

J. A. P. CRISFIELD.
 APPARATUS FOR DETERMINING WATER IN COKE, &c.
 APPLICATION FILED NOV. 19, 1908.

982,765.

Patented Jan. 24, 1911.

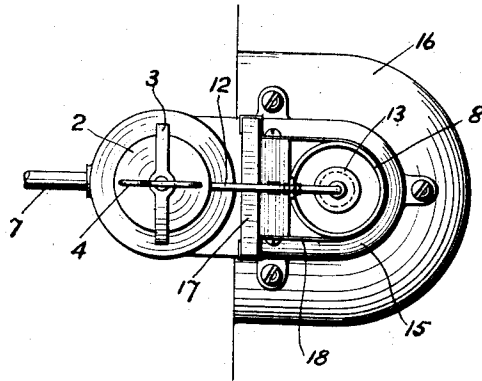


FIG. 1.

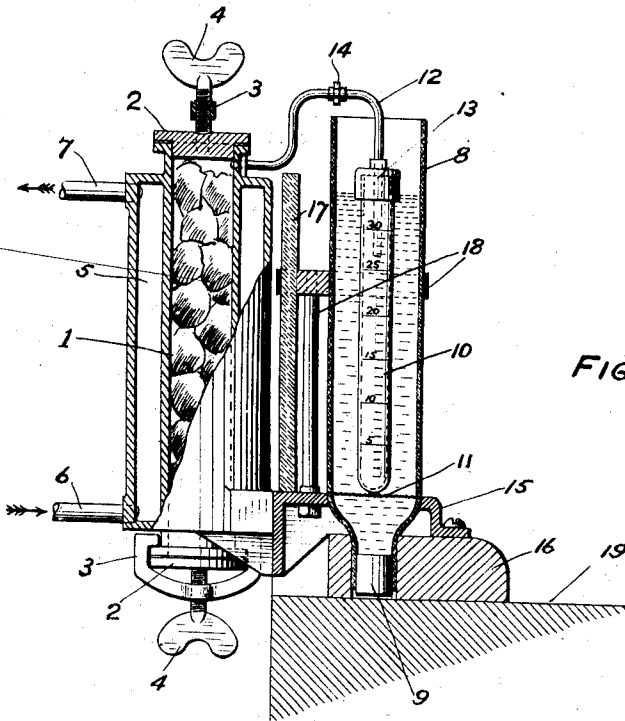


FIG. 2.

WITNESSES:

Robt. R. Kitchel.

Frank H. Hanch

INVENTOR

James A. P. Crisfield

BY *Augustus D. Stoughley*
 ATTORNEY

UNITED STATES PATENT OFFICE.

JAMES A. P. CRISFIELD, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE UNITED GAS IMPROVEMENT COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

APPARATUS FOR DETERMINING WATER IN COKE, &c.

982,765.

Specification of Letters Patent.

Patented Jan. 24, 1911.

Application filed November 19, 1908. Serial No. 463,340.

To all whom it may concern:

Be it known that I, JAMES A. P. CRISFIELD, a citizen of the United States, and a resident of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a certain new and useful Apparatus for Determining Water in Coke and the Like, of which the following is a specification.

10 The principal object of the present invention is to provide a simple and reliable apparatus for rapidly and easily determining the quantity of water or moisture in coke by means of a direct reading.

15 One embodiment of the invention is illustrated in the accompanying drawings, in which—

Figure 1, is a top or plan view of apparatus embodying features of the invention, and Fig. 2, is a side view principally in central section of the same.

In the drawings 1, is a coke chamber. As shown it is open at its ends and there are covers 2, for closing these ends.

25 3, are yokes adapted to engage flanges on the ends of the chamber and provided with set screws 4, by means of which the covers may be made to seal the ends of the chamber. There are means for heating the chamber 1 and the steam jacket 5 with its steam inlet connection 6 and steam outlet connection 7, is one example of such means.

30 8, is a condenser receptacle adapted to contain a cooling liquid, as water. It is shown as open at its top and provided with a stopper 9, at its bottom.

40 10, is a calibrated tube arranged in the chamber 8, which may be provided with a gauze or other suitable partition 11 for supporting it.

12, is a tube or connection that communicates with the chamber 1 and with the calibrated tube 10, for example, through the cap 13 of the latter. The tube 12 is shown as provided with a coupling 14, by means of which its parts may be disconnected.

