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METHOD OF COKING PETROLEUM RESIDUES

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This invention relates to a new and improved fuel and method of making same, and more particularly to a solid fuel made from coking coal and petroleum coke formed into a substantially homogeneous mass and to the method of making such solid fuel.

The processes of petroleum and coal tar distillation result in a substantially solid residue which as formed is not marketable as a commercial fuel. This residue is commonly called petroleum coke and remains in the usual tank still employed in both the coal tar and petroleum industries and also in several of the well-known cracking processes used with petroleum oils. This petroleum coke is not a satisfactory commercial fuel on account of its oily and pitchy nature, being odorous and unclean to handle, and also being weak physically so that it disintegrates excessively when handled by the usual marketing methods. Coke made at refineries is classed as large and small, the largest and strongest being salable in some sections for domestic fuel, but the small finds no markets able to absorb the quantities produced. Where it can be sold, this small or disintegrated petroleum coke has about the value of slack coal. At many plants no attempt is made to market this solid residue, and it is used to fill in around the plants and for road building.

The petroleum coke is not suitable for metallurgical purposes as produced, particularly on account of the weakness of its structure. This fine petroleum coke which is practically a waste product, is a valuable source of pure carbon for many industries, being practically free from ash, if it can be made into a usable form. Many attempts have been made in existing carbonizing systems, such as vertical coke ovens, to utilize these petroleum coke tar residues either alone or in mixtures with binding material. None of these attempts have so far, however, reached commercial success where they utilize any large percentage of the petroleum residue. In such systems of treatment only from five to fifteen per cent of petroleum coke can be added to the best coking coals without rendering the combined product unsalable and making the coking operation difficult.

It is an object of the present invention to provide a new and improved process for making a salable commercial fuel from petroleum coke and the like.

It is an additional object to provide a new and improved commercial fuel having as its major constituent petroleum coke.

Other and further objects will appear as the description proceeds.

My improved process consists in pulverizing petroleum or pitch coke or other similar material, to a fineness preferably below one-eighth of an inch mesh and mixing this pulverized material with a carbonaceous binder consisting of coking coal, or solid pitchy or asphaltic residue of the petroleum and coal tar industries, pulverized preferably to a fineness below three-sixteenths of an inch. This mixture is then placed in a flat substantially horizontal surface in an oven sealed against the admission of air, the oven being heated from below and preferably only so heated. In the preferred method of operation the flat surface is formed of refractory material and is horizontal and forms the bottom of a comparatively low chamber with a large bottom surface area. The mixed material is spread in a relatively thin layer over the bottom of the chamber, this bottom being heated from below. The temperature is raised to a point above four hundred and fifty degrees centigrade, adequate for proper coking. The volatile products pass upwardly through the mass through which the heat progresses gradually from below and these products assist materially in binding the mass together. The binding effect is the result of heating principally from below while the bed remains practically stationary throughout the coking period In the vertical ovens the volatile products do not pass through the uncoked mass, and this mass does not remain stationary but expands and contracts continuously, thereby resulting in small, loose, unbound pieces unsuitable for commercial fuel and difficult to remove from the oven. The volatile products are drawn off from the chamber and the condensible material may be con-

densed out. The remaining gas is high in heat values. The fuel resulting from this process is a coke-like mass having considerable strength adapting it to form a commercial fuel which may be handled in the usual ways. The fuel is not objectional in odor, and is very high in carbon and very low in ash content.

The proportions of the pulverized residue and the pulverized coking coal or other binder may be varied within wide limits, these limits depending upon the binding qualities of the material added to the petroleum residue and with material of high binding qualities I have found it possible to produce a salable fuel containing as high as ninety-five per cent petroleum or pitch coke. In generally carrying out my method, a percentage of from fifteen to twenty-five of coking coal or other binder with the remainder consisting of petroleum residue or the like, will be found to produce a highly satisfactory product.

I claim:

1. The method of producing fuel which comprises mixing a minor portion of coking coal and a major portion of petroleum coke and heating a thin horizontal layer of said mixture to a coking temperature in a closed chamber by heat applied from below.

2. The method of producing fuel which comprises mixing a minor portion of pulverized coking coal and a major portion of pulverized petroleum coke and heating a thin horizontal layer of said mixture to a coking temperature in a closed chamber by heat applied mainly from below.

3. The method of producing fuel which comprises mixing coking coal pulverized to a size less than three-sixteenths of an inch and petroleum coke pulverized to a size less than one-eighth of an inch, and heating the mixture to a coking temperature in a closed chamber by heat applied mainly from below.

4. The method of producing fuel which comprises mixing not more than twenty-five per cent of coking coal pulverized to a size less than three-sixteenths of an inch and not less than seventy-five per cent of petroleum coke pulverized to a size less than one-eighth of an inch, and heating the mixture to a coking temperature in a closed chamber by heat applied mainly from below.

Signed at Chicago, Illinois, this 10th day of February, 1927.

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