2 Sheets—Sheet 1.

J. H. RAE.

Peat Machine.

No. 55,018. Patented May 22, 1866.

Fig. 2.

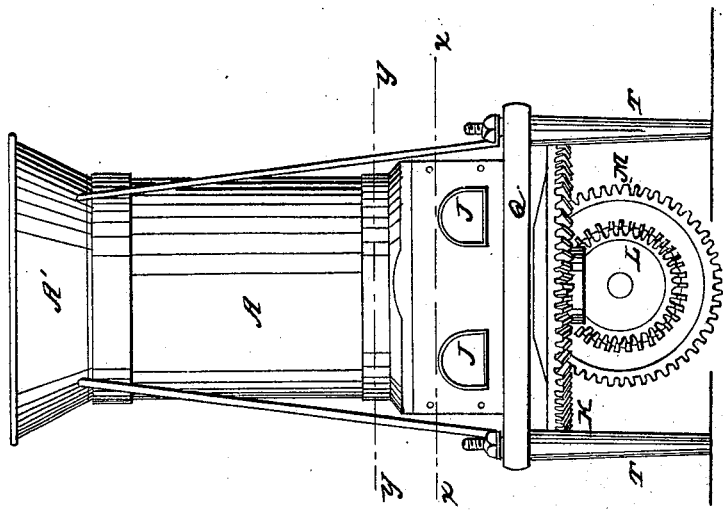
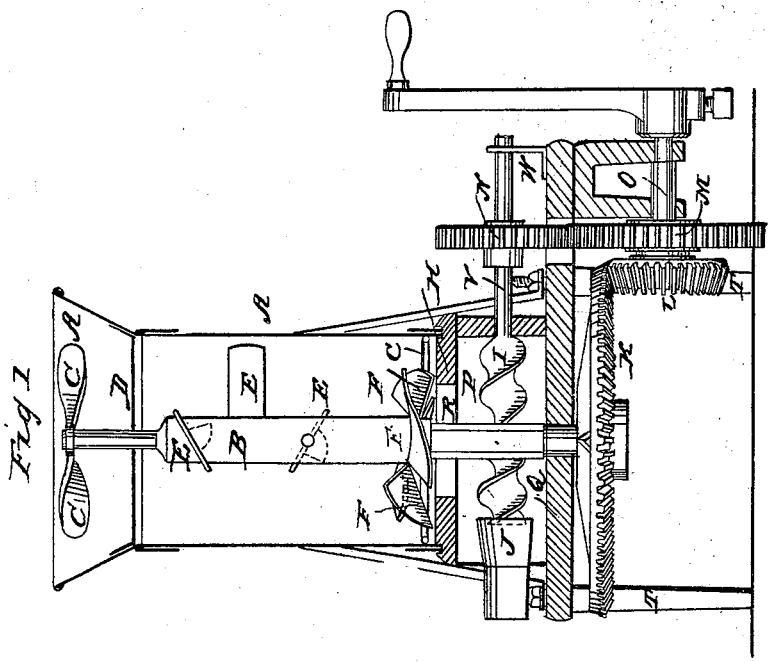


Fig. 1



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2 Sheets—Sheet 2.

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Peat Machine.

No. 55,018. Patented May 22, 1866.

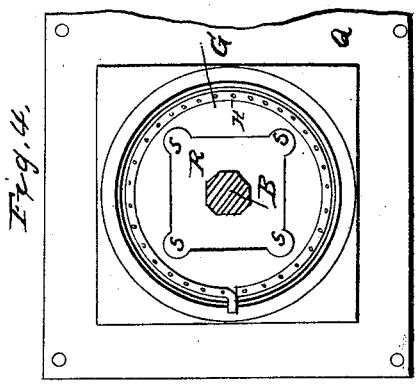

Fig. 4.

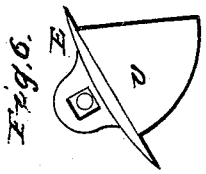

Fig. 6.

