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PATENT SPECIFICATION

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2878

COMPLETE SPECIFICATION

Apparatus for the Catalytic Treatment, more particularly the Purification, of Gases.

We, RUHRCHEMIE AKTIENGESELLSCHAFT, of Oberhausen-Holten, Germany, a Company organised and existing under the Laws of the German State, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement :

The invention relates to tower-like apparatus for the treatment of gases with catalytically acting substances at raised temperatures, in which the contact substances are provided in chambers disposed one above the other which are associated in twos to form units. For the purpose of avoiding the passage of gas, the upper chamber of each unit is provided with a cup-shaped rim, into which the lower edge of the next higher unit is fitted for the purpose of forming a seal.

It is known to provide tower-like apparatus with seals in the form of channels. Furthermore, it has been proposed to use sand or other pulverulent material in such cup-shaped seals ; such sand seals are used more particularly in connection with hot gases.

If such a tower be used for purifying gases at raised temperatures by the use of catalytic substances, for example, for the removal of sulphur compounds, it will be understood that solid substances do not provide a sufficiently tight seal, so that occasionally the purified gases are rendered impure by the gases to be purified.

It has been found that these objections are avoided if the cup which forms the seal be filled with the same material as is used for the catalytic treatment of the gas. In this connection care should be taken that the gas is exposed to greater resistance in the cup than when it passes through the purifying chamber. This can be secured for example by the catalytic material being used as packing in a fine-grain or even pulverulent condition. Furthermore, the lower edge of the next higher unit rests ordinarily in the channel of the cup seal, so that the packing provides greater resistance to the passage of gas.

The advantage of the apparatus according to the invention consists in that if, nevertheless, the gas should find a way through the seal, it will undergo catalytic conversion as it passes through the seal, so that such penetration by the gas will no longer lead to the purified gas being rendered impure. The essential features of the invention thus consists in that the sealing device does not provide merely a seal, but at the same time converts, for example purifies, the gas which may pass through it.

The invention is hereinafter described by reference to an example of apparatus illustrated in the accompanying diagrammatic drawing.

For the purpose of removing sulphur compounds from a gas containing CO and H_2 at temperatures of from 150 to 300° C the gas is passed through a purifying mass, by means of which all the sulphur compounds, that is to say, both the hydrogen sulphide and the organic sulphur compounds, can be completely removed. The gas to be purified is fed through the pipe A at B into the tower-shaped purifier, which consists of a casing C and is provided with a cover plate D. At the bottom of the tower a steel ring E is provided which has at its upper edge a cup-shaped channel F. Into this channel fits a cylindrical unit of the apparatus, which consists of two purifying chambers G and H, of which the upper part G is itself provided with a cup-shaped annular seal J. Inside the purifying tower a number, such as 3, of such units are placed one above the other. A known compensating device K is inserted into the top cup-shaped seal to allow for thermal expansion, the device K being provided integrally with the cover plate D.

Part of the unpurified gas which enters the apparatus at B passes into the lower chamber H, which is filled with a catalytic purifying material ; part of the gas rises around the closed side wall L of the lowest unit and enters the upper purifying chamber G ; part of the gas however enters the lower purifying chamber H_1 of the next higher unit, while still a further part of the gas sweeps past the side wall L_1 of the next higher unit and thence enters the upper chamber G_1 of the

second unit. The purified gases passing out of the chambers G and H enter a central space M which is disposed between the two purifying chambers of a unit; from this space they pass into the annular space N which is between the purifying apparatus and the casing C and leave the annular chamber N through the pipe O.

The course of the gas is exactly the same in the upper units.

