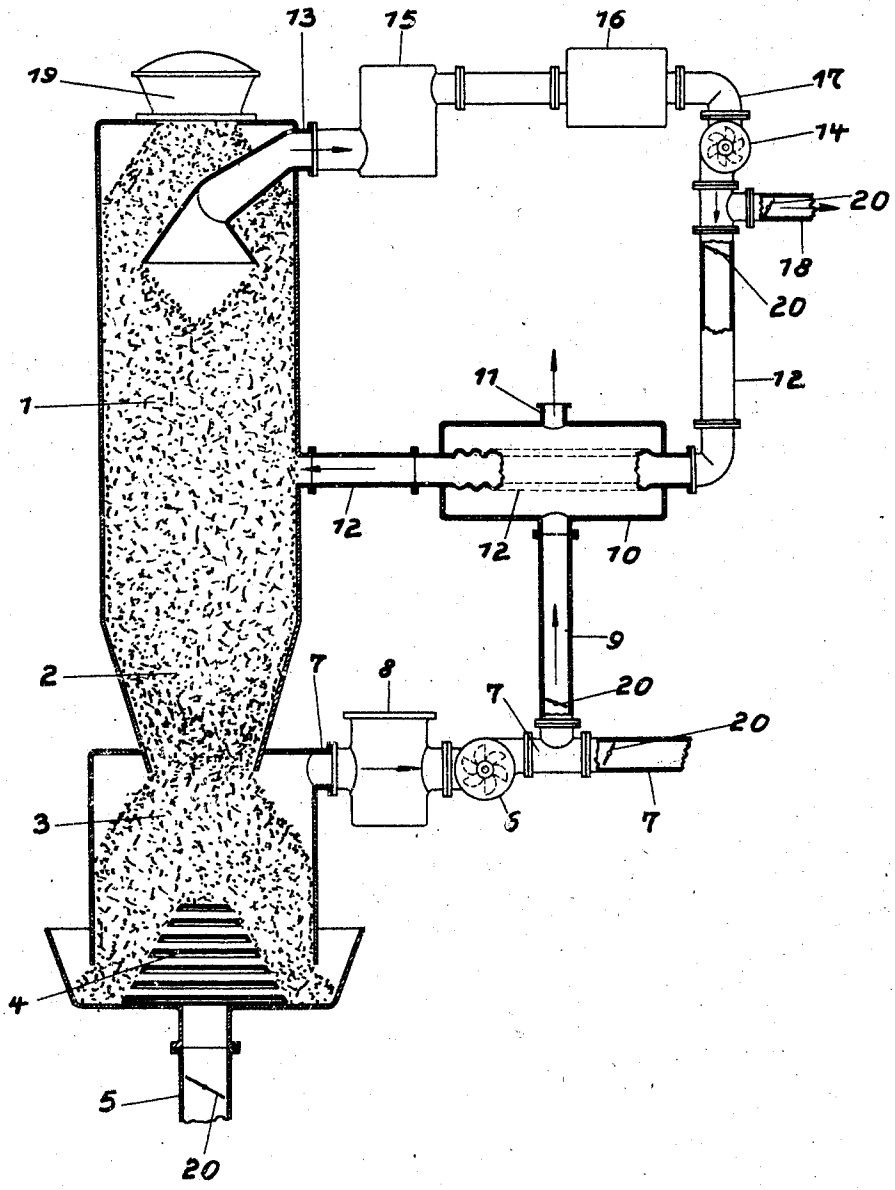
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H. ROSENTHAL

METHOD OF DISTILLING SHALE AND SIMILAR BITUMINOUS FUELS

Original Filed March 24, 1922



Inventor
H. Rosenthal
By Marks & Clerk
Attys.

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UNITED STATES PATENT OFFICE.

HANS ROSENTHAL, OF BERLIN, GERMANY, ASSIGNOR TO JULIUS PINTSCH AKTIEN-GESELLSCHAFT, OF BERLIN, GERMANY.

METHOD OF DISTILLING SHALE AND SIMILAR BITUMINOUS FUELS.

Original application filed March 24, 1922, Serial No. 546,430. Divided and this application filed February 4, 1925. Serial No. 6,850.

