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PROCESS OF TREATING COKE

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5 Claims. (Cl. 44—6)

My invention relates to the treatment of coke and particularly to processes for treating coke for domestic use whereby the product has highly improved characteristics.

An object of my invention is to provide a process for treating coke whereby it is rendered substantially dustless during subsequent handling.

A further object of my invention is to provide a process for treating coke whereby it has a distinctive appearance that may indicate its origin.

A further object of my invention is to provide a coke that burns with a characteristic flame coloration.

A still further object of my invention is to provide coke having a distinctive odor.

One of the disadvantages in the employment of coke, and particularly for domestic purposes, is the comparatively large amount of fine dust that results from its handling. This condition results from the fact that the oils and other volatile materials are recovered from the coal during coking and the product is in the form of porous masses that are dry and brittle.

It is desirable, also, in the purchase of coke to have assurance that the coke has been produced by a process and from coals that insure a reliable product of high quality. The average consumer is not in position to determine the quality of coke since the appearance of both high-grade and low-grade coke is quite similar.

In the burning of coke, the flame ordinarily has little or no color and there is, accordingly, no way of distinguishing the band or source of coke by observing its flame.

In accordance with the present invention, it is proposed to eliminate certain of the disadvantages in the employment of coke and particularly for domestic use by rendering the coke substantially dustless, not only when it leaves the plant where it is manufactured but also during the course of its handling prior to its being consumed. It is proposed, also, to render the coke distinctive in appearance by applying thereto at the same time that it is rendered dustless a coloring or marking that will serve to identify the source or brand of the coke.

In order that the coke may be further identified both during the time that it is stored prior to combustion and while the coke is being consumed, it is provided with material for giving off a distinctive odor and with other material which causes the flame to have a distinct coloration. By these latter means, the identity of the coke may be readily perceived by its distinctive odor and by observing the coloration of the flame while it is burning.

In practicing the preferred method of treating coke for the purposes set forth above, a compound is prepared which comprises, for example, an oil or oil emulsion which contains coloring material for marking the surface of the coke and an oil having a distinctive odor. Additional material may be added for the purpose of flame coloration although, in certain instances, a single material may operate to color or mark the surface of the coke and to color the flame of the coke when the latter is burned.

The oil constituting the major portion of the treating material may be, for example, a light fuel oil, although it is conceivable that a number of petroleum oils having the proper characteristics or certain mixtures thereof may be employed. To this oil may be added certain vegetable or aromatic oils, such as pine oil, which not only neutralize any slight offensive odor of the base oil but impart to the coke a distinctive odor that serves to render the coke distinctive. The coloring or marking material may be in the form of an oil-soluble or suspension dye for giving the coke a distinctive color. For the latter purpose, however, I have found that comminuted metal, such as bronze powder, known to the trade as "rich gold brilliant", is very suitable since it is readily held in suspension in the oil, imparts a distinctive color to the coke and, in addition, imparts a green color to the flame of the coke by reason of its high content of copper. Other metals or materials may be employed to impart other colors.

The coke to be treated is prepared in the usual well-known manner by distillation to produce gas and to recover substantially all of the materials such as oils and tar which constitute valuable by-products of the coking operation. The resultant product, which consists principally of the solid constituents of the coal, is a porous structure of thin cellular walls which are so free from oil as to be brittle whereby dust is formed, on the outer surface especially, when it is handled.

The treatment provided herein requires only a very small quantity of oil relative to the quantity of oily materials removed during coking. This small quantity is ample to reduce the brittleness of the outer surface of the coke and to cause the particles of the latter to adhere to each other and to the larger masses of coke. This small amount of oil is sufficient to reduce the surface friability of the coke to such degree as to render the coke substantially dustless.

The solution or liquid for treating the coke may be applied in any suitable manner but it has been found that it may be applied very efficiently by means of spray guns of the type commonly employed for painting steel structures. The coke may be treated at any time after it is quenched and cooled but preferably after it is screened and sized for delivery to the customer. From the standpoint of economy and convenience, it may be preferable to apply the treating material before the coke has passed the crushers and sizing screens but such operation would result in waste of oil in the breeze and smaller sizes that are not commercial and, also, the surfaces resulting from fracture during subsequent handling would not be covered with the solution.

