4 Sheets—Sheet 1.

B. LEACH.

PEAT PRESSING MACHINE.

No. 182,205. Patented Sept. 12, 1876.

Fig. 1.

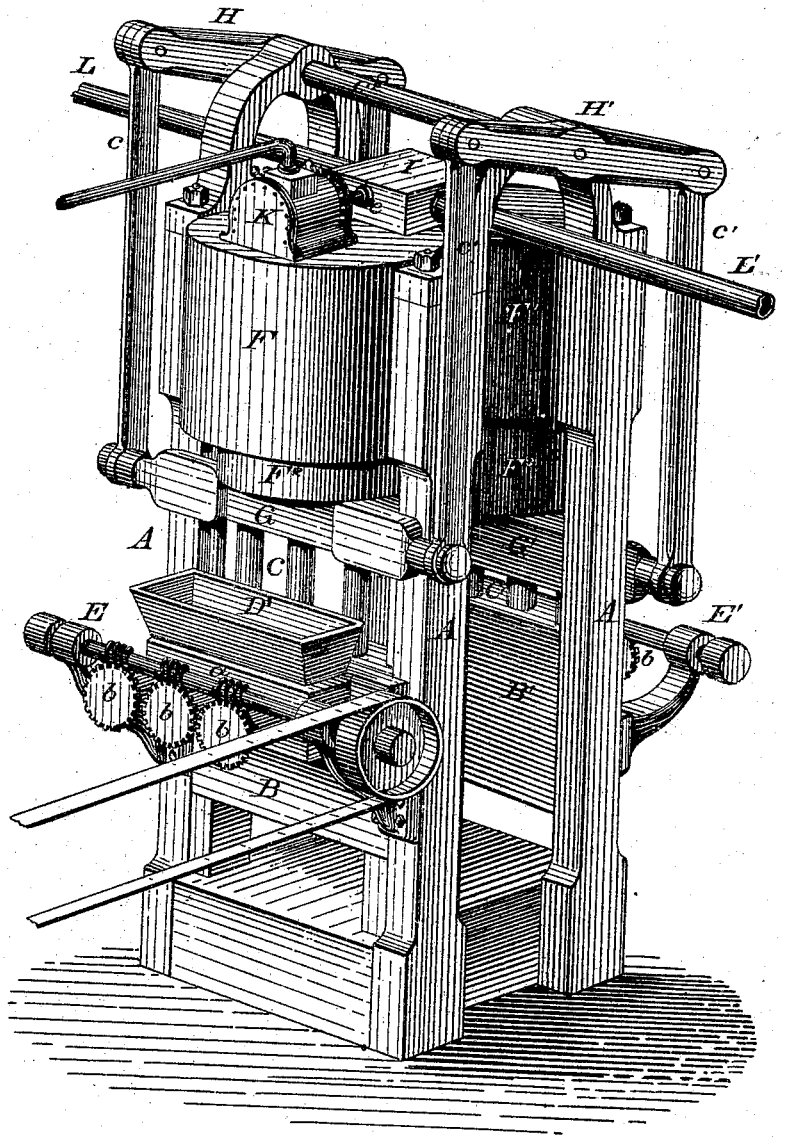

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