

No. 621,802.

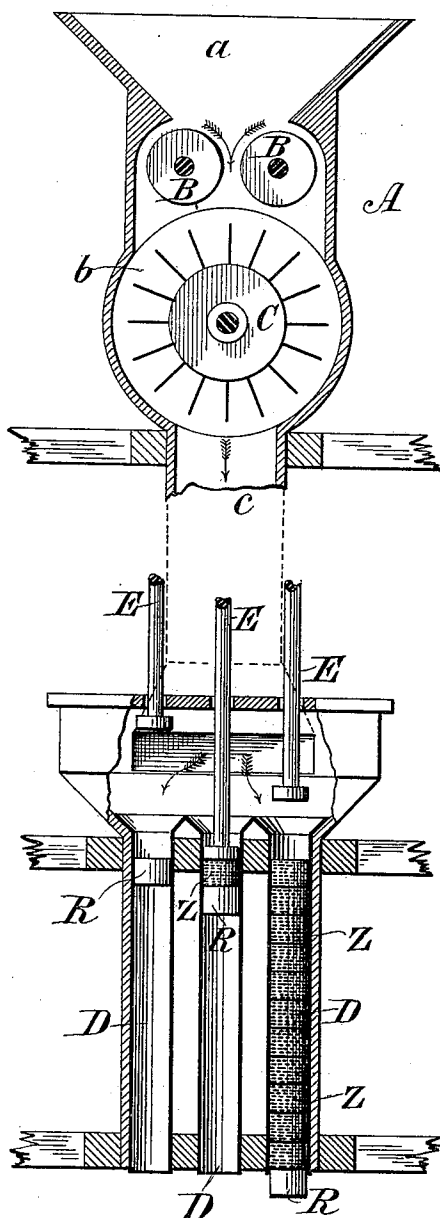
Patented Mar. 28, 1899.

A. A. DICKSON.

METHOD OF MANUFACTURING PEAT INTO BLOCKS OF FUEL.

(Application filed Apr. 5, 1895.)

(No Model.)



Witnesses:

James R. Williamson
Witness

Inventor:

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UNITED STATES PATENT OFFICE.

ARCHIBALD A. DICKSON, OF TORONTO, CANADA.

METHOD OF MANUFACTURING PEAT INTO BLOCKS OF FUEL.

SPECIFICATION forming part of Letters Patent No. 621,802, dated March 28, 1899.

Application filed April 5, 1895. Serial No. 544,638. (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, Canada, have invented a certain new and useful Improved Method of Manufacturing Peat into Blocks for Fuel, (for which I have obtained Letters Patent of Great Britain, No. 27,416, dated November 23, 1897; France, No. 274,994, dated May 26, 1898, and Belgium, No. 133,775, dated February 28, 1898;) and I do hereby declare that the following is a full, clear, and exact description of the same.

The present invention relates to the manufacture of peat into blocks for fuel; and its purpose is that the maximum amount of volatile and combustible matter shall be retained in the peat as finally manufactured into fuel, that the blocks shall have the highest possible density and specific gravity consonant with smallness of bulk and proper dryness, and consequently be of slower and more regular combustion, that they shall be practically dustless and waterproof in their manufactured condition, and at the same time that the cost of labor of manufacturing the peat into fuel of this most desirable form shall be reduced to the minimum.

I will describe my improved method in such detail as will permit those skilled in the art to put the same into practice and will then point out the novel features in the claim.

As in some of the old methods, where the peat has largely been excavated direct from the watery marsh, I prefer that the first step toward the manufacture of peat into fuel shall be the tapping or draining of the bog of surplus water, so as to allow the fibrous matter to settle down into a comparatively dense or solid mass upon its bed of clay, rock, sand, &c., as the case may be. This draining or tapping requires no explanation further than that it is accomplished by cutting channels, with suitable grades or inclines, through the bog or marsh and taking the surplus water in this way to some low level or drainage-channel. Drainage having been thus effected (when from the nature of the bog only it becomes necessary) and the peat having in consequence settled down into a comparatively solid state, as above stated, I prefer to

cut the raw material into blocks or squares of convenient size and to turn the pieces over onto their sides or edges (either on the top of the marsh or on conveniently-erected staging) and allow these blocks to drain and remain exposed to the action of the sun or atmosphere for a sufficient length of time (according to different conditions and requirements) to reduce the constituent moisture to about the atmospheric degree, which varies between ten and thirty per cent. of the weight, according to the existing humidity of the air. In some cases, where haste is necessary or the weather is continually unfavorable, I may store the peat under cover and aid the drying by artificial means, but do not intend that any heat shall be applied so as to affect the inherent volatile matter. These dry blocks of raw peat are fed by hand or otherwise to any suitable breaking mechanism whereby they may be reduced or divided to such a degree of fineness as will bring the raw material into proper condition for compression, but which will not unduly disintegrate the fiber. It is essential to my invention that the raw material after being treated as above shall be perfectly cool and that it shall be compressed while in this dry and cold condition into blocks without the application of any artificial heat whatever.

The accompanying drawing forms part of this specification and represents a vertical sectional elevation of a suitable form of reducing and pressing apparatus.

In the drawing I have shown a casing A, including a hopper *a*, a breaking-up or reducing chamber *b*, and a chute or conduit *c*, in the chamber *b* being located a pair of crushing-rollers B B and a picker C.

