

# UNITED STATES PATENT OFFICE.

SAMUEL H. DADDOW, OF ST. CLAIR, PENNSYLVANIA.

## IMPROVEMENT IN ARTIFICIAL FUEL.

Specification forming part of Letters Patent No. 150,537, dated May 5, 1874; application filed March 16, 1874.

*To all whom it may concern:*

Be it known that I, SAMUEL HARRIES DADDOW, of St. Clair, county of Schuylkill and State of Pennsylvania, have invented certain new and useful Improvements in Artificial Fuel, of which the following is a specification:

The object of my invention is to utilize the coal or fuel now wasted at coal-mines and other places on account of its pulverent or impure character by combining it with a cementing or binding principle to form a commercial article of trade, as fuel, flux, &c. To this end the nature of my invention consists in a compound for artificial fuel consisting of earth or clay, lime, dried peat, and commercial silicate of soda, or soluble glass mixed with the waste coal, as will be hereinafter more fully set forth.

To produce my artificial fuel from the waste of anthracite or bituminous coal-mines, I make a thin paste composed of earth or clay, lime, dried peat, and commercial silicate of soda or soluble glass; or, in place of the commercial soluble glass, calcined silica and commercial soda, in proportion of ninety silica to ten soda. The ingredients are mixed in the proportion of, earth, eighty parts; calcined lime, ten parts; commercial silicate of soda, five parts; and dried peat, five parts, and thoroughly incorporated and reduced to a fine powder through iron rollers, or other suitable machinery. The incorporated mass is then made into a thin paste by the addition of hot water or steam. The paste thus formed is then ready for mixture with the coal in proportions of five parts of paste to ninety-five parts of coal.

The coal is first prepared by grinding, and washing if impure, thus: The small or waste particles of coal are first separated from impurities by screening, or washing. It is then ground by rollers to a fine powder. In this condition it is mixed with the pulp or paste above described in large conical cylinders, in which hollow shafting, with radial hollow arms or knives are rotated, having a current of low-pressure steam passing through the shafting and arms into the mass; or other machinery, suitable for the purpose of mixing the plastic mass of coal and pulp and forcing it into molds. The molds, in which the combined fuel is subjected to heavy pressure, are lubri-

cated or smeared with the residuum of petroleum-stills, paraffine-varnish, coal-tar, or other suitable varnish, which is kept in a hot condition by the passage of a coil of steam-pipe, or other suitable apparatus, through the tank in which it is held. The objects hereof are, to lubricate the molds; to glaze or varnish the outside of the fuel; to preserve it from moisture; and to aid in the ignition of the fuel. The prepared fuel is then subjected to heat in any desirable place and form to dry and harden.

The silicate of soda, or its equivalent, is designed as the cementing principle.

The mixture of earth and lime with the silicate is to form an inexpensive paste, the silicate of soda acting as the hardening element, and to effect homogeneity or prevent crumbling under combustion.

The use of the peat is not so essential to soft bituminous coals as to the harder anthracite. The latter is naturally more dense and difficult to unite than the former, and requires greater pressure to consolidate, which tends to increase its density and still farther lower its point of ignition. The addition of peat to the harder varieties of coal is to decrease this density, and to form a comparatively porous mass under combustion.

I am aware that the waste of coal-mines, or small coal, has been combined with various ingredients to form artificial fuel; and I do therefore not claim such broadly as my invention; but

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination, in an artificial fuel, of coal and a paste composed of earth, lime, and soluble glass, or its equivalent, substantially in the manner herein set forth.

2. The combination, in an artificial fuel, of coal and a paste composed of earth, lime, peat, and soluble glass, or its equivalent, substantially in the manner herein set forth.

In testimony that I claim the foregoing as my invention I hereunto affix my signature this 9th day of March, 1874.

SAMUEL HARRIES DADDOW.

Witnesses:

SAML. HINES,  
MEREDITH L. JONES.