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METHOD OF TREATING FUELS

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This invention relates to a method of treating fuel and more particularly to a method of treating lump coal.

The primary object of this invention is the provision of a method of treating coal by which the thermal efficiency of the coal is greatly increased over the efficiency of the same coal if burned untreated, i. e. from a given quantity of coal my process releases and makes available in the form of sensible heat more of the B. t. u. in the coal than has heretofore been done.

While the exact processes of combustion are not fully understood in all their complexities, a few fundamental facts are well recognized. Most prominent among these facts is that before combustion of a hydrocarbon can take place, two atoms of oxygen must be present to unite with one atom of carbon and two atoms or hydrogen must be present to unite with one atom of oxygen. But, before these atoms can react into carbondioxide, water or carbon monoxide, it is obvious that the atoms must be disintegrated or divorced from the molecules of which they form a part.

Another well known fact is that heat is the only agent that will bring about this disintegration of the molecules of the fuel, hence it is important in the furnace of a locomotive, or any other boiler, that the distribution of heat throughout the entire grate surface be as nearly equal and uniform as possible. It is equally important that the supply of air be ample and that its distribution throughout the ashpit and grate be equal and uniform in all ways. If this condition can be maintained, it is obvious that the overall efficiency of the furnace would be at its maximum. It is equally evident that any condition which will prevent an ample supply of air and uniform and equal distribution of air, preventing maintenance of a sufficiently high temperature throughout the fire box will materially decrease the efficiency of combustion.

Coals from certain mining regions contain a very high percentage of impurities such as iron, sulphur, etc., and also have a very high ash content; and these classes of coal when burned readily form clinkers which, while the iron is in a state of flux, readily mixes with the ash, clogs the grate and prevents circulation of air through the ashpit and grate into the fire box, thus greatly lessening the efficiency of combustion.

It is the purpose of my process of treating coal to prevent the formation of clinkers and so control the ash as to permit a uniform flow of air through the ashpit into the burning coal, thereby making available a maximum number of B. t u. from a given amount of coal.

I have found by experimentation and repeated tests that by sprinkling or spraying the coal, either at the tipple as it comes from the mines, or on any other suitable conveyor where the coal can be agitated, with a mixture of from 95 to 99 percent of powdered or granulated limestone and from 1 to 5 percent of zinc, held in solution and suspension in a sufficient amount of water to properly distribute the limestone and zinc in the cracks, crevices and on the surface of the coal, combustion is more complete, the ash content may be better controlled and the formation of clinkers eliminated.

Another factor reducing the thermal efficiency of combustion, i. e. preventing the heat generated from being transmitted to the water in a boiler, is the formation of soot which clings to the tubes materially reducing the over-all efficiency of the boiler. By my method of treating the coal the amount of soot deposited is materially reduced and the requirement for frequent cleaning of the fire obviated.

While I have referred to the use of a combination of powdered or granulated limestone and zinc, I desire it understood that my method involves the use of various forms of limestone, such as calcium chloride, calcium carbonate, etc. the term limestone being intended to be broad enough to cover various combinations of calcium. Coals containing different classes of impurities may require analyses and the proportion of limestone varied so suit the specific coal used.

Having fully described my method, what

I claim as new and useful and desire to protect by Letters Patent is:

A process of treating fuel, whereby combustion is made more complete, which is characterized by sprinkling or spraying coal, while travelling in a conveyor, with a mixture of comminuted limestone and zinc in the proportion of approximately ninety-five to ninety-nine parts limestone to approximately five to one parts of zinc, said substances being held in suspension and solution in water, said limestone, said zinc and said water being of such consistency as to cause the limestone and zinc to adhere to the surface of the coal and in the cracks and crevices thereof when the water has evaporated.

In witness whereof I have hereunto affixed my signature this 3 day of Sept., 1929.

GEORGE M. McGLONE.