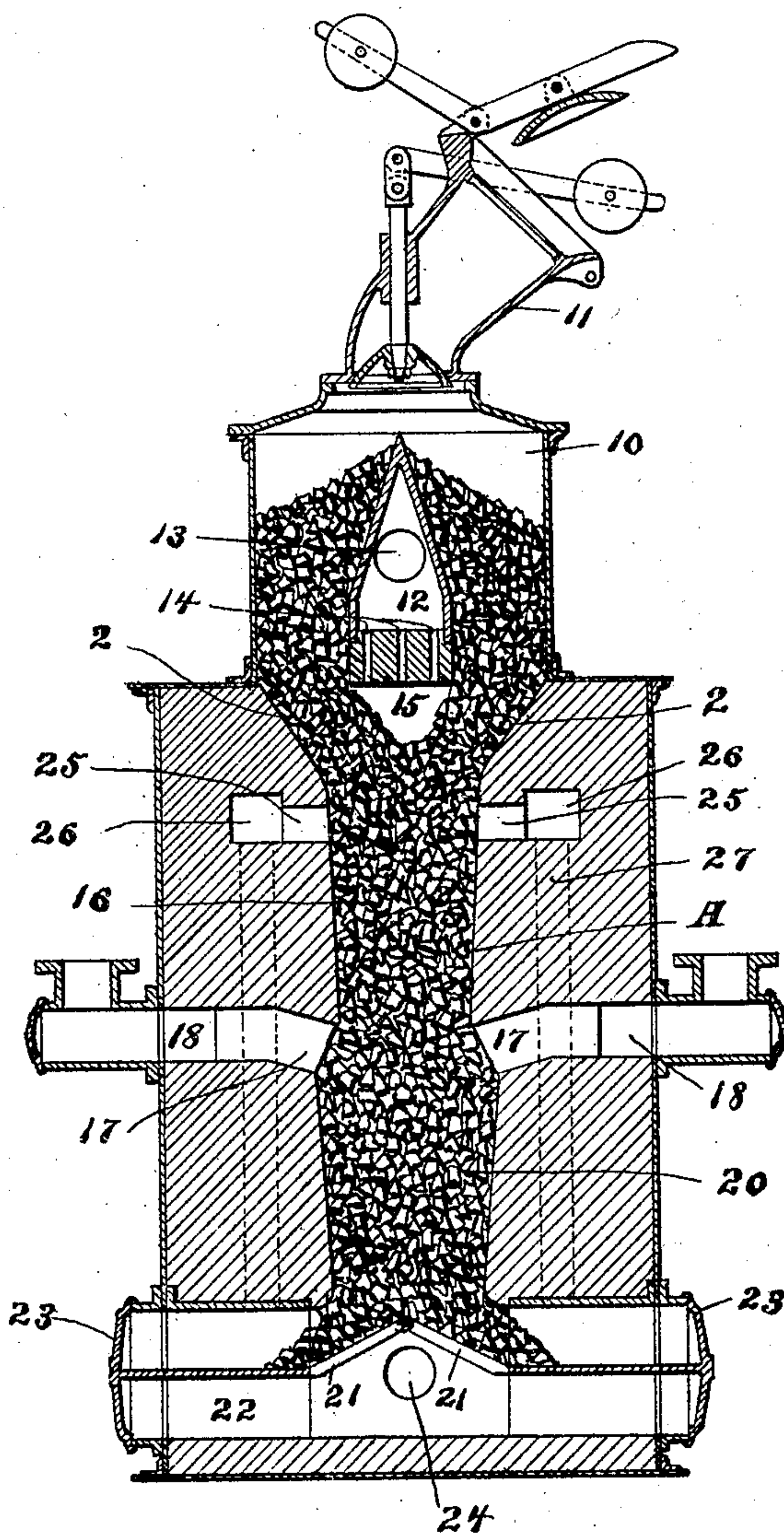


No. 795,918.

PATENTED AUG. 1, 1905.

E. KÖRTING.  
GAS PRODUCER.

APPLICATION FILED SEPT. 26, 1904.



Witnesses  
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# UNITED STATES PATENT OFFICE.

ERNST KÖRTING, OF PEGLI, ITALY.

## GAS-PRODUCER.

No. 795,918.

Specification of Letters Patent.

Patented Aug. 1, 1905.

Application filed September 26, 1904. Serial No. 225,950.