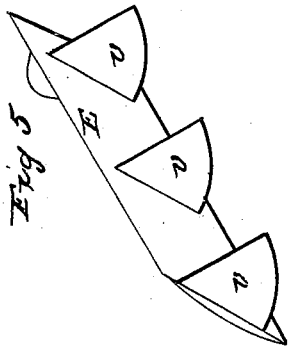

Fig. 5

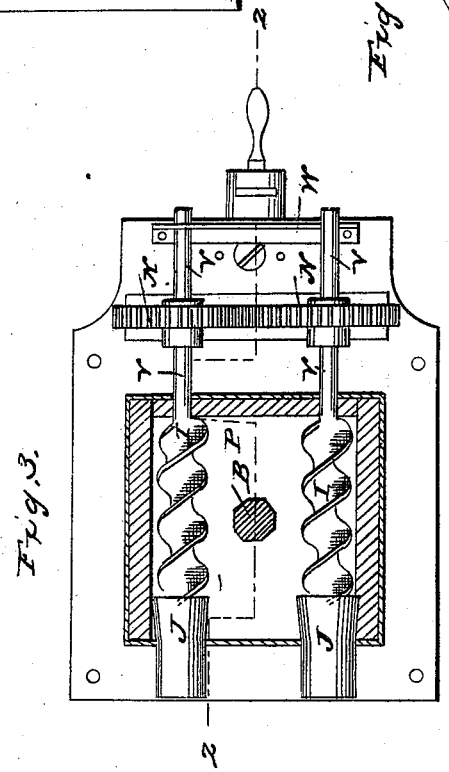

Fig. 3.

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UNITED STATES PATENT OFFICE.

JULIO H. RAE, OF SYRACUSE, NEW YORK, ASSIGNOR TO HIMSELF AND EDWIN L. BUTTRICK, OF MILWAUKEE, WISCONSIN.

IMPROVED PEAT-MACHINE.

Specification forming part of Letters Patent No. **55,018**, dated May 22, 1866.

To all whom it may concern:

Be it known that I, JULIO H. RAE, of Syracuse, in the county of Onondaga and State of New York, have invented a new and useful Improvement in Peat-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1, Sheet 1, is a vertical section of a machine made according to my invention, the section being made along the bent line *z* of Fig. 3. Fig. 2 is an elevation looking toward the front. Fig. 3, Sheet 2, is a horizontal section on the line *x* of Fig. 1. Fig. 4 is a horizontal section on the line *y* of Fig. 1. Fig. 5 is a perspective view of one of the cutter-blades detached. Fig. 6 is an end view of a cutter-blade detached.

Similar letters of reference indicate corresponding parts.

This invention consists in an improved machine for breaking up, condensing, and preparing peat for use as fuel. The peat is delivered into the top of a cylinder, which is, in this example, placed in a vertical position, in which cylinder is a revolving shaft, to which are permanently fastened, near its top, two or more arms, which are set at an angle with the axis of the shaft, their office being to draw down the peat from the top of the cylinder and feed it along into that part of the cylinder where it will be subjected to the action of revolving knives or cutters, which are formed on the under side of blades projecting from the shaft, said blades being placed at an angle with the axis of the shaft. The number of blades can be varied, and also the number of cutters on the blades. In a cylinder of about four feet in length about seven such blades can be used advantageously. They are arranged around the shaft in spiral order, and are so inclined that the front edge of each blade is higher than the rear edge, whereby they are made to give a downward impulse to the peat as they revolve. Below the lowest blade is a propeller consisting of a series of blades, each bent so as to form a section of a screw; but the blades are fastened to the shaft in the same plane. The office of the propeller is to seize the peat and press it downward through an opening in the bottom of the cylinder into a chamber, wherein are placed conveyers that convey and force the peat into condensing and discharging tubes that project through the sides of the chamber. The condensing-tubes and the conveyers are, in this example, placed in a horizontal position, the ends of the conveyers reaching a little way within the tubes; but they can be arranged in any other desired position. The inner ends of said tubes are cylindrical, and the tubes gradually decrease in diameter for about half their length, so as to resemble the frustum of a cone. From or near the point of their greatest contraction the tubes assume a shape nearly semi-cylindrical, retaining that shape to their outer ends, and gradually increasing again in diameter.

