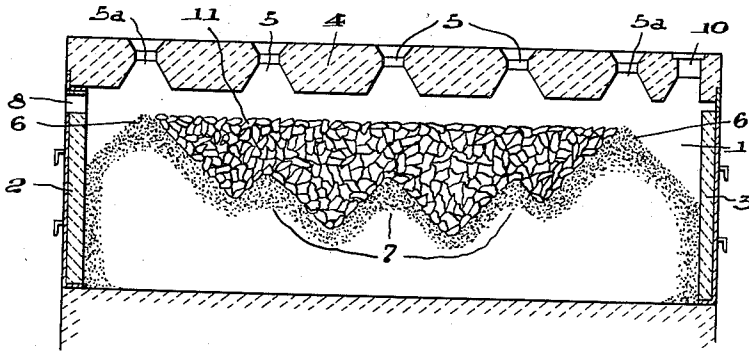


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PROCESS FOR CONVERSION OF LIQUID HYDROCARBONS  
IN HORIZONTAL CHAMBER OVENS  
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## PROCESS FOR CONVERSION OF LIQUID HYDRO-CARBONS IN HORIZONTAL CHAMBER OVENS

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The present invention relates to a process for conversion of liquid hydrocarbons, for example, petroleum oil, heating oil, or residual oil into gaseous fuels in horizontal chamber ovens used for the production of gas and coke.

In recent years, there has been an ever-increasing demand for heating gas, whereas the demand for coke has not kept pace with the demand for coke oven gas. Consequently, in order to meet the increased demand for gas, it has been necessary to produce more coke than the coke market can consume. The coke and gas industry has thus been faced with the problem of increasing its output of gas while decreasing its coke production.

Several attempts have been made to increase the production of gas without a corresponding increase in the production of coke by gasifying liquid hydrocarbons simultaneously with the coking of coal. However, none of these previous attempts has proved to be practical. If coal is saturated with liquid hydrocarbons prior to being charged into the coke oven, the coal, which can take up only about 2% to 3% by weight of the liquid hydrocarbon becomes a tarry, gummy mass which is exceedingly difficult to handle since it sticks to conveyor belts and does not flow freely from hoppers. If the liquid hydrocarbon is added to the coal after the coal has been charged into the coke oven considerable difficulty is encountered in removing the coke cake from the oven since the cake sticks to the oven walls.

One object of the present invention is to increase the production of gas from a coke oven without correspondingly increasing the amount of coke produced.

Another object is to gasify a liquid hydrocarbon simultaneously with the coking of coal in a horizontal chamber oven to yield a coke cake which can be removed easily from the oven.

Other objects will be apparent from the following disclosure.

The present invention relates to the conversion of liquid hydrocarbons into heating gas in a coke oven by introducing in the oven chamber oil-saturated, non-coking constituents on a layer of coking coal and effecting the coking process in the usual manner.

By following the procedure described below, a coke cake can be produced whereby the cake can be easily pushed from the oven by means of ordinary coke pushing rods.

According to the present invention the oven chamber is charged in such manner that first only such an amount of coking coal is introduced into the oven as is necessary to be able to push the entire charge from the oven chamber after formation of the coked cake bearing the superimposed, non-coking constituents. The additional charging of the oven chamber with oil-saturated, non-coking constituents, for example small coke, takes place immediately thereafter.

It is to be noted that indiscriminate charging of coal and oil-saturated, non-coking constituents is unsatisfactory for the purpose of the present invention. According to

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the present invention, the oven is charged with coking coal through the charging holes located in the top of the oven. However, the oven is charged to its normal charge level only through the exterior charging holes, namely, the holes nearest the oven doors, and is only partially filled through the central charging holes. By charging the oven in this manner, the coking coal forms a series of cone-shaped piles which, at each end of the oven, extend almost to the top of the oven and which are considerably lower in the central portion. After the coal has been charged in this manner, the oil-saturated, non-coking constituents are charged through the central charging holes to complete the oven charge.

A further binding of the non-coking constituents in the coke cake formed from the coking constituents is effected according to the invention by not leveling the first-charged, coking coal. Only after charging the non-coking, oil-saturated constituent, which thereby is placed in the inverted conical spaces formed by the coking coal, is the charge of the oven chamber leveled to form the gas collecting space.