To all whom it may concern:

Be it known that I, HANS ROSENTHAL, a German citizen, residing at Berlin, in the Province of Brandenburg, Germany, have invented certain new and useful Improvements in or Relating to a Method of Distilling Shale and Similar Bituminous Fuels, of which the following is a specification.

The present invention relates to a method of distilling oil shale and similar bituminous fuels, and forms a division of the application Serial No. 546,430 of 24, 3, 1922.

According to the latter the fixed carbon still contained in the distilled shale is gasified, and the hot gas obtained mixed with cold gas and introduced directly into the distilling zone in order, by discharge of the sensible heat, to distil the shale. According to the present invention the glowing and already distilled shale is gasified as in the case of the application Serial No. 546,430, but the gas obtained is drawn off from the gasifying chamber, burnt in a special gas pre-heater of the circulation type (recuperator or regenerator), and the resulting heat given off on to gas or steam, which is thus heated to the temperature required for the distillation of the shale, and introduced into the distilling zone. The heated gas here distils the shale by discharge of its sensible heat, is then freed of the volatile distillation products, the excess amount being drawn off, and the remainder again heated as circulatory gas in the circulation pre-heater, to be then introduced anew into the distilling zone. This circulatory gas is a pure, high-grade distillation gas not contaminated by atmospheric nitrogen.

In order to be able to supply the generated gasifying gas to the pre-heater under sufficient pressure, or to conduct same to another point of employment, it is in certain cases desirable to provide a cooling device, scrubber or the like directly to the rear of the gas exit. The heat thus released may be utilized for pre-heating the combustion air, for generation of steam, or for other purposes. The distillation of the shale and the subsequent combustion may, if desired, also be effected in two apparatus spaced at a distance apart. If the fixed carbon is not of such quantity as to sufficiently heat the circulation gas in the pre-heater, a part of the generated distillation gas or an entirely different fuel may be burnt in addition in the pre-heater.

A form of embodiment of the invention is shown diagrammatically in the accompanying drawing.

1 indicates the distilling zone of the plant, whilst 2 is a neutral zone and 3 the gasifying zone with the rotary hearth 4. Cold or pre-heated air or steam, or a mixture of both, or also a mixture containing carbonic acid gases, is conducted through the pipe 5 into the glowing and already distilled shale. In this zone 3 the gasifying occurs of the fixed carbon still contained in the distilled shale. The gas thus obtained is drawn off by means of the ventilator 6 through the pipe 7. In front of the ventilator 6 is situated a cooling device 8, in order, as described above, to be able to employ the heat thus released for pre-heating the combustion air, for generation of steam, or for other purposes. A portion of the gas sucked up through the ventilator 6 passes through the branch pipe 9 into the pre-heater 10, in which the gas is burnt, the burnt gas escaping through the pipe 11 into the open. The heat released by the combustion is given off on to the gas traversing the pre-heater in the pipe 12. This gas is termed circulatory gas, and acts as a heat transmission means for the distilling process. The distillation gas is drawn by means of the ventilator 14 out of the pipings or sockets 13 into the pipe 17, the cooling device 15 and the tar separator 16 being located at an intermediate point, and from there is passed through the pipe 18 to the desired point of consumption. A part of this distillation gas reaches the pipe 12 and, as described above, is heated in the pre-heater to the temperature required for distilling the shale. The plant is fed by means of the filling device 19.

The gas drawn off from the combustion zone, which is not required to be burnt in the pre-heater, passes through the pipe 7 to a desired point of consumption. Throttle devices 20 are provided in the pipes 5, 7, 9, 12 and 18, in order to be able to effect the necessary regulation of the currents of gas.

What I claim is:

A method of distilling oil shale and similar bituminous fuels by means of internal

heating, consisting in wholly or partly burning in a special pre-heater the gas resulting from the gasification of the shale residue, said gas giving off in the pre-heater the heat resulting from its combustion on to a gas, which continuously circulates through the fuel and acts as a heat transmission means.

In testimony whereof I have affixed my signature in the presence of two witnesses.

HANS ROSENTHAL.

Witnesses:
WLAD ENDER,
ROY V. FOX.