# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN MANUFACTURE OF ARTIFICIAL FUEL.

Specification forming part of Letters Patent No. **22,410**, dated December 28, 1858.

*To all whom it may concern:*

Be it known that we, WILLIAM A. BRADLEY and JACOB BIGELOW, of Washington, in the District of Columbia, have invented a new and useful method of treating coal and preparing it for use, of which the following is a specification.

First. The nature of our invention consists in pulverizing the crude coal as it comes from the mines, heating and mixing it with the following substances, and then compressing it into blocks for use as fuel.

Second. When the coal is so pulverized by any suitable powerful machine it is placed in vats or pans of fire-proof material and heated to a sufficient degree, when we mix with it the following articles and quantities, according to the character of the coal:

Bituminous coal: Benzole, one gallon to one ton; coal-tar, twenty gallons to one ton; green-wood tar, fifteen gallons to one ton; rosin, one hundred pounds to one ton; saltpeter, ten pounds to one ton; coal-oil, five gallons to one ton; naphtha, three gallons to one ton.

Anthracite or hard coal: Benzole, three gallons to one ton; coal-tar, thirty gallons to one ton; green-wood tar, twenty gallons to one ton; rosin, two hundred pounds to one ton; saltpeter, twenty pounds to one ton; coal-oil, ten gallons to one ton; naphtha, four gallons to one ton.

Charcoal: Benzole, five gallons to one ton; coal-tar, forty gallons to one ton; green-wood tar, thirty gallons to one ton; rosin, three hundred pounds to one ton; clay, three hundred and fifty pounds to one ton; saltpeter, five pounds to one ton; coal-oil, twenty-five gallons to one ton; naphtha, ten gallons to one ton.

Third. When the coal is thus prepared it is then placed in a powerful steam-press and formed into blocks, bringing it back to its natural state of density before it is mined—say twenty-seven cubic feet to the ton. Crude coal, that is called the "run of the mines," occupies forty-seven feet cubic to the ton. Consequently when compressed and dried as above there will be a saving of twenty cubic feet in a ton stowage on board of a ship or steamer, which alone is of great importance to the mercantile marine; also, when coal is thus prepared it wil stand any climate or water, &c.

Fourth. This article of coal possesses many very important qualities. Thus it requires no artificial draft, less smoke-stack, makes but little soot, little or no clinkers or ashes, burns with a rapid smooth flame, will not honeycomb the boilers, will raise steam in two-thirds of the time of any other fuel, and it will burn one-half longer. There is no coal-dust or waste to be thrown overboard, like as in crude coal. It requires less firemen and less attention to it. Another important feature is that when stowed in the coal-bunkers of a steamer of war during an action a shot will not pass through it and reach or cause injury to her machinery.

Fifth. We consume the fine coal from the mines, that is lost to the miner, in preference to the lump-coal, thereby enhancing the value of the mines.

We claim—

The manufacture of artificial fuel made from refuse bituminus coal, anthracite, or charcoal, as set forth, combined with the substances herein described, the whole made in the manner and for the purposes set forth.

W. A. BRADLEY.
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Witnesses:
JAMES P. LEVY,
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