

UNITED STATES PATENT OFFICE.

HENRY R. DORR, OF RUTLAND, VERMONT.

FUEL.

SPECIFICATION forming part of Letters Patent No. 753,246, dated March 1, 1904.

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To all whom it may concern:

Be it known that I, HENRY R. DORR, a citizen of the United States, residing at Rutland, Vermont, have invented certain new and useful Improvements in Fuel, of which the following is a specification.

My invention relates to artificial or composite fuels in which the finer particles of coal, heretofore principally waste, and such as are commonly known as "coal-dust," "culm," "slush," and the like, are used as a basis of combustion. Heretofore attempts have been made to utilize such waste, and hydraulic cement has been proposed as an element of such composite fuel, and it has also been suggested to use a mixture of anthracite and bituminous dust. In my invention hereinafter described I also use as a binder hydraulic or similar cement, and in some cases I use a mixture of the anthracite and bituminous waste. The cement imparts coherence and solidity to the coal-dust and sufficient strength, so that it may be handled and transported in lumps like ordinary hard coal; but in addition to these ingredients I also use another or other ingredients calculated to cooperate with those mentioned above in the process of combustion and to promote and regulate such combustion. It is important that these ingredients should be cheap as well as efficient in order that the cost of the product may be kept within practical commercial limits. Such ingredients suitable for my purpose in this invention I have found to be common salt and potash, such as is contained in wood-ashes. These substances in the proportions in which I use them fuse in the heat generated by combustion and help to sustain the coal in proper condition. The principal function of the salt, however, is in the generation of chlorin gas, which is an active supporter of combustion. The potash has some effect in binding together the fine coal particles during the process of combustion; but it is mainly useful in facilitating ignition. The action of the chlorin gas and the potash is such as to render combustion almost complete, so that during this process the check-draft may be closed as soon as the fuel is fairly ignited. The combustion is so nearly perfect that substantially no unburned coal remains in the

ashes, no clinkers can possibly be formed, and very little smoke is produced.

As an illustration of the manner in which my invention may be carried out, I proceed to describe the materials, their proportions, and method of treatment which I have found practicable.

In making my improved fuel of anthracite-coal waste I mix thoroughly in a dry condition three bushels, for example, of anthracite-coal dust, screenings, or other fine waste, such as slush, with one-half bushel of hydraulic cement and with one-third bushel of wood-ashes. I then wet the mixture with ordinary sea-water or with a solution of the cheapest common salt, to which I may add commercial sodium benzoate in the proportion of about twelve ounces of the benzoate to thirty-six gallons of sea-water. After this salt or salt and sodium benzoate solution is added I work the mass thoroughly until it is about the consistency of common mortar. The mixture is then spread out to dry and left to harden, and when it has become thoroughly hardened I break it into suitable sizes for burning. Instead of thus spreading out the mass the mixture above described, of the proper consistency, may be pressed in molds of proper shape and dimensions for transportation and use. It will be apparent that the amount of common salt in the product will be small; but as the mixture must be treated with water and the salt can be in that medium added without additional manipulation it does not increase the expense materially, and it supplements the action of the potash of the wood-ashes. When a quick fire is required, as in stoves for cooking or in the furnace, and particularly for use in the open grate or in the reduction of ores, I add to the three bushels of anthracite-coal dust one-half bushel of bituminous-coal dust, and in this case I increase slightly the proportion of hydraulic cement, using, for example, three-fourths of a bushel of hydraulic cement and one-third of a bushel of wood-ashes. This mixture is wet with sea-water or a solution of salt and treated as above described in connection with the anthracite-coal dust alone.

Instead of the anthracite-coal dust alone or of the combination of anthracite and bitumi-

nous coal dust I may use the bituminous-coal dust alone in the proportion stated for anthracite and with the use of the same method.

I use the wood-ashes for the purpose of economy; but potash in other forms may be used instead in the proper proportion; but in some cases hydraulic cement contains a relatively high percentage of potash and may contain also a percentage of salt, under which conditions the use of the salt and potash, either or both, may be correspondingly modified.

In the proportions above stated I have found the composite fuel fit to bear transportation and handling without detriment, to burn with an even combustion, and as long or longer than anthracite coal under the same conditions.

I do not confine myself to the proportions above specified, as a good effect may be produced by other proportions of the ingredients different from those hereinbefore described; but those which I have specified I regard as the best.

I have found that the bitumen contained in bituminous-coal waste is efficient in binding the anthracite-coal dust together during the process of combustion, and this is its principal

function in my fuel, although it has its effect on the combustible quality of the fuel. I use bituminous waste, because it is at present the cheapest form in which I can obtain bitumen in sufficient quantities; but I may use instead of bituminous waste bitumen in its other various forms, whether crude or refined.

I claim as my invention—

1. A composite fuel composed of bituminous dust, anthracite dust, cement, and common salt in the proportions substantially as described.

2. A composite fuel composed of coal-dust, hydraulic cement, potash and a solution of common salt in the proportions substantially as described.

3. A composite fuel composed of coal-dust, cement, potash and sodium benzoate with a solution of common salt, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY R. DORR.

Witnesses:

CHARLES P. HARRIS,
EDGAR B. MOORE.