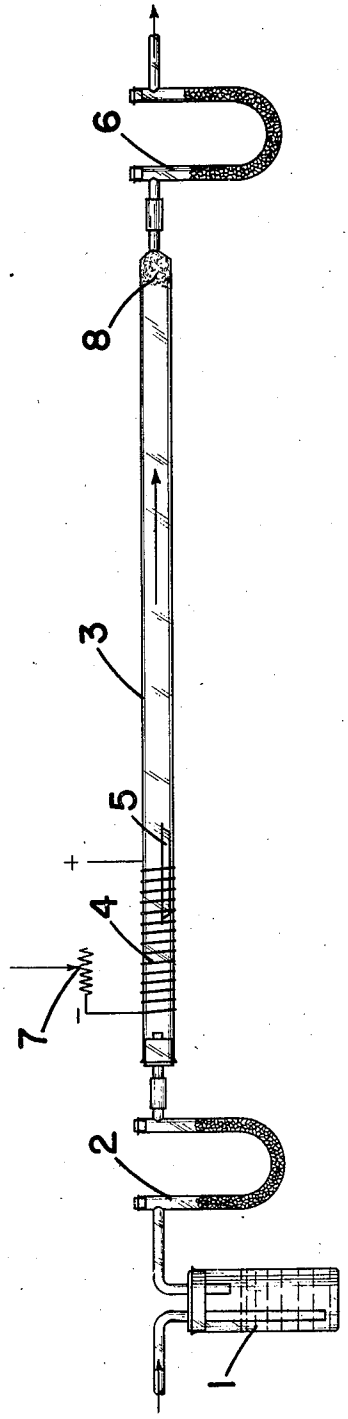
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PROCESS FOR ANALYSIS OF CORE SAMPLES CONTAINING OIL AND WATER

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PROCESS FOR ANALYSIS OF CORE SAMPLES CONTAINING OIL AND WATER

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2 Claims. (Cl. 23—230)

This invention relates to a process and apparatus for the determination of oil and water in a core sample.

More particularly, the invention relates to a process and apparatus for making a quantitative determination of oil and water in a core sample.

It is often desirable to obtain a quantitative determination of both the oil and the water in a sample. A common example where such a determination is desired is in the analysis of core samples obtained from the producing formation of an oil well. In order to be able to determine the amount of oil which will be recovered from the production zone both the oil in the sample and the connate water in the sample are determined.

The herein disclosed invention involves a process for carrying out a determination of the water and oil in a core sample in a single procedure and apparatus used for carrying out the determination.

Other objects and advantages of the present invention may be seen from the description of the invention taken in connection with the drawing in which the sole figure is a diagrammatic representation of the apparatus used in carrying out the invention.

In the drawing, a cylinder 1 filled with concentrated sulfuric acid is connected to U-shaped drying tube 2 which is filled with a solid dehydrating agent. Attached to the drying tube 2 is a cylindrical glass tube 3 of convenient dimensions, usually 1" in diameter and 25" long, provided with an electrical heating element 4 and a small porcelain boat 5. Attached to the other end of the glass tube 3 is a U-shaped tube 6 filled with a drying agent, such as "Dehydrite." A cotton plug 8 is placed in the end of the glass tube as shown, for reasons which will be later explained.

The process is carried out in the following manner. The drying tube 6 is filled with solid dehydrating agent as above described, weighed and put in place in the apparatus, as shown. Then a weighed core sample is put in the weighed porcelain boat 5 and placed within the section of the tube surrounded by heating element 4. Air is then passed through the apparatus at a slow velocity with heat being applied by the heating element 4, the temperature of the heating element being controlled by rheostat 7. In the first stage the temperature in the tube is usually held below 100° C. This temperature allows the water in the core sample to vaporize and to be carried into the drying tube 6 where it is absorbed by the drying agent. On the other hand, this temperature is low enough that very little oil from the sample is removed from the core and most of that which is removed is retained by the cotton plug 8. When it is adjudged that all of the water present in the core sample in the boat has been evaporated from the sample and absorbed in the drying tube 6, the drying tube is disconnected and weighed.

As the next step the temperature of the core sample is increased by increasing the temperature of the heating element 4. As an example this temperature may be raised to about 425° C. which is considered sufficient to burn and expel all of the oil in the sample in the presence of the stream of drying air. After all the oil in the sample has been removed the heating of element 4 is terminated and the boat and the sample are removed from the tube 3 and weighed.

The amount of water which was contained in the sample is determined by the difference in weight in the drying tube 6 before and after the water has been expelled from the sample. The amount of oil in the sample is the loss in weight of the sample minus the amount of water obtained from the sample.

It will be evident from the above description that the method of determination described is rapid and does not require calibration to correct results since both the water and the oil are determined in a single procedure.

While I have disclosed the preferred modification of my invention, it will be evident that various modifications and changes may be made without departing from the scope of the invention. For example, a different heating element than the electric unit shown may be used in carrying out the procedure, and some other drying agent than the preferred material mentioned may be used in making the determination. Further, different temperatures may be used in carrying out the several steps of the process than the preferred temperatures disclosed and the dimensions of the apparatus may be altered as convenient. These modifications are within the purview of my invention and I do not wish to be limited to the specific limitations of the description, but only by the appended claims in which the invention is claimed as broadly as the prior art permits.

I claim:

1. A process for analyzing a core sample comprising the step of flowing a stream of drying air over the sample while the sample is at a temperature of at least 100° C. and sufficient to vaporize moisture therefrom, passing the stream

of air through a drying agent to absorb the moisture from the air, weighing the drying agent to determine the moisture absorbed, subsequently increasing the temperature of the sample, while continuing to flow drying air thereover, to a temperature sufficient to remove substantially all the oil from the sample but not substantially above 425° C., and then weighing the treated sample.

2. A process for analyzing a core sample containing oil and water, comprising the steps of passing a stream of dry air over said sample while it is at a temperature of substantially 100° C., subsequently causing the stream of air to flow through a drying agent to absorb moisture from the air, weighing the dry agent to determine the amount of moisture absorbed, thereafter increasing the temperature of the sample to approximately 425° C. while continuing to flow dry air thereover to remove substantially all of the oil from the sample and then determining the weight of the sample after the oil has been removed therefrom.

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