The cup-shaped annular seals F, J, J_1 and J_2 are filled with the same catalytic purifying material, which is finely powdered merely for the purpose of increasing resistance to the gas, whereby on the one hand greater resistance is offered in the seal to the gas to be purified, while on the other hand any gas which passes through the seal into the annular chamber N is at the same time purified, so that the gas already purified will not be affected. In order to secure a sufficiently high gas resistance, the sealing devices are for example so constructed that the depth of the cup-shaped sealing device corresponds to about half the height of a purifying chamber.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. Apparatus for the catalytic treatment, more particularly the purification, of gases at raised temperatures, in which the solid catalytic material is provided within a tower-shaped casing in chambers disposed one above the other, such chambers being associated in twos or other number to form units, and in which the upper purifying chamber of each unit is provided with a cup-shaped rim serving as gas seal, the rim being filled with a solid substance as packing, characterised in that the packing consists of the same substance as is used for the catalytic treatment of the gases.

2. An apparatus for the catalytic treatment, particularly the purification, of gases at raised temperatures substantially as hereinbefore described with reference to the accompanying drawings.

Dated this 10th day of September, 1936.

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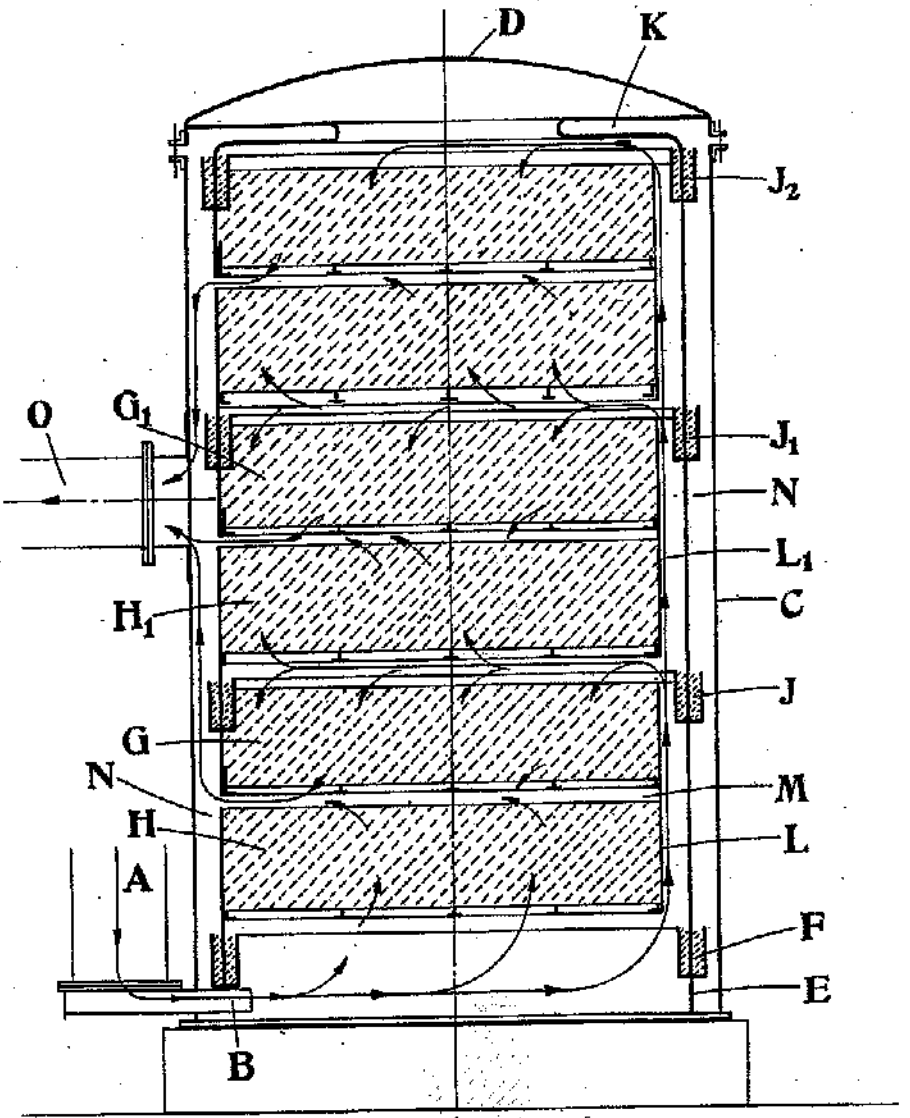

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