In this example of my invention I have shown a vertical cylinder, A, in which the peat is broken up, as hereinafter described. The cylinder is surmounted by a hopper, A′, which may be circular or square or of any other convenient form, and it rests on a bed-plate, H, which forms the bottom of the cylinder, said plate having a central opening, R, whose sides are square, but whose corners are curved outward, as at S, so as to enlarge and widen the spaces at the angles of the opening.

The plate H is supported on the sides of a chamber, P, which sides are, in turn, supported by the main bed-plate Q, which is upheld by standards T at any desired height above the ground, so as to give room below it for the application of gearing to drive the machine.

B designates a shaft set vertically in the center of the cylinder, being supported below on the plate Q by means of a shoulder on the shaft, said shaft being extended through said plate and far enough below it to enable the horizontal bevel-gear K to be fastened thereto.

The shaft B is held in a vertical position by means of braces D, that go across the cylinder, near its top. The upper end of said shaft extends upward into the hopper, where it has secured to it wings C C, two in number in this example, placed in the same diametrical line and set spirally, so that each forms a segment of a screw, the elevated edges of the wings being in advance, so that when the shaft is rotated they will seize the peat that is thrown into

the hopper and force it downward toward the cylinder.

E are cutter-arms placed radially on the shaft B at different points in its height and in spiral order. I have here shown only three such cutter-arms, but their number can be increased as desired, and in practice I have found seven such arms to be a proper number in a cylinder about four feet in height. These arms E are set diagonally, their elevated edges being in advance, and on their under sides are vertical cutters or knives U, whose forward edges are straight.

The backs of the cutters are curved in this example, so that the cutters or knives in side view resemble a segment of a circle; but the cutters may be of any other desired form. I have here shown three such cutters or knives on each arm, but they may be increased in number, if desired. The action of the cutters or knives U is to divide the peat and reduce it into a homogeneous mass by cutting the undecomposed fiber and breaking up the air and water cells of the peat, thereby releasing the air and allowing the water, which is more or less charged or loaded with vegetable or other matter, to mix with the whole mass. At the same time that the knives cut the peat the lower sides of the cutter-arms E press the mass of peat in a downward direction, so as to cause it to be fairly submitted to the action of the cutters U, next below. The peat, by means of the revolving cutters and cutter-arms, is reduced to a homogeneous and plastic mass by the time it reaches the lower part of the cylinder, where it is acted on by a propeller, F, consisting of a circular plate fixed around shaft B, a little above the bottom or bed plate H, over the opening K of said bed-plate, said plate being divided by several radial slits so as to form a series of wings, which are each bent to a spiral form, so that each forms a segment of a screw-thread, their forward edges being elevated so that they seize the peat that descends from the cutter-arms and push and press it downward through the opening R into the receiving-chamber P, whence it is afterward conveyed out of the machine. While the crude peat is being reduced by the cutter-arms and cutters I subject it to the action of steam delivered into and upon it by means of a perforated steam-pipe, G, which may be connected with the exhaust of the engine that drives the machine. I have introduced the pipe G, in this example, into the lower part of the cylinder next above the bottom plate, H. There may be one or more coils, as may be desired by the operator. The steam warms the peat and facilitates its reduction into a proper degree of plasticity. When the peat reaches chamber P it comes in contact with conveyers, which force it forward into the expanded mouths of the condensing and discharging tubes J.

The conveyers which I have shown in this example of my invention consist of screws placed in horizontal positions on opposite sides of chamber P, their shafts or stocks V V extending through the back side of the chamber, and having pinions N N keyed on them outside thereof, as shown in the drawing. The outer ends of shafts V V have bearings in a standard or plate, W, which rises from plate Q. The pinions N N of the conveyer-shafts are turned by a spur-wheel, M, on the driving-shaft O, which shaft may be driven by a pulley, a crank, or other suitable means.