The material prepared as above will be caused to fall by gravitation from the chute *c* in evenly-disposed successive charges.

The press itself should consist of vertically-arranged forming tubes, molds, or cylinders, as D, open at both ends, of the same diameter (which is that given to the fuel-blocks) throughout their length, with plungers, as E, operating therein to pack and compress the peat by successive strokes (one stroke and one vertical compression for each block formed) as successive charges of same are fed into the inlet ends of the forming-

tubes. Each of these forming-tubes should be furnished with a closely-fitting but yielding-resistance block R, which may be a previously-formed peat-block, to prevent the first charge of loose peat from immediately discharging at the outlet end and afford a base upon which the first block can be formed. When the plunger has retired, a fresh charge of peat will be ready at the inlet end of the forming-tube to be forced in at the returning stroke and to form the second block upon the base offered by the first block, the resistance having been forced forward. Each successive charge of peat forms a block of itself in contact with but separate from the preceding block, and when a sufficient number have been formed the first yielding-resistance block will be automatically ejected from the forming-tube and the operation proceeds, forming one block upon another so long as the feed of raw material continues, the blocks being successively ejected from the tubes, as will be readily understood.

Z Z indicate the formed blocks in the drawing, and I have shown three sets of forming devices simply to illustrate different stages of the operation. One or more sets may be used, as desired.

Proper means is of course provided for the egress of the air from the material and from the tubes, (which may be effected by a simple variation in the diameter of the plunger-head.) The effect of the above operation is to firmly consolidate the peat, with all its fibrous, carbonaceous, and gaseous matters, into hard compact blocks almost of the consistency of coal, and the friction to which they are subjected while passing through the forming-tubes is sufficient to result by the fracture or compression of the minute cells contained in the fibers at the surfaces of the blocks in bringing to the surface just sufficient of the indigenous tarry matter to impart a glaze or coating to the blocks of an atmosphere and moisture resisting material, a feature which is considered of value in the art.

It will be seen that by my above-described process the fibers in the body of the peat are left intact and unbroken, and there being no artificial heat applied no danger can be feared from the formation of gases during the pressing operation, as all volatile matters are retained in the fuel manufactured by my process.

I have found in the course of my experiments with the compression of crude peat that there is a considerable difference in its specific gravity—that is to say, a mold three inches in diameter and twelve inches deep will contain when the peat is light and fibrous and before compression about one pound in weight. Let this be the first charge and the next succeeding charge be from a deeper strata of the bog, consequently of a greater specific gravity and probably weighing from twenty-five to thirty-five per cent. more. These if compressed in a mold or former by

means of a plunger working in such mold with a fixed resistance or with the mold closed at one end and a plunger turning at a fixed point, as in a brick-press, would give the result that one block would be very heavy and compact and the machinery be strained to perhaps the breaking-point, while another block, from insufficiency of compression and cohesion, would be comparatively inferior as fuel, even if it did not fall to pieces on coming out of the mold.

It makes the difference between success and failure in peat-fuel manufacture that the material, besides being reduced or broken up, as above described, should be both dry and cold previous to and during compression, and that all of the blocks, from start to finish, should be evenly and permanently compressed at the first or initial operation or stroke of the plunger or former. By my process of pressing the dried peat while cold I generate or volatilize no gas of consequence. Therefore there will be no expansion of the material either within the tube or after the block leaves it. Consequently there is no excess of friction (heretofore found fatal in dealing with hot peat) and no tendency in the block to crack and break when the pressing operation is finished.

Although my blocks may be of uneven length, (which is not undesirable in fuel,) according to the difference in density of the charges of raw peat, the full stroke of the plunger is given to each charge, and the molds being arranged vertically and being of the same diameter from end to end, and consequently almost antifriction in character, and the yielding resistance being always the same, a uniform pressure is given to all of the blocks, and the serious objections which I have noted are thus entirely obviated. By adopting a vertical compression, also, the gravity of the peat aids in furnishing charges of raw material each of even density from top to bottom and side to side, and this arrangement also overcomes all undue friction and assists in the rapid and successive formation and easy delivery of the finished blocks.

Although I have been particular to describe devices eminently suitable and convenient for the effectual carrying out of my process, it must be understood that these form no part of my present invention and may therefore be varied or modified according to judgment without departing from the principle or sacrificing the advantages of my improved method or process.

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

The art, method, or process of manufacturing cold peat into blocks, which consists, essentially, in the following sequence of operations, viz: first: drying the raw peat by exposure to natural atmospheric influences and sufficiently to deprive it of all but approximately the atmospheric degree of moisture; second: reducing it—while thus cold and dry—so as to separate but not destroy the

natural fiber; third: disposing such reduced
cold and dry material in successively-gravi-
tating charges, and forming a corresponding
number of blocks—one upon the other—by
5 subjecting each of the successive charges to
a single and corresponding pressure applied
vertically against a yielding resistance af-
forded by the preceding charges during the

continuous formation of the charges into
blocks, substantially as set forth. 10

In testimony whereof I have signed in the
presence of the two subscribing witnesses.

ARCHIBALD A. DICKSON.

Witnesses:

J. G. HOWORTH,

JAMES R. SILLIMAN.