Jan. 7, 1930. G. H. HALVORSON 1,743,035

DETERMINING VOLATILE MATTER IN COMBUSTIBLE MATERIAL

Filed Jan. 15, 1926

Fig. 1

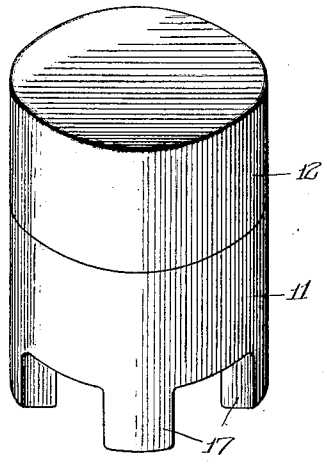
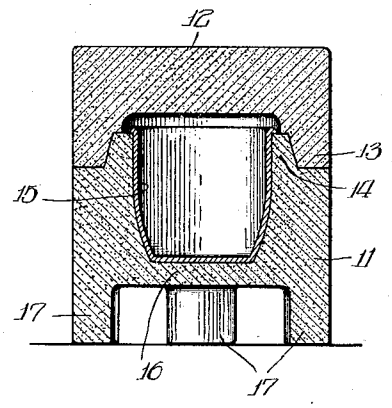


Fig. 2



Witness:
R. Burkhardt

Inventor:
Gaylord H. Halvorson,
By L. Anthony Usina
Atty.

Patented Jan. 7, 1930 1,743,035

UNITED STATES PATENT OFFICE

GAYLORD H. HALVORSON, OF DULUTH, MINNESOTA

DETERMINING VOLATILE MATTER IN COMBUSTIBLE MATERIAL

Application filed January 15, 1926. Serial No. 81,368.

This invention relates to a new and improved method for determining the volatile matter in fuel, or other material.

Tests of this character are in general use for a number of purposes and particularly in connection with determining the volatile content of fuels such as coal. Here the volatile content is an indication of a quality of the coal and of its suitability for various fuel purposes. It is highly important that tests such as these be so standardized as to enable different chemists in different laboratories to arrive at the same result in the tests of similar samples.

A method now in general use consists in placing a one gram sample in a platinum crucible of 15 cubic centimeters capacity and in placing the crucible in the front of a furnace registering 500 degrees centigrade until the flame subsides and then placing it in the interior of a muffle where the temperature is 950 degrees centigrade for three minutes, after which it is cooled and weighed, the loss in weight representing volatile matter. In carrying out the above method a variation of one-half inch in the location of the crucible during the preliminary ignition may cause a variation in the volatile content determination of as much as 75/100 of 1%. While the same chemist using reasonable precautions may be able to obtain uniform results, it is very difficult for different laboratories to so manipulate the method that the coal will not be ignited more rapidly in one case than in the other.

It is an object of the present invention to provide a new and improved method for the determination of the volatile matter in fuel or other material, whereby the determination may be carried out by different persons with the assurance of securing uniform results.

It is a further object to provide a method of this character adapted to be carried out by the use of simple apparatus with rapidity and efficiency.

Other and further objects will appear as the description proceeds.

I have illustrated in the accompanying drawing a preferred form of apparatus for carrying out my improved method.

In the drawing,

Figure 1 is a perspective view showing the crucible casing and

Figure 2 is a vertical section through the crucible and casing.

The crucible casing comprises the body 11 and cover 12 preferably formed of magnesite, although it may be formed of other refractory material capable of standing high temperatures. As shown in Figure 2, the cover 12 is provided with a circular flange 13 which surrounds a circular flange 14 on the body member in order to insure a complete enclosure of the crucible 15. This crucible 15 may be formed of platinum, or any suitable material. The bottom 16 of the casing body 11 is preferably thinner than the side walls and top of the casing and the casing is supported by legs 17 so that the bottom is out of contact with the support upon which the casing rests.

In the use of my device, according to my method, the sample of the material to be tested is placed in the crucible and the crucible placed in the casing. The casing containing the crucible is then placed directly in the muffle, which preferably is at a temperature of 950 degrees centigrade. The magnesite casing insulates the crucible so that the sample is not heated too rapidly. The rate of heating will be uniform at all times and results secured by different laboratories using this apparatus will be truly comparable.

I have shown one preferred form of apparatus for carrying out my improved method, but it is to be understood that this is capable of modification and I contemplate such changes and modifications as come within the spirit and scope of the appended claims.

I claim:

1. That step in the method of determining volatile content of material which includes placing a receptacle having a sample of this material in a closed vessel and placing said vessel in a furnace uniformly to heat said sample.

2. That step in the method of determining volatile content of material which includes

placing a platinum receptacle having a sample of this material in a closed refractory vessel and subjecting said vessel to heat in an oven uniformly to heat said sample.

3. That improvement in methods of determining the volatile content of combustible material which consists in weighing a sample of the material, placing the weighed sample in a container, enclosing the container in an insulating casing, applying to the casing heat of a predetermined temperature in order to heat the sample, removing the sample from the casing and the container, and finally weighing the removed sample to compare its weight before and after being submitted to the heat treatment.

4. That improvement in methods of determining the volatile content of combustible material which consists in, weighing a sample of the material, placing the weighed sample in a container enclosed in an insulating casing, applying to the casting heat of a predetermined temperature in order to heat the sample, removing the sample from the casing and the container, and finally weighing the removed sample to compare its weight before and after being submitted to the heat treatment.

Signed at Duluth, Minnesota, this 2nd day of January, 1926.

GAYLORD H. HALVORSON.