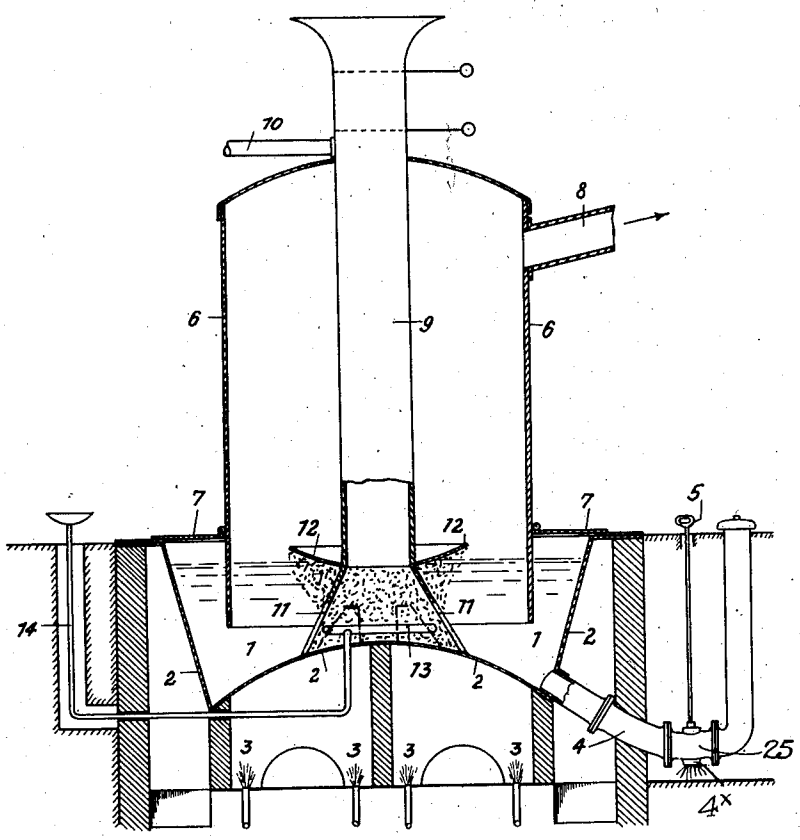
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PROCESS OF PRODUCING WATER GAS

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PROCESS OF PRODUCING WATER GAS

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3 Claims. (Cl. 48—206)

The present invention relates to a process for producing water-gas. The advantages of the new process consist therein, that any kind of fuel, such as coal, lignite, peat, dirty coal, oil coke etc. can be used, furthermore in the excellent and uniform quality of the water-gas produced according to my invention, by avoiding the alternate blasting the coal charge to white heat. The present invention concerns a continuous operation, wherein only fuel and steam are supplied, but no oxygen-nitrogen air, so that the process can be carried into effect with a minimum of loss.

It will here be explained that "free" nitrogen, in gaseous form, must be differentiated from "combined" nitrogen, in solid form, that is to say in combination with other solid bodies or substances. In the water gas hitherto produced, there is usually a content of 4 to 30% free nitrogen in gaseous form. If nitrogen-containing fuels are introduced according to the present process, the nitrogen is in a combined form in the fuels and is converted in the presence of sodium chloride, NaCl, into chloride of ammonium without the combined nitrogen becoming free. It is true that the water gas, which is produced in accordance with the present process, does not receive any free nitrogen but has only the combined nitrogen in the form of chloride of ammonium. In the water gas, which is produced according to the old process, the content of 4 to 30% free nitrogen is due to the alternate heating to white heat of the coal charge. The present invention does not concern an alternate heating to white heat but a continuous operation, wherein only fuel and steam are supplied but no oxygen-nitrogen air.

In carrying out the process I prepare a bath of molten salts, especially sodium chloride NaCl. This material is molten at 792° C. and begins to be vaporized at about 1100° C. Into this bath of molten salts the fuels are introduced wherefrom the water-gas is to be produced. I prefer to dry the fuels and to extract the gases from the fuel, before introducing the latter into the bath of salts. The fuel is, within the bath heated up to 900–1000° C., at the same time steam vapor is introduced into the bath, so that water-gas is being produced continuously. The ashes remain in the bath and are removed therefrom in any ordinary manner.

The water gas produced in this manner is for instance composed as follows: 0.8% CO_2; 45.6% CO; 2.7% CH_4; 47.2% H_2 with 3.7% loss.

It may be here explained that the 3.7% loss is due to the inaccuracies of the gas analysis and that only a very small part consists of traces of nitrogen because the major part of the nitrogen, as stated above, is combined into chloride of ammonium in the presence of NaCl without being affected by the heat. All other nitrogen compounds are decomposed in the heat and only the nitrogen chloride compound, ammonium chloride is heat resisting.

By the use of activated coal, that means coal rendered reactive, in the presence of any catalyzers, methane and ammonium chloride can be obtained. The steam to be introduced can be regulated very closely, as required for the gasification of the coal. Owing to the intimate penetration of the fuel with the molten salts and the steam, a seal is not only obtained, but the heat concentrated to such a high degree, that the loss of heat is being reduced to a minimum, rendering the new process consequently very economical.

Any kind of gas-generator with a bed for molten salts and a closed space above the bath for collecting the produced gas, may be used for my new process. I prefer however a gas-generator, as illustrated by the accompanying figure in vertical cross-section, comprising a gas generator with a sole chamber. The bath of salts 1 is heated in a steel pan 2, by the burners 3. The pan is provided with an outlet 4, having a discharge spout 4x for ashes, this outlet being closed by a valve 25 controlled by the handle 5. The shell 6 extends into the bath 1. The annular space between the pan and the shell is covered by a hinged cover 7. The shell 6 is provided with an outlet 8 for the produced water gas. In the middle of the upper shell chamber a tube 9 is provided for introducing the fuel. The upper part of the tube 9 above the tube 10 is closed by two gates 26, alternately closed, in the well known manner. The gates serve for feeding the fuel in predetermined quantities. By employing moist fuel it is advisable to provide an outlet 10 for the vapors and gases extracted from the fuel by dry distillation.

The dried and distilled fuel settles at the conical bottom 11 of the tube 9 and forms a pile going downwardly. The single particles of distilled fuel pass through the openings in bottoms 11 and rise through the molten bath on the surface of the molten salts rising under the ring 12, where they are entirely gasified in the presence of superheated steam flowing from the

ring 13, connected to the steam pipe 14 which has a control valve 15. The fuel is introduced into the salt bath 1 in the pan 2 from the tube 9 through side openings 24 in the conical bottom end 11 thereof.

In this gas-generator I use a bath heated by the pan. Instead of this arrangement I can use a gas-generator, in which the bath is molten in a special chamber, connected by communicating channels with the chamber, where the fuel is gasified.

I claim:

1. A process for producing water-gas comprising heating carbonaceous fuel on a bath of molten sodium chloride to the temperature of said bath and introducing steam into the said heated fuel, whereby water-gas is produced.

2. A process for producing water-gas comprising heating carbonaceous fuel on a bath of molten sodium chloride to the temperature of said bath and introducing steam into the said heated fuel, whereby water-gas is produced, the ash separating and settling to the bottom of the bath.

3. A process for producing combustible gas consisting in preheating and distilling carbonizable fuel in an externally heated retort, introducing the solid residue into a bath of molten sodium chloride having a temperature between 900° and 1000° C., passing superheated steam through said residue thereby forming water-gas, the ash separating and sinking to the bottom of said bath.

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