The mass of peat delivered into the chamber P is pressed laterally as well as vertically into contact with the conveyers, and any tendency of the peat to become packed therein is partly checked by enlarging the angles or corners of opening R, which enlargements allow the peat at those points freer access from above to the conveyers than it can have along the straight sides of the opening.

The ends of the conveyers enter within the inner ends of the condensing-tubes J, through which the peat is finally discharged. These tubes are fixed in the front side of chamber P, being respectively in line with the conveyers. Their inner ends are circular and the tubes decrease in diameter toward their forward ends gradually for about the distance of half or more than half their length, when they take the shape shown in front view, Fig. 2, having square or straight bottoms, and being rounded or elevated above.

The place of greatest contraction of the tubes occurs in this example at a point outside of the machine, from which point they again gradually increase in diameter up to the point of discharge.

The object in giving a square shape to the bottom of the outer portions of the tubes is to give the peat, when it issues from the machine, a flat or square shape on its under side, so that it can be laid evenly on the ground or other place. The rounded upper side of the tubes at their discharge ends gives a corresponding rounded form to the peat that is forced through them; but any other form may be adopted for the upper side of the discharge ends of the tubes that will accomplish the purposes aimed after, one of which is to prevent water and moisture from lodging upon the peat while being dried or afterward, as it would do if the peat was turned out from the machine in flat blocks, and another is to prevent the peat from cracking or falling down, as it is apt to do when produced in square blocks or in shapes flat on the top. The upper parts of the discharge ends of the tubes may therefore be rounded off, as here shown, or they may be conical or roof-shaped, so as to give to the upper side of the prepared peat a proper or sufficient water-shed, so that it will not be easily saturated or wetted when it is exposed to rain, and to strengthen it above to prevent it from falling down along its back or top.

The peat which is forced into the inner ends of the tubes by the conveyers is gradually condensed as it is pushed forward by reason of the contraction of their diameter. I have obtained good results by contracting the diam-

eter of the tubes from about seven and one-half inches at their receiving ends to about five inches at the point where the contraction ceases.

If the peat is discharged directly after having passed the point of greatest condensation, it is liable to crack and break or burst asunder into small or unequal fragments. I have therefore increased the diameter of the discharge ends of the tubes, as above shown, to allow the peat, after passing the point of greatest condensation, to expand while yet in the tubes sufficiently to prevent it from breaking or cracking afterward of its own accord, the amount of enlargement which I have found to produce good results and to allow the desired natural expansion of the condensed peat being about one-half an inch, the increase of diameter being gradual, so that in case the tube at its narrowest place is about five inches in diameter its outer end will measure about five and one-half inches.

The said condensing and delivering tubes may be made of any suitable material.

The inner end of the driving-shaft O has on it a bevel-gear, L, which drives the horizontal bevel-gear K, and motion is thereby communicated to the shaft B.

The peat may be received from the ends of the tubes J onto the ground or upon a traveling belt or platform, and may be cut up immediately into convenient lengths, to be conveniently handled in drying, and for use and transportation.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. Enlarging the corners or angles of the opening R, through which the peat is received into the conveyer-chamber P, substantially as described, in combination with the conveyers I.

2. Contracting the diameter of the condensing and delivering tubes for a portion of their length, and then enlarging their diameter toward their discharge ends, substantially as described.

3. Making the outer portions of the tubes J square or straight on their under sides, substantially as described.

4. Making the upper sides of the tubes J at their discharging ends of an elevated form, so that the peat discharged therefrom will shed falling water, substantially as described.

5. The combination of the conveyers I with the condensing and delivering tubes J, substantially as described.

6. The arrangement and combination of the driving-shaft O and its spur-wheel M with the conveyers I and the pinions N N of the conveyer-shafts, in combination with shaft B, substantially as described.

7. The arrangement and combination of the driving-shaft O with the vertical shaft B, and the wings and blades C, the cutter-arms E, and the propeller F, and the perforated steam-pipe G, substantially as described.

The above specification of my invention signed by me this 3d day of May, 1866.

JULIO H. RAE.

Witnesses:
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