*To all whom it may concern:*

Be it known that I, ERNST KÖRTING, a subject of the King of Prussia, German Emperor, residing at Pegli, Liguria, Italy, have invented certain new and useful Improvements in Gas-Producers, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to downdraft gas-producers, and aims generally to provide an improved producer of this class which even with the use of bituminous fuel and fuel of a poor quality shall produce a gas of good quality and comparatively free from tarry constituents and shall avoid the formation of large clinkers and the adhesion of slag to the walls of the producer-shaft. To these ends I provide the upper air-supply by means of an air-chamber located centrally in the charging-chamber of the vertical producer-shaft, to which the air is supplied by suitable means and from which the air passes downward into the fuel in the shaft, the bottom of such air-chamber being of considerable area and preferably provided with a number of perforations for the passage of the air. The fuel in the charging-chamber moves down on all sides of the air-chamber, leaving beneath the air-chamber a hollow space with a pointed lower end, the depth of which space depends on the size of the bottom of the air-chamber and the angle of motion of the fuel. The air entering such hollow space through the perforated bottom of the air-chamber fills the space and passes thence through the fuel toward the gas-outlets located farther down in the shaft, burning and gasifying the fuel in its downward passage. As the air tends to take the path of least resistance—that is, from the point of the hollow space or centrally of the producer-shaft—the most energetic combustion and the greatest formation of slag will occur at and near the central portion of the shaft. From the upper-portions of the hollow space beneath the bottom of the air-chamber less air will enter the fuel and therefore the combustion will be less intense, and besides the products of combustion products of distillation will be developed and will pass downwardly with the products of combustion toward the gas-outlets. To compel all the gaseous products to travel through the incandescent portions of the fuel, the producer-shaft is preferably narrowed or decreased in horizontal area below the bottom of the air-chamber, so that all the products of combustion

and distillation must pass through a comparatively small horizontal area, in which the fuel will be evenly highly heated and will be brought into intimate contact with such highly-heated fuel.

In order to prevent such portions of the fuel which may pass the gas-outlets unconsumed from being removed with the ashes, it is desirable to extend the producer-shaft below the gas-outlets to form a secondary up-draft producing-chamber below the main downdraft producing-chamber, such chamber being provided with a grate through which a certain quantity of air is supplied, by which the partially-consumed fuel in the secondary producing-chamber will be burned to CO, as in an ordinary updraft gas-producer. If the fuel develops large quantities of products of distillation, channels are preferably provided for leading these products from points near the upper air-supply to other points in the highly-heated portions of the shaft.

The accompanying drawing shows a producer constructed to embody my invention.

As shown in said drawing, A represents the vertically-arranged producer-shaft, which may be of any suitable form in horizontal section, as circular, and 10 represents the receiving-chamber formed by the upper part of the shaft and to which the fuel is supplied through a charging-funnel 11, opening into the top of the receiving-chamber. Located centrally within the receiving-chamber is an air-chamber 12, to which air is supplied through an inlet 13 and from which the air passes through openings 14 in the bottom of the chamber to the hollow space 15 automatically formed and maintained beneath the bottom of the chamber by the movement of the fuel. The walls of the producer-shaft below the bottom of the air-chamber are inwardly inclined, as shown at 2, so that the cross-area of the shaft below the bottom of the air-chamber is sharply decreased. The air passes from the hollow space 15 through the fuel which moves downward from the space about the sides of the air-chamber, the fuel being thus consumed and the products of combustion and distillation passing downward into the portion of the shaft which forms the main producing-chamber 16, the contents of which is uniformly and so highly heated thereby that by their passage therethrough toward the lateral gas-outlets 17 the gases are reduced and decomposed, so that the CO<sub>2</sub> is



transformed entirely or partly to CO and the tarry products of distillation are transformed into permanent hydrocarbons and CO. From the gas-outlets 17 the gas passes into a receiving-channel 18, from which it is taken to the place of use.

The producer-shaft is extended below the gas-outlets 17 to form the secondary producing-chamber 20, and the bottom of such chamber is formed by a grate 21, preferably formed to slope in opposite directions, as shown. A closed ash-pit 22 is provided, having openings normally closed by caps 23, which are removable for removing ashes or slag from the producer. The walls of the producing-chamber 20 preferably terminate a short distance above the grate 21, as shown, so as to permit the removing of clinkers without disturbing the grate. Atmospheric air in regulated quantities is admitted to the ash-pit through an inlet 24. The slag descending in the producing-chamber 16 (which slag is formed mostly in the central part of the chamber, because the downwardly-extending point of the hollow space under the air-chamber, and consequently the path of least resistance for the air, is located centrally of the producer-shaft) and the unconsumed fuel after passing the gas-outlets 17 will collect in the secondary producing-chamber 20, to which a certain amount of air is admitted from the inlet-opening 24 through the ash-pit and through the grate 21. Such air as it passes upward through the chamber 20 toward the gas-outlets 17 burns the partially-consumed fuel to CO, as in an ordinary up-draft gas-producer.

To provide a path through which products of distillation which may be formed in too large quantities in the upper part of the producing-chamber 16 may escape from the upper part of the chamber 16 and be returned to the shaft below the outlets 17 to pass through the highly-heated layers of fuel below such outlets, outlets 25 are preferably provided leading from the upper portion of the producing-chamber 16 to a receiving-channel 26, from which channels 27 lead downwardly to the ash-pit 22, as indicated by dotted lines. The products of distillation may thus pass downwardly through the channels 27 to the ash-pit, to pass from thence upwardly again through the hot material in the secondary producing-chamber 20 toward the gas-outlets 17.