The use of coke, especially small coke, as oil carrier in the distillation process has the advantage that it can again be used. This small coke from the mass of coke pushed from the oven chamber, after quenching and going through a screening device, is again saturated with oil and used for charging another oven chamber. In addition, when small coke is used as the non-coking constituent and is charged to the oven saturated with oil, the oil represents as much as 10% by weight of the coal charged.

The process of the present invention is illustrated in the accompanying drawing which schematically represents a vertical, longitudinal section through an oven chamber.

After sealing the doors 2, 3 of the oven chamber 1, the coal is charged into the oven chamber by standard charging cars, not shown in the drawing, arranged on the top 4 of the oven, in such manner that by correspondingly opening the discharge hopper of the charging car the oven chamber is filled almost to the top of the oven through charge holes 5a located near the doors so that cones 6 are formed, whereas the oven chamber is only partially charged through the middle charge holes 5, as shown by cones 7. The coking coal is, for example, charged into the oven chamber in an amount of about 1/2 to 2/3 of the total charge. The oven chamber is then charged with oil-saturated, small coke through charge holes 5 by means of a special charging car.

The charge is then leveled through the leveling bar opening 8 of the machine-side door 2 by means of the coke pushing machine not shown in the drawing, so that a gas-collecting space is formed from which the volatile constituents are withdrawn through opening 10 arranged at the end of the oven chamber into the ascension pipe (not shown). Coking then proceeds in the usual manner.

At the end of the coking, after opening doors 2, 3, the contents of the chamber are pushed by means of standard pusher rods (not shown). The glowing mass of coke is conveyed by means of a coke-conveying device (not shown) into the quenching car (also not shown) and is quenched therein under the quenching tower.

As apparent from the drawing, by the described and illustrated charging method, a coke cake is formed which consists only of coked coal at both doors and contains the small coke charged in the intermediate spaces above and between the cones 7, so that the entire contents of the chamber can be easily pushed.

In this way a mixed gas of higher calorific value is obtained than is required for the use of city gas. The

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calorific value can be correspondingly decreased in known manner by mixing a leaner gas therewith.

I claim:

1. A process for the conversion of liquid hydrocarbons into gaseous fuels in a horizontal chamber oven with doors at its two opposite horizontal ends, comprising: top charging said oven to form within the same oppositely disposed end piles of coking coal at the two horizontal ends of the oven, leaving a fuel gas space above the piles and an unfilled space between the end piles; top charging said oven in the unfilled space in the central portion of the oven to form piles of coking coal of lesser height between the end piles at the horizontal ends of the oven; completing the charging of said oven by top filling to a higher level the remaining unfilled space in the central portion of the oven, between the end piles with a non-coking constituent saturated with oil, leaving a free gas space in the oven above the same; leveling the complete charge; and then completing the conversion of the liquid hydrocarbon into gaseous fuels by subjecting said charge in said oven to coking therein by externally heating said oven.

2. A process for the conversion of liquid hydrocarbons into gaseous fuels in a horizontal chamber oven with doors at its two opposite horizontal ends, comprising: top charging said oven with one-half to two-thirds its capacity of coking coal to form within the same oppositely disposed end piles of coking coal at the two horizontal ends of the oven completely filling those end sections of said ovens adjacent the doors, and only partially filling the central section of said oven intermediate the end piles adjacent said doors with said coking coal to form a heap of coking coal of lesser height between the end piles at

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the horizontal ends of the oven; completing the charging of said oven by top filling to a higher level the remaining unfilled space in the central portion of the oven between the end piles with a non-coking constituent saturated with oil, leaving a free gas space in the oven above the same; leveling the complete charge; and then completing the conversion of the liquid hydrocarbon into gaseous fuels by subjecting said charge in said oven to coking therein by externally heating said oven, and simultaneously gasifying said oil thereby.

3. The process of claim 1 in which the oil is a petroleum oil.

4. The process of claim 1 in which the oil is a heating oil.

5. The process of claim 1 in which the oil is a residual oil.

6. The process of claim 1 in which the non-coking constituent is small coke.

7. The process of claim 2 in which the non-coking constituent is small coke.

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