

# UNITED STATES PATENT OFFICE.

JAMES A. MARS AND WILLIAM IRELAN, JR., OF SAN FRANCISCO, CAL.

## IMPROVEMENT IN COMPOSITION FUEL.

Specification forming part of Letters Patent No. 154,701, dated September 1, 1874; application filed June 18, 1874.

*To all whom it may concern:*

Be it known that we, JAMES A. MARS and WILLIAM IRELAN, JR., of San Francisco city and county, State of California, have invented an Improvement in Composition Fuels; and we do hereby declare the following description sufficient to enable any person skilled in the art or science to which it most nearly appertains to make and use our said invention or improvement, without further invention or experiment.

Our invention relates to an improved fuel-composition, which is especially useful as a substitute for charcoal and coke for metallurgical and other purposes, where a fuel free from sulphur and impurities is required.

To make our improved fuel-composition, we take coke and pulverize or granulate it, and then add to every one hundred per cent. of the pulverized coke the following ingredients: Fire-clay, from five to ten per cent; coal-tar or asphaltum, from ten to fifteen per cent.; salt, glycerine, water, from five to eight per cent.

The coal-tar or asphaltum and clay we heat to a temperature of at least 212° Fahrenheit before mixing them with the pulverized coke. After the ingredients have been thoroughly mixed we form the mixture into cakes of sufficient size to make, when pressed, blocks weighing from one to four pounds, more or less, and these cakes we subject to a pressure of from one to three thousand tons, so as to provide blocks of great solidity. After the blocks are pressed, we place them in a hot closed furnace or retort, and allow them to

remain until most of the volatile portions are evaporated. The blocks, when removed from the retort, will be found to be perfectly solid and firm.

We prefer to use a coke which is made from semi-bituminous coal in the manufacture of our fuel compound; and to coke this quality of coal successfully we place it in a retort or oven, which is at a high heat at the time the coal is introduced.

By the above-described means we provide a fuel-composition which is equal to charcoal for metallurgical purposes, being almost pure carbon and entirely free from impurities.

This fuel has extraordinary burning qualities, such as retaining its solid form when exposed to great heat, and only disintegrating from the outside as it burns away. It will also withstand the blast from the tuyeres in the furnace better than ordinary coke, as it has greater solidity.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

A composite fuel composed of pulverized coke, fire-clay, asphaltum, salt, glycerine, and water, mixed in about the proportions named and treated in the manner set forth.

In witness whereof we hereunto set our hands and seals.

JAMES A. MARS. [L. S.]  
WM. IRELAN, JR. [L. S.]

Witnesses:

JNO. L. BOONE,  
C. M. RICHARDSON.