What I claim is—

1. A downdraft gas-producer having a vertically-arranged producer-shaft, a body located in the upper part of the shaft and centrally thereof and having a bottom of considerable area so that the fuel will move downward past said body and form a hollow space beneath the body, and means for supplying air to said hollow space, and the walls of the shaft being inclined inwardly below the bottom of said body, substantially as described.

2. A downdraft gas-producer having a vertically-arranged producer-shaft, a body located in the upper part of the shaft and centrally thereof and having a bottom of considerable area so that the fuel will move downward past said body and form a hollow space beneath the body, and means for supplying air to said hollow space, the shaft having its walls inclined sharply inward below the bottom of said body and being of substantially uniform horizontal section for a distance below such sharply-inclined walls, substantially as described.

3. A downdraft gas-producer having a vertically-arranged producer-shaft, and an air-chamber located in the upper part of the shaft and centrally thereof and having a bottom of considerable area so that the fuel will move downward past the air-chamber and form a hollow space beneath the air-chamber, the bottom of the air-chamber being perforated to supply air to said hollow space, and the walls of the shaft being inclined inwardly below the bottom of the air-chamber, substantially as described.

4. A downdraft gas-producer having a vertically-arranged shaft, a body located in the upper part of the shaft and centrally thereof and having a bottom of considerable area so that the fuel will move downward past said body and form a hollow space beneath the body, means for supplying air to said hollow space, and a lateral gas-outlet leading from the shaft below the portion thereof forming the main producing-chamber, the walls of the shaft being inclined inwardly below the bottom of the air-chamber, and the shaft extending below said outlet to form a secondary up-draft producing-chamber, substantially as described.

5. A downdraft gas-producer having a vertically-arranged shaft, a body located in the upper part of the shaft and centrally thereof and having a bottom of considerable area so that the fuel will move downward past said body and form a hollow space beneath the body, means for supplying air to said hollow space, and a lateral gas-outlet leading from the shaft below the portion thereof forming the main producing-chamber, the shaft having its walls inclined sharply inward below the bottom of said body and being of substantially uniform horizontal section for a distance below such sharply-inclined walls, and the shaft extending below said outlet to form a secondary up-draft producing-chamber, substantially as described.

6. A downdraft gas-producer having a vertically-arranged shaft, a body located in the upper part of the shaft and centrally thereof and having a bottom of considerable area so that the fuel will move downward past said body and form a hollow space beneath the body, means for supplying air to said hollow space, a lateral gas-outlet leading from the



shaft below the portion thereof forming the main producing-chamber, the shaft being extended below said outlet to form a secondary updraft producing-chamber, and a channel leading from a point in the shaft above the gas-outlet to a point below the gas-outlet, substantially as described.

7. A downdraft gas-producer having a vertically-arranged shaft, an air-chamber located in the upper part of the shaft and centrally thereof and having a bottom of considerable area so that the fuel will move downwardly past the air-chamber and form a hollow space beneath the air-chamber, the bottom of the air-chamber being perforated to supply air to said hollow space, lateral gas-outlets leading from the shaft below the portion thereof forming the main producing-chamber, the shaft having its walls inclined sharply inward below the bottom of the air-chamber and being of substantially uniform horizontal section for a distance below such inclined walls, and the shaft being extended below said outlets to form a secondary producing-chamber; and channels leading from a point in the shaft above the gas-outlets to a point below the gas-outlets, substantially as described.

8. A downdraft gas-producer having a vertically-arranged producer-shaft, an air-chamber located in the upper part of the shaft and centrally thereof and having a bottom of considerable area so that the fuel will move downward past the air-chamber and form a hollow space beneath the air-chamber, the bottom of the air-chamber being perforated to supply air to said hollow space, a lateral gas-outlet leading from the shaft below the portion thereof forming the main producing-cham-

ber, the shaft being extended downward below such gas-outlet to form a secondary updraft producing-chamber, a closed ash-pit below the shaft, a grate arranged at the bottom of the shaft, means for supplying air to the ash-pit below the grate, and a channel leading from a point in the producer-shaft above the gas-outlet to the ash-pit, substantially as described.

9. A downdraft gas-producer having a vertically-arranged producer-shaft and a central air-inlet to the upper part of the shaft, the shaft having its walls inclined sharply inward below the air-inlet and being of substantially uniform horizontal section for a distance below such inclined walls, substantially as described.

10. A downdraft gas-producer having a vertically-arranged producer-shaft, a central air-inlet to the upper part of the shaft, a lateral gas-outlet leading from the shaft below the portion thereof forming the main producing-chamber, the shaft having its walls inclined sharply inward below the air-inlet and being of substantially uniform horizontal section for a distance below such inclined walls and being extended below the gas-outlet to form a secondary updraft producing-chamber, and a channel leading from a point in the shaft above the gas-outlet to a point below the gas-outlet, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ERNST KÖRTING.

Witnesses:

LEONORE KASCH,  
ANNA DIPPEL.