UNITED STATES PATENT OFFICE.

JOHN J. ENDRES, OF JERSEY CITY, NEW JERSEY, ASSIGNOR OF ONE-HALF HIS RIGHT TO L. L. CROUNSE, OF WASHINGTON, D. C.

IMPROVEMENT IN ARTIFICIAL FUEL.

Specification forming part of Letters Patent No. **162,362**, dated April 20, 1875; application filed March 1, 1875.

To all whom it may concern:

Be it known that I, JOHN J. ENDRES, of Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in the Process of Manufacturing Artificial Fuel; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it pertains to make and use the same.

This invention relates to that class of processes employed in the manufacture of artificial fuel, and to the production thereby of a new and valuable composition of artificial fuel, all as will now be more specially and in detail set forth.

To the so-called screenings, culm, or dust produced by mining, breaking, screening, or transporting of anthracite and semi-bituminous coal, crushed coal-tar pitch is added ordinarily in the proportion of from five to twelve per cent.; but I do not limit myself to this exact proportion.

This composition is delivered into a mixing apparatus heated by a surrounding steam-jacket, where it is brought into contact with highly-superheated steam introduced under pressure in numerous small jets from stationary pipes, arms, or nipples inside the mixer. The effect of subjecting the coal and the bitumen to this high temperature under pressure is to fuse them so thoroughly that when the product is subjected to combustion the affinity of the bitumen for the carbon produces a coking effect, which holds the fuel in shape without disintegration until it is gradually consumed like natural coal.

In the plastic condition to which the composition is brought by mixing, as above described, it is discharged, and pressed into blocks of any desired shape or size. While being molded and pressed the material gradually cools off, and, owing to the hardening of the pitch, the product leaves the machinery ready for transportation, and for use as fuel.

As the sulphur generally contained by the coal is an element which aids the hardening effect upon the binding material, I claim the adding of sulphur where the coal has little or no sulphur in it.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The process herein described, of manufacturing fuel from the culm or dust produced in the mining, breaking, screening, or transporting of anthracite or semi-bituminous coal, which process consists in combining, fusing, and agglomerating the same with coal-tar pitch or bitumen under high heat and pressure, as herein set forth, and molding and pressing the same into any desired shape or form for transportation and use.

2. The fuel herein described, consisting of screenings, culm, or dust, combined, fused, and agglomerated with coal-tar pitch bitumen, as herein set forth, and forming a fuel which, when subjected to the action of combustion, retains its given shape, and consumes gradually like natural coal, substantially as and in the manner herein described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JOHN J. ENDRES.

Witnesses:

D. C. HICKENLOOPER,

E. F. M. FAEHTZ.