I prefer to apply the solution immediately after the coke has been re-screened to remove the breeze and fine material formed in the bins. From the re-screening system, the coke is delivered direct to cars or trucks for delivery to the customer or dealer and the solution may be efficiently applied immediately before or during the process of loading the coke into cars, trucks or boats. This arrangement insures that the coke would be handled to a substantially minimum degree after it has been treated.

When the solution is applied by means of spray guns, approximately one-half gallon of solution is used per ton of coke. When spray guns are employed on opposite sides of a column of coke, substantially all portions of all of the pieces of coke pass through a very fine spray in the form of a mist or fog of the treating solution and a very light film of oil covers the cellular structure of the surface of the coke.

The coke thus treated is slightly darker in color than untreated coke but the oil film has been found to be so thin that there is no other indication from this source that the coke has been treated. The outer surface of the coke is, however, rendered distinctive by the particles or spots of bronze powder, if such material is used, since the latter is plainly visible on the relatively dark background. Bronze powder does not corrode easily and, accordingly, the appearance of the coke may be retained for a considerable time.

When an aromatic oil, such as pine oil, is used, treated coke may be stored for domestic use and there is no disagreeable petroleum odor such as might be the case if pine oil were not present. When the coke is burned, the flame has a pleasing green color which further identifies its origin.

While my invention has been described particularly with respect to the employment of petroleum oils for treating coke, it is conceivable that other oils may be employed with substantially similar results. While petroleum oils may be the most desirable from a practical standpoint, since they are readily available in commercial form, vegetable oils, asphaltic oils, tar oils, coal tar, water gas tar, etc., may be employed.

Essential characteristics of an oil for this purpose are that it shall be of high gravity, have a high boiling point in order that it will not evaporate at ordinary temperatures to any great extent, and yet have such viscosity as to permit its use in a spraying device. The flash point must be high and the odor must not be excessive.

Oils of the characteristics set forth above may be modified by admixture of other oils or substances. For example, it may be advantageous to emulsify the oil with water, using certain fixatives such as soap or resin to provide a stable emulsion.

The advantages of employing coke treated in accordance with my invention will be obvious to those familiar with conditions that have heretofore obtained in residences, apartments, hotels or other buildings in which dust incident to the handling of the coke has settled over the floor and other objects in the basement and even on floors above the basement. The effects of the treatment of the coke as provided herein are substantially permanent and the disadvantages with respect to dust are substantially entirely eliminated.

The advantages of a coke having a distinctive appearance, a pleasing odor and a distinct flame coloration will be apparent to those skilled in the art relating to the manufacture of coke or to consumers of coke since the latter are able to identify desirable brands of coke without the necessity of being expert in such matters.

My invention is not to be limited except as expressed in the claims.

I claim as my invention:

1. The method of treating coke to render it substantially dustless, to give it a distinctive appearance and to cause it to have a distinctive odor which comprises applying a thin film of odorized oil and comminuted metal of distinctive color to the outer surface thereof.

2. The method of treating coke which comprises applying to the outer surface thereof a thin film of non-volatile liquid that has colored material mixed therewith for rendering said coke substantially dustless and for marking it for identification, said liquid being of such limited quantity and of such affinity for the surface of said coke that substantially no liquid is transferred from said coke upon its contact with other materials.

3. The method of treating such fuel as coke consisting of atomizing a light mineral oil of high gravity, high flash point and a high boiling point in order that it will not evaporate at ordinary temperature whereby to provide a fine mist or spray and then tumbling the aforesaid solid fuel in the presence of the mist or spray, for a length of time sufficient to deposit on the pieces of solid fuel an enveloping film of oil of such amount as will distribute a small quantity of oil approximating one-half gallon of oil over approximately one ton of the solid fuel.

ALFRED R. POWELL.

CERTIFICATE OF CORRECTION.

Patent No. 1,989,526. January 29, 1935.

ALFRED R. POWELL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, second column, after line 63, insert the following as claims 4 and 5;

4. The method of treating such fuel as coke to render it substantially dustless and to cause it to have a distinctive odor which comprises applying a thin film of oil comprising pine oil to the outer surface of said solid fuel.

5. The method of treating such fuel as coke to cause it to have a distinctive odor which comprises applying a thin film of oil comprising pine oil to the outer surface of said solid fuel.

And that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 12th day of March, A. D. 1935.

Leslie Frazer

(Seal) Acting Commissioner of Patents.