UNITED STATES PATENT OFFICE.

ARCHIBALD A. DICKSON, OF TORONTO, CANADA.

PEAT FUEL.

SPECIFICATION forming part of Letters Patent No. 624,629, dated May 9, 1899.

Application filed December 31, 1897. Serial No. 665,176. (No specimens.)

To all whom it may concern:

Be it known that I, ARCHIBALD ANDERSON DICKSON, a subject of the Queen of Great Britain, and a resident of the city of Toronto, in the county of York and Province of Ontario, in the Dominion of Canada, have invented a certain new and useful Improvement in Manufactured Peat Fuel; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention relates to the transformation of crude peat into blocks for fuel; and it consists in a novel article of manufacture in the form of a hard dense block containing all of the fibrous, carbonaceous, volatile, and other materials and elements which are embodied in the raw peat and an amount of moisture only corresponding approximately with that in the surrounding atmosphere.

Experiments and practice extending over many years and a thorough study of the art as known in Canada, the United States, Great Britain, and Europe have convinced me that not only has peat never been produced commercially in hard dense blocks retaining the full complement of volatile matter and fixed carbon as it is found in the raw material, but it has never been manufactured in any condensed form in which the water has been eliminated sufficiently to reduce the inherent moisture to the atmospheric degree without carbonizing the fiber or dissipating much of the volatile matter.

It being recognized that one prime essential quality of peat in relation to its value as fuel should be its density, many attempts have been made to impart to it a degree of solidity approximating that of coal, so that it should be in condition to afford the maximum heating power and durability during consumption, and it is therefore desirable that I should point out the reasons why a peat block similar to mine could never have been produced and the causes of the failure in order that the differences in the product shall be fully understood and appreciated.

Pressure has been exerted upon peat in its natural hygrometric condition as taken from the bog and the cakes thus produced left to dry, both while the pressure has been continued and after it has been removed. Result: a friable block incapable of having more than a small proportion of the water eliminated at the start, so porous as to be a ready receptacle, by absorption, for additional moisture during storage and transport, and one certain of speedy disintegration and consequent waste of heating power when fed to the fire.

Peat has also been drained of the bulk of water and air-dried, then pulverized, and what is supposed to have been the remaining surplus water driven off by artificial heat continued until pressure had been applied. Result: a cake or block deprived of much of its volatile matter by the artificial heat and having cracks or fissures caused by the gases forcing their way out during the process of cooling. Consequently there was a product of impaired combustibility and one certain to quickly break down during handling and consumption.

Steam has been employed to reduce peat to a semipulpy condition, and the material so prepared has been pressed (while hot) in a horizontal tube tapered or contracted toward its discharge end. Result: the heat released the volatiles and the lateral compression at the contracted opening served to materially break down the block formed by the initial horizontal compression in the tube. Consequently the product contained not only too much moisture and too little volatile matter, but its formation was loose, uneven, and friable.

Various other methods have been employed for "tempering"—*i. e.*, warming—peat previous to compression, and it has also been pressed in molds heated up to the point where carbonization of the fiber has taken place and part of the constituent tar liberated, so as to coat the surface of the block with a shiny glaze, and many ways of compressing peat in a more or less wet condition have been attempted; but the products of all of such methods have possessed the objectionable characteristics, in one form or the other, which I have named, and consequently do not anticipate my present invention.

To the end, therefore, that the fiber shall not be impaired and that the fixed carbon and all of the volatiles shall be retained and that there shall not be sufficient moisture to prevent the formation of a non-friable, thoroughly combustible, and waterproof block of

peat of the smallest possible bulk and highest specific gravity, I proceed in the manufacture of my improved fuel preferably by the following sequence of operations, viz: First, the raw peat is excavated from the bog or marsh by any approved means and is then allowed to drain and dry upon the ground or upon some convenient supports and there exposed to the action of the sun and atmosphere until the constituent moisture has been reduced to about the atmospheric degree; second, the peat thus dried is fed to any suitable mechanism, whereby it may be broken up, reduced to fragments, or finely divided, which disintegration will be thorough, but not sufficient to destroy the fiber or liberate any of the valuable inherent elements or materials; third, the dry disintegrated peat must now be cold, and it must further be treated without the application of any artificial heat whatever. In the above condition it is compressed or consolidated into blocks by pressure, preferably vertically applied, against a yielding resistance. This is accomplished by disposing such cold, dry, and disintegrated material in even successively-gravitating charges and subjecting each of such charges to one definite compression against the yielding resistance, whereby the initial pressure upon each charge forms same into a block, and whereby such formative action upon a succession of blocks shall always be the same irrespective of the varying density in the charges, and whereby the formation (one upon the other) of evenly-hard separate blocks may be continuously carried on contemporaneously with the feed of the material.

The above process is fully set forth in my process application, filed April 5, 1895, Serial No. 544,638.

The operation herein described clearly shows that it is impossible that any of the constituents of the raw peat will be impaired or lessened and also that there will be no undesirable moisture, but, on the contrary, that a block of peat is produced of almost the consistency of hard coal and waterproof by reason of its extreme density and by the frictional glaze imparted to the surface during the course of its formation, and, further, that a succession of such blocks, evenly hard and of equal density throughout and possessing all the desirable characteristics of a high-grade fuel, may be rapidly and economically manufactured.

The percentage to which I reduce the inherent moisture of the peat will of course vary slightly according to the conditions of the atmosphere existing at the time and at the place where the fuel is manufactured; but the following analysis of my improved manufactured peat fuel may be taken as a fair average: moisture, ten; volatile matter, 58.20; fixed carbon, twenty-seven; ash, 4.80; total, one hundred; specific gravity, 1.166; weight per cubic foot, seventy-three pounds nearly.

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

As a new article of manufacture, a hard dense fuel-block consisting of peat containing approximately only the atmospheric degree of moisture, and embodying all of the fibrous, carbonaceous, volatile and other elements inherent of the raw material intact and unimpaired, substantially as set forth.

ARCHIBALD A. DICKSON.

Witnesses:
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