

UNITED STATES PATENT OFFICE.

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MANUFACTURED PEAT FUEL.

SPECIFICATION forming part of Letters Patent No. 713,110, dated November 11, 1902.

Application filed January 9, 1902. Serial No. 88,952. (No model.)

To all whom it may concern:

Be it known that I, ROBERT ARTHUR KELLOND, a subject of the King of Great Britain, and a resident of the city of Chicago, Cook
5 county, and State of Illinois, have invented a certain new and useful Improvement in Manufactured Peat Fuel, of which the following is a specification.

My invention relates to peat compressed
10 into blocks or briquets to serve as fuel; and it consists of a new article of manufacture in the form of a block, briquet, cake, cylinder, or dense hard lump of any preferred contour and size in which the greater proportion of
15 the peat or that forming the center or core retains all of its fibrous, carbonaceous, and volatile constituents and a percentage of moisture exceeding the atmospheric degree, while the whole area or outer surface of the
20 block has a coating, envelop, or crust of combined carbonaceous and tarry matter formed by the entire or partial fracture and carbonization of the peat fiber, and consequent liberation of tarry and oily constituents, for any
25 suitable depth extending from surface toward interior, the thickness of this coating varying by preference with the size and weight of the block produced.

The object of this improvement is to pro-
30 duce a smooth, dense, and impervious texture externally of the block, so as while presenting the most inflammable constituents of the peat to the immediate action of the fire when igniting the hardness and water-resist-
35 ing qualities of the manufactured fuel are materially increased and while not depriving the raw material of any appreciable quantity of combustible constituents to render the blocks more lasting in the fire, and conse-
40 quently more approaching to coal in value for steam-raising and domestic and other purposes where the maximum of heat is to be produced with the minimum feed and replenishment of fuel.

45 To this end my present invention may be termed a "seared" block of compressed peat in contradistinction, first, to a block carbonized throughout after the lighter volatile vapors have been first liberated and dissipated
50 and with the tarry and resinous matters first separated and then recombined and inter-

mixed with the fixed carbon while under the influence of heat and pressure, and, second, to a block of peat dried to the atmospheric degree and retaining all of the volatiles, light 55 and heavy, produced simply by heavy compression and relying for its waterproofing quality simply upon the shine or glaze imparted to the circumference only of such block, (such block being a solid cylinder,) 60 leaving the ends untouched while passing through the molds or tubes. My new block possesses every valuable feature embodied in either or both of these known forms of manufactured peat fuel without the faults of 65 either, inasmuch as it is more economical in production and contains far more combustible matter than the former and is free from the serious objections that the latter possesses no effectual waterproof characteristic what- 70 ever and is only of questionable service as a first-class fuel after it has been subjected to expensive and slow-drying processes and has had an extravagant amount of power exhausted upon its solidification. 75

It is well known that the problem of drying the crude material taken from the peat-bog down to anything approaching the degree of moisture existing in the surrounding atmosphere is one of the most serious and difficult 80 of attainment in all modern processes of peat-fuel manufacture, and the chief reason of failure to reach the market with this otherwise valuable fuel in any commercial quantities has been the necessity of constant, ex- 85 pensive, and so far unsuccessful experiments along this line.

Complete air-drying has proved impossible in America owing to the climatic conditions, and cold dry compression has been found im- 90 practicable unless the moisture is actually reduced to ten per cent. or less of the weight of raw material.

My experience and experiments go to prove that in manufacturing my seared block of 95 peat I need not reduce the moisture to such an extreme degree, but may avail myself of many economical systems used extensively for drying other materials than peat, which will economically liberate enough of the wa- 100 ter to make my fuel highly combustible when the other qualities due to the "searing,"

which I have above set forth, have been imparted to the compressed blocks, and thus make a superior fuel at much less expense than that produced by any of the old methods. I have found that this degree of dryness may vary from, say, twelve to twenty-five per cent. or even more of water remaining, according to conditions, density, &c. (The "younger," more fibrous, and less earthy the peat is the dryer it should be made in order to relieve it of that spongy character which leads to ready reabsorption of moisture and renders permanent compression difficult. When the raw material is "old," "mud," or "dredge" peat, I find that it does not require the extreme degree of dryness in making my seared block, either of these qualities being sufficiently dense and decomposed as to be practically homogeneous with even twenty-five per cent. of water remaining therein.)