15, is a bracket which may be mounted upon a block or stand 16 and it serves to support the chamber 1 in overhanging position so that its covers may be removed. This bracket also carries a shield or partition 17, arranged between the chambers 1 and 8 to prevent the transfer of heat.

18, is a stand rising from the bracket 15

and adapted to support the condenser chamber 8.

The described parts constitute a complete piece of apparatus which may be readily mounted on a suitable object as 19, and the necessary connections for heating the chamber 1 can be readily made.

Coke readily takes up moisture, particularly in rainy weather and it is therefore important in connection with coke to know the amount of moisture which it contains. To ascertain the amount of water present in coke by means of the described apparatus a sample of coke, for example, one-half pound, is placed in the coke chamber 1 and sealed. This may be done by removing the top cover 2 and then replacing it. Heat applied to the chamber 1, for example by means of the steam jacket, drives off the water from the coke and this water passes through the connections 12 and reaches the calibrated tube 10, in which it is condensed by the action of the cooling liquid in the condenser chamber 8. The temperature employed for this distillation is from 225° F. to 350° F., more or less. The tube 10, is so calibrated and marked that the divisions of its scale indicate by direct reading the percentage of water contained in the one half pound of coke. The operation is therefore simple and easily performed. Moreover it is quite accurate and much more accurate than it would be if an attempt were made to weigh the water driven off from the coke. A slight error in the weight of the coke is comparatively immaterial, because the weight of the coke is relatively large in proportion to the weight of the water that is driven off and condensed. Upon the completion of the operation the lower cover 2 may be removed and the coke permitted to fall from the chamber 1. The coupling 14, affords means for disconnecting the connection 12, so that the calibrated tube can be taken out and emptied. When the parts are restored to place, the apparatus is in condition for use in making another test.

It may be said that the apparatus constitutes a means for determining the amount of water or moisture in coke which is available to persons comparatively unskilled in the art of making accurate physical determinations.

To drive off water from the coke the latter must be heated above 212° F., but the coke must not be heated to a much higher temperature than this, say something under 300° F., because if heated above this temperature volatile matter other than water is driven off from the coke and would interfere with the determination of the amount of water present as moisture in the coke. The temperature of steam corresponds to the pressure, so that by utilizing steam at ordinary pressures the temperature to which the coke is heated is fixed without manipulation or attention at the proper point for driving off water but not the volatile constituents of the coke. The use of steam heating means therefore, as well as the described construction of apparatus, makes it possible for unskilled persons to determine the amount of water present in the coke without requiring them to direct their attention to a constant manipulation of apparatus for attaining and keeping the temperature of the coke within the comparatively narrow limits which are necessary for an accurate determination of the amount of water.

The apparatus is adapted to determine the moisture in coke and of course coal and permits of the use of the latter in its commercial state, that is, in lumps without having recourse to pulverizing. This is advantageous because if the coke had to be pulverized moisture would evaporate during the operation and an error would be introduced into the determination. By the described apparatus the determination of the moisture in the coke is made at the place and at the time where the same is being used. This is important because coke and coal are usually piled in the open and a shower changes the amount of moisture therein and if the coal or coke were transported to be tested it would dry out in transit. For these reasons

as well as others that will be readily understood it is important to provide for quickly getting the coke in commercial sizes into and out of the apparatus and the described construction provides for this.

What I claim is:

1. Means for determining water in coke comprising the combination of a fixed coke chamber adapted to be filled with coke of commercial size and provided with entrance and exit means capable of freely passing coke of commercial sizes, devices for sealing said means, a steam jacket co-extensive in length with the coke chamber for applying a limited degree of heat to said chamber and for heating the coke throughout its mass, a condenser chamber adapted to contain a cooling substance, a calibrated tube arranged in the condenser chamber, and means for connecting the interiors of the coke chamber and calibrated tube.

2. Means for determining water in coke comprising the combination of a coke chamber having an opening commensurate with its cross-sectional area and adapted to receive coke of commercial size, steam heating means for applying a limited degree of heat throughout all parts of the coke chamber to uniformly drive water from the coke, a calibrated tube connected with the coke chamber, and a transparent condenser chamber adapted to contain a cooling fluid and within which the calibrated tube is arranged and through which it is visible, substantially as described.

In testimony whereof I have hereunto signed my name.

J. A. P. CRISFIELD.

Witnesses:

CLIFFORD K. CASSEL,
FRANK E. FRENCH.