



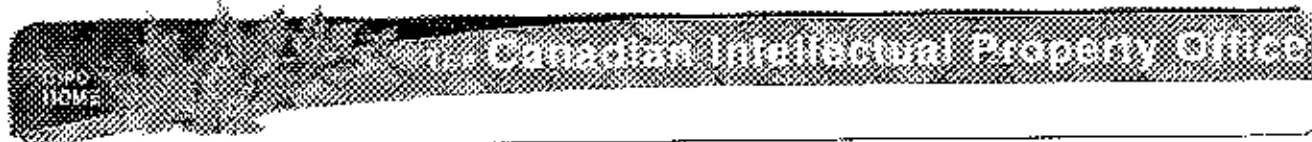
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## Canadian Patents Database

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(12) Patent:

(54) GAS MANUFACTURE

(54) FABRICATION DE GAZ

|  |                                      |
|--|--------------------------------------|
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### ABSTRACT:

CLAIMS: [Show all claims](#)

\*\*\* Note: Data on abstracts and claims is shown in the official language in which it was submitted.

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This invention relates to the production of gases from solid carbonaceous materials, for instance the production of water gas and the gasification of low-grade coal.

5 According to the present invention industrial gases are produced from solid carbonaceous materials while the solid carbonaceous materials are in the form of a thin layer and more particularly a thin annular layer.

10 It has been found that particularly uniform and efficient heating of the carbonaceous materials may thus be obtained and the production of the gases as a continuous process greatly facilitated.

15 In carrying out the gasification processes heat is preferably supplied to both sides of the layer of solid carbonaceous material. The material may be contained in the annular space formed between the inside wall of a tubular furnace or retort and a cylindrical body held centrally in the furnace or retort, this cylindrical body being solid or hollow as desired. As above indicated heat is preferably supplied to both sides of the layer of  
20 carbonaceous material and, where the layer is annular in shape, the central body will then be hollow and its interior will be heated.

25 The actual thickness of the layer of carbonaceous material will depend to a certain extent upon the state of division of the carbonaceous material. Where, however, an annular layer is employed its thickness may be  $\frac{1}{3}$  or less of its outer diameter and is preferably only  $\frac{1}{4}$  to  $\frac{1}{10}$  or even less, e.g.  $\frac{1}{20}$ , of its outer diameter.

Where the solid carbonaceous materials are subjected to treatment with a gas or vapour, e.g. with steam as in the case of water gas production, the materials may be employed as a suspension of powder or dust in the steam or other gas or vapour. Apparatus of relatively small dimensions may thus be employed with advantageous results. Thus for the production of water gas finely divided coke may be blown together with steam through an annular space between two tubes, the outer having a diameter of 2 to 6" and the annular space having a thickness of  $\frac{1}{8}$ " or less or, when the outer tube has a diameter of say 4 to 6", a thickness of an inch or more. In such a process it is very convenient to supply a finely divided carbonaceous material to the bottom of the annular space formed between two vertical or substantially vertical members where it is caused to meet one or more upwardly directed jets of the steam or other reactant gas or vapour. In this way the carbonaceous material may be carried in the form of a suspension right up the annular space and thence to a settling chamber in which any residue may be collected from the gas formed and unchanged reactant gas or vapour.

In the production of gases by processes in which the carbonaceous materials are subjected to the action of heat in less finely divided form, for example in the gasification of low-grade coal, apparatus of larger dimensions will be used.

Such processes, whether or not they involve the use of reactant gases or vapours, may be carried out very efficiently as a continuous process by employing a vertical retort or furnace containing a hollow central member. The carbonaceous material is allowed to travel slowly under the action of gravity down the annular space between the central member and the wall of the retort or furnace. Heat may be supplied to both sides of the annular layer of carbonaceous materials by furnace gases, or by means of rings of gas burners or other suitable heating means arranged round the outside wall of the retort or furnace and round the inside wall of the central member. Preferably no heating is applied to the portions of the retort or furnace in the immediate vicinity of its upper and lower ends. Spent carbonaceous material is allowed to fall from the bottom of the furnace or retort into a water seal from which it may be removed intermittently or continuously as desired, and fresh carbonaceous material is supplied to the top of the furnace or retort by means of a conveyor operating through another water seal, the gas produced being withdrawn through a separate outlet provided for this purpose. Part of the gas may, if desired, be circulated through the carbonaceous material in the retort or furnace for the purpose of supplying heat thereto.

It should be understood that, while the invention has been described more particularly with reference to the production of water gas and the gasification of low-grade coal, the invention may be applied generally to the production of gas from solid carbonaceous materials such as coal, coke and low grade solid fuels whether or not gaseous or vaporous reactants such as steam and/or air are employed.

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In the accompanying drawing is illustrated diagrammatically a plant suitable for the continuous gasification of low-grade coal or like carbonaceous material.

The plant comprises a hopper 1 and a screw conveyor 2 adapted to feed coal from the hopper on to the conical closure 3 of the upper end of the inner retort member 4. An annular space 5 is formed between this inner retort member and the retort wall 6 and another between said retort wall and the flue wall 7. Main flue 8 is connected by conduits 9 and 10, and the stack 11 is connected by exhaust conduits 12 and 13, to the outer annular space and the inside of the inner member 4 respectively. Leading from and to the annular space 5 outlet and inlet pipes 14 and 15 are provided. The hearth 16, bucket conveyor 17 and chute 18 are provided for the removal of spent coal.

In operation the coal is fed from the hopper 1 by means of the screw conveyor 2 to the conical closure 3 of the inner retort member 4. During its passage under the action of gravity down the annular space 5 between the inner retort member 4 and the retort wall 6 the coal is gasified, the heat necessary being supplied by furnace gases passing from the main flue 8, through conduits 9 and 10, to the space between the flue wall 7 and the retort wall 6 and to the inside of the inner retort member 4 respectively, and thence to the stack 11 via exhaust conduits 12 and 13.

The gas produced is led off from the outlet 14, part being introduced again at 15 to assist heating, together with the steam or other reactant gas employed. Spent coal discharges into the hearth 16 whence it is removed by the bucket conveyor 17 to the chute 18.

In operation sufficient water is maintained in both the hopper 1 and the hearth 16 to seal the retort from contact with the air.

Can App. 171,475-26  
Simp. Rev. Ch. 171  
33:237-10/136

Having described my invention what I desire to secure by Letters Patent is:

1. In the manufacture of carbon monoxide-containing gases by heating solid carbonaceous material in the presence of a reactant gas, subjecting the heated carbonaceous material to treatment with said reactant gas while packed in a narrow annular space formed between a cylindrical casing and a central member fixed therein and travelling downwards slowly under the action of gravity, and applying heat to the outside of the annular layer of solid carbonaceous materials.

2. In the manufacture of carbon-monoxide-containing gases by heating solid carbonaceous material in the presence of a reactant gas, subjecting the heated carbonaceous material to treatment with said reactant gas while packed in a narrow annular space formed between a cylindrical casing and a central member fixed therein and travelling downwards slowly under the action of gravity, and applying heat to both sides of the annular layer of solid carbonaceous materials.

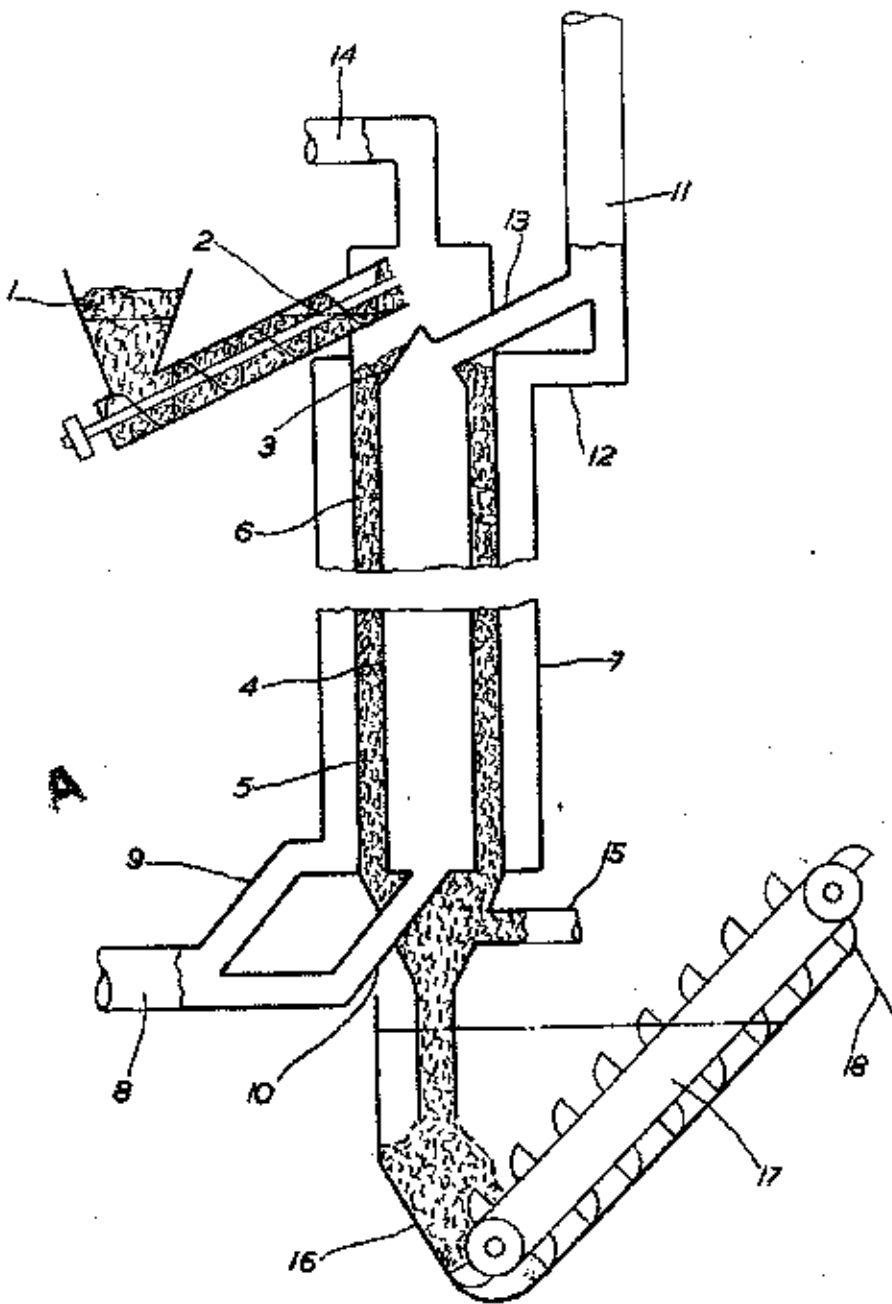
3. In the manufacture of carbon-monoxide-containing gases by heating solid carbonaceous material in the presence of a reactant gas, subjecting the heated carbonaceous material to treatment with said reactant gas while packed in a narrow annular space formed between a cylindrical casing and a central member fixed therein, and having a thickness of 1/4 to 1/10 of its outside diameter and travelling downwards slowly under the action of gravity and applying heat to the outside of the annular layer of solid carbonaceous materials.

4. In the manufacture of carbon-monoxide-containing gases by heating solid carbonaceous material in the presence of a reactant gas, subjecting the carbonaceous material to treatment with said reactant gas while packed in a narrow annular space formed between a cylindrical casing and a central member fixed therein, and having a thickness of 1/4 to 1/10 of its outside diameter and travelling downwards slowly under the action of gravity, and applying heat to both sides of the annular layer of said solid carbonaceous materials.

~~Signed at London, England, this 12th day of December, 1900.~~  
(S) HENRY DREIFUS

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30751



Certified to be the drawings referred to  
 in the specification ~~of~~ of Application  
 S.No. 425261 filed 26 December 1935.  
 Henry Drayfus inventor

Witness

Signed at London, England this  
 13th day of August, 1936.

By  
*Stephens & Allen*  
 Attorneys