I prefer to "sear" or coat my block of peat fuel with the partially carbonized and tarry envelop or crust at the same time as the solidification or compression takes place; but I may perform this searing operation immediately after the initial compression has been imparted with equally good results.

In my application for patent filed February 19, 1902, Serial No. 94,794, I have set forth the process I prefer to employ for the manufacture of the herein-described new peat fuel; but I will now explain such process and some of its alternatives in detail sufficient for those skilled in peat-manufacture to put my present invention into practice.

I take peat after it has been deprived of water down to, say, from twelve to twenty-five per cent. (which, according to conditions, density, &c., will be practically dry, but not necessarily to the atmospheric degree) by any natural or artificially-assisted process which will not scorch or carbonize it or dissipate any appreciable quantity of the volatiles and which has been deprived of sticks, large roots, and valueless foreign substances and reduced to the proper degree of fineness, which should be about the consistency of fine or partially-powered tea. This finely-divided material must now be cool enough to prevent the exudation of vapor from the interior after the block is formed, extreme heat and extreme cold being alike unfavorable to the formation of a permanent peat block for reasons which should be known in the art, about 65° Fahrenheit being what I estimate as the proper temperature to produce the best results in carrying out my invention. I feed the material thus prepared into suitable molds or dies for solidifying same, and then, by preference, directly into extensions of these molds, which have been brought to a sufficiently-high temperature by dry heat, gas, steam, or electricity, to sear the outer surfaces of the block by wholly or partially carbonizing the external fibers and bringing out the constituent tar, their subjection to these instrumentalities being continued for a sufficient time to effect

the necessary solidification and searing of the blocks, which are then finished and may be ejected automatically or otherwise.

In making a large heavy block I may so time the treatment and regulate the heat as to give a greater thickness to the coating than would be necessary for smaller blocks, so as to increase the durability; but this will only be a matter of judgment, for it will be borne in mind that the thicker the tarry coating the less friable will be the block. A good average thickness for the coating upon blocks of one pound and less in weight would be, say, one-eighth of an inch. For heavier blocks this may be advantageously increased in proportion.

The forming mechanism may be arranged to work either vertically or horizontally without affecting the product, and I may effect the compression in one part of the molding mechanism and the searing operation in another part or member. I prefer that the dies and plungers, however, should be laid in a horizontal line when I effect the compression either against a fixed or a semiyielding resistance as the means for feeding the raw material, for ejecting the finished blocks or briquets, and for the disposal or carrying off of the gases resulting from the searing process may be readily and economically accomplished by devices which I am now formulating for these purposes; but all of these details would easily suggest themselves to persons skilled in the art.

I prefer to economize power and to effect a large output by arranging several dies in one machine to operate simultaneously and with one contemporaneous feed of material.

My invention can be also carried out to advantage by the employment of a rotating table or bed in which are located a number of female dies or pockets in connection with vertically-operating male dies or formers and heated rollers or other devices adapted to sear the top of each block after it has been formed and been moved past the line of the male die, all in such a manner that the block is first formed out of raw material in a heated die or pocket, then seared by a separate instrumentality while another pocket is being filled, and then ejected by other suitable means at another point of the circle of rotation of the table, or the dies may be arranged in a die-block arranged to be moved lengthwise with like results. I wish it to be understood, however, that I do not limit myself to any of the methods just described nor to any precise sequence of operation, nor yet do I confine myself to any of the suggested arrangements of mechanism, as all of these may be varied or modified according to the skill and judgment of those skilled in the art without producing a different article, departing from the principle, or sacrificing the advantages of my invention.

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

As a new article of manufacture, a block or
briquet of peat fuel composed of a body or
core of natural or raw peat reduced to a finely-
divided but unimpaired condition and em-
5 bodying a proportion of moisture exceeding
the atmospheric degree, and an outer coating,
envelop or crust formed by the fracture and
carbonization of a portion of the natural fiber
and liberation of indigenous tarry and oily
10 constituents of the material, the whole block
or briquet being condensed into solid form
by pressure while the raw material is at a

medium temperature, and the coating, en-
velop or crust being formed upon the exterior
thereof by the application of intense heat, 15
substantially as set forth.

In testimony whereof I have signed my
name to this specification in the presence of
two subscribing witnesses.

ROBERT A. KELLOND.

Witnesses:

A. B. MACKAY,
SAMUEL C. IRVING.