

UNITED STATES PATENT OFFICE.

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COMBUSTIBLE COAL-BRICK.

SPECIFICATION forming part of Letters Patent No. 424,299, dated March 25, 1890.

Application filed August 17, 1889. Serial No. 321,129. (No specimens.)

To all whom it may concern:

Be it known that I, JOSEPH J. HIERTZ, of the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Combustible Coal-Bricks, of which the following is a specification.

This invention relates to a composition of matter for utilizing coal dust or slack and for putting it into a combustible condition and cleanly form for handling; and the invention consists in features of novelty hereinafter fully described, and pointed out in the claims.

While this invention is of great advantage for providing the means for utilizing the slack, waste, or coal-dust in all descriptions of coal, both of bituminous varieties and those which are lacking in bituminous elements, it is especially advantageous for use in the last-named varieties—such as lignite and brown coals—which while they form the exclusive coal products of vast areas of this continent and of other parts of the globe yet have they but little local and no shipping value, for the twofold reason that they are almost entirely devoid of bituminous elements in the first place, and in the second place, as a natural sequence of the first and of their consequent tendency to disintegration they are largely surcharged with water, which anti-combustible element amounts to from twenty-two to thirty-one per cent. of the product. Now not only are such lignite and brown coals almost incombustible until their hydrous elements have been evaporated or otherwise discharged from them, but also in the course of said evaporation or discharge the coal itself slacks and results in a product of coal slack or dust, which, being void of combustible bituminous elements, is both from its disintegration and said lack in its constitution of the highest grade elements of combustible material of little if any value as fuel, especially as the dust precludes the passage of any atmospheric current.

The process and formula in the manufacture of my combustible coal-brick are as follows: Take the slack, dust, or waste of lignite, brown, or any other variety of coal or pulverized coal and dry the same, which is preferably effected on metallic drying-floors, where it can easily be turned or tended, and

which floors may be heated by steam, or by any other suitable means, to effect the drying of the coal; or the evaporation may be effected by exposure of the coal to the rays of the sun. A combinative compost is prepared, preferably in about the proportions stated below, and in accordance with the following formula to each ton of dry coal to be treated, although the respective proportions of the different elements may be varied to adapt the compost to the requirements of the variety of coal-slack to be treated and the heating purposes to which said combustible bricks are to be applied. Thus in treating bituminous-coal slack the amount of tar and turpentine used may be somewhat reduced.

The ingredients of said combinative compost for the treatment of each ton of dry coal-dust are, with the exceptions noted, of respective proportions, as follows: Quicklime, one bushel; tar, seven gallons; salt, twenty-five pounds; turpentine, one gallon. These ingredients, when the lime is slaked and the salt dissolved by the tar and turpentine, are mixed so as incorporate the various elements of the compost. This initial compost is then added to the dry coal-dust or pulverized coal and the whole is thoroughly worked together by any suitable mechanical means, which, with the mechanical construction of the brick, may be the subject-matter of a future application. The fully-composted ingredients are then heated to a temperature sufficient to cause the intimate fusion of all the ingredients, which are then placed in heated molds of any required size and shape. The brick formed in said molds is then pressed by hydraulic or any other form of pressure, amounting, preferably, to about three tons to the square inch, surface measure, with bricks which are about three inches in thickness. Thus if the bricks are made nine inches long by four inches wide, a pressure of about one hundred and eight tons is preferably applied to consolidate said brick. The fusing of the compost and the extreme pressure in the mold not only consolidate the same, but also secure a glazed or glassy surface, which is impervious to moisture, clean to handle, and compact for storage and shipping. The

glazed surface also confines the odors within the brick.

This process is especially adapted for the economic reconstruction of lignite and brown coals, which carry from twenty-two to thirty-one per cent. of water. These coals, when exposed to the air, in the course of parting with their large quantum of water slack or pulverize partly, because, also, they are lacking in the bituminous properties that bind other coals together. The above-named coals are at present altogether worthless for shipping purposes, partly because of their slacked condition (and it is impossible to extract the water from them without their slacking) and partly because of their lack of bituminous ingredients, both which objections are obviated by the use of my process for the construction of said coal-brick, which produces a fuel more compact than is the best bituminous coal, cleaner to handle, and more highly charged with combustible material. The water being extracted, as stated, in the initial stage of the process gives in the product a much larger ratio of carboniferous combustible material; also, for the same reason, the said coal-brick is almost completely consumptive and produces but little, if any, smoke, so that when used on locomotives drawing trains through lengthy tunnels there is no perceptible emission of smoke. It follows, therefore, that, as the only perceptible waste products of combustion are in the ash, and there is but little of that, and what there is is entirely clinkerless, not only is this coal-brick, as has previously been stated, especially clean, easy to handle, to pack, and to ship, and well glazed in from the reintrusion of moisture, but also, as there is no perceptible discharge of smoke, it is much more cleanly and has a sanitary advantage in its minimum of emission of smoke and noxious gases. It is also economic in its use, inasmuch as the major element in its composition is the waste coal slack or dust, which is of little and often of no value in its unreconstructed condition.

While the process is, as stated, of especial use with lignite, brown and other semi-bituminous coals, or the slack of said coals, it is also of great value in reintegrating the slack

of bituminous coals, it being understood, as stated, that in such case the respective proportion of tar and turpentine in the aforesaid combinative compost is preferably somewhat reduced in quantity; also, in the treatment of bituminous coal-slack in preparation for molding it is preferred to heat the composted product to a somewhat higher temperature than with the treatment of lignite or brown coal.

I do not confine myself to the kind of tar that is used in the compost for either coal or pine tar may be used in the compost with substantially similar results, and the choice between the two would generally depend on which is the most readily obtainable in the respective localities where the combustible coal-brick is manufactured. Thus, for instance, where lignite and brown coal abound, as there are no bituminous coals in the same territory and fatty pines abound in much of that southern country, coal-tar is consequently *non est* and pine-tar is plentiful, and in consequence is preferably used, and so also, vice versa, in the territories that abound in bituminous coal.

I claim as my invention—

1. A compound consisting of coal dust or slack, slaked lime, tar, salt, and turpentine, substantially as described, and for the purpose set forth.

2. In a combustible coal-brick, the combination of the coal dust or slack, lime, tar, salt, and turpentine, composted together in about the following proportions and in accordance with the following formula: one ton of coal-slack, the slaked product of one bushel of quicklime, seven gallons of tar, twenty-five pounds of salt, and one gallon of turpentine, substantially as and for the purpose set forth.

3. A compound consisting of lignite or brown-coal slack incorporated and compacted together with slaked lime, tar, salt, and turpentine molded into a combustible pressed brick, substantially as and for the purpose set forth.

JOSEPH J. HIERTZ.

In presence of—

BENJN. A. KNIGHT,
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