

# UNITED STATES PATENT OFFICE

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## ARTIFICIAL FUEL.

No. 832,574.

Specification of Letters Patent.

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*To all whom it may concern:*

Be it known that I, GEORGE E. FULLER, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Artificial Fuel; and I do hereby declare that the following is a full, clear, and exact description thereof.

This invention relates to an improved artificial fuel of that class made from pulverized coal, suitable combustion-promoting substances, and a binder of a character to retain the fuel in desired molded shapes.

The invention consists in the matters hereinafter set forth, and more particularly pointed out in the appended claims.

The fuel made in accordance with my invention is composed of pulverized coal or culm, preferably ground to an impalpable powder and mixed with the following ingredients: sulfur, lime, common salt, linseed-meal, flour, glucose, and sufficient moisture to bring the mass to a pasty or easily-moldable consistency. The following are the proportions of such ingredients which are recommended to be mixed with a quantity of pulverized coal to produce ten tons of the artificial fuel: lime, (preferably gas slaked,) one hundred pounds; sulfur, ten pounds; common salt, forty pounds; linseed-meal, ten pounds; flour, ten pounds; glucose, twenty pounds; water, one hundred gallons.

The linseed-meal, glucose, and flour, together with certain properties of the salt, constitute the binder which causes the molded mass to adhere and retain its molded form while being transported and during combustion so long as it remains unconsumed. The crystallizing action of the salt tends to harden the molded forms and combines with the adhesive properties of the linseed-meal, flour, and glucose to bind the molded mass together and retain the same in solid form. The salt also hastens the hardening or setting of the molded masses and acts during the combustion of the fuel to destroy soot clinging to the walls of the combustion-chamber and smoke-passages. The linseed-meal while serving its principal function as a binder serves also as a waterproofing material, tending to prevent the absorption of moisture by the molded material. The function of the sulfur in the mixture is to increase the heat of the burning fuel, and thereby promote combustion. Furthermore, the

gases given off by the sulfur during combustion have the effect to disintegrate or destroy soot which may tend to cling to the walls of the combustion-chamber and smoke-passages. The lime constitutes a radiant which disseminates the heat throughout the burning block or mass, and the lime is distributed in small particles throughout the mass and disintegrates before the highest heat is reached and falls away from the molded mass, so as to make the same porous and permit the escape of gases therefrom, thereby aiding the combustion of the coal and other combustible constituents of the fuel. The said lime, while serving as radiant for the purpose described, is of such a character as to be thoroughly disintegrated by the heat and does not tend to mix with the other constituents to form clinkers. The ash from the fuel is therefore free from clinkers and cinder.

The above quantities of the fuel constituents are recommended when using a low-grade or bituminous coal. When using a higher-grade coal, the quantities of the foregoing constituents, especially the combustion-promoting elements, may be varied while maintaining substantially the proportions thereof as given above.

In manufacturing the fuel the dry constituent of the fuel is first mixed with the pulverized coal by any suitable form of mixing device, and thereafter the glucose is mixed with this compound in the presence of moisture, either in the form of water or steam, the proportion of the moisture being such as to reduce the compound to a readily-moldable state. When steam is economically available, I prefer its use, inasmuch as the steam may be readily delivered to the mass and renders unnecessary the labor and expense incident to handling the water. Only sufficient moisture is imparted to the fuel mass as is necessary to reduce the fuel to the required consistency to allow it to be readily molded. Any suitable molding device may be employed to give the plastic material the form of blocks of the desired size and shape. Owing to the activity and integrity of the binder, it will ordinarily be necessary to submit the material to only moderate pressure in molding the same, and the molded form may be air-dried when the state of humidity of the air permits, thereby ordinarily rendering the use of heat for this



purpose unnecessary. The character of the binder is such that the required plasticity may be imparted to the mass with a minimum amount of water, thereby economizing the time required for drying the molded blocks.

My improved fuel may be used as well in a stove or open hearth for domestic uses as in boiler-furnaces and the like for manufacturing uses. The fuel burns uniformly and with high thermal efficiency and without clinkers, and the fuel-blocks retain their form without disintegration until completely consumed. The fuel also burns substantially without smoke and at most without the escape of smoke from the furnace or stove flue.

I claim as my invention—

1. An artificial fuel which consists of pulverized coal, linseed-meal, flour, glucose, sulfur, common salt and lime in substantially

the proportions specified, mixed in the presence of moisture and molded to form.

2. An artificial fuel consisting of the following constituents combined in substantially the following proportions, viz., ten pounds of linseed-meal, ten pounds of flour, twenty pounds of glucose, forty pounds of common salt, ten pounds of sulfur, one hundred pounds of lime, one hundred gallons of water and a sufficient quantity of pulverized coal to produce substantially ten tons of the resultant artificial fuel.

In testimony that I claim the foregoing as my invention I affix my signature, in presence of two witnesses, this 6th day of December, A. D. 1905.

GEORGE E. FULLER.

Witnesses:

W. L. HALL,  
JOHN R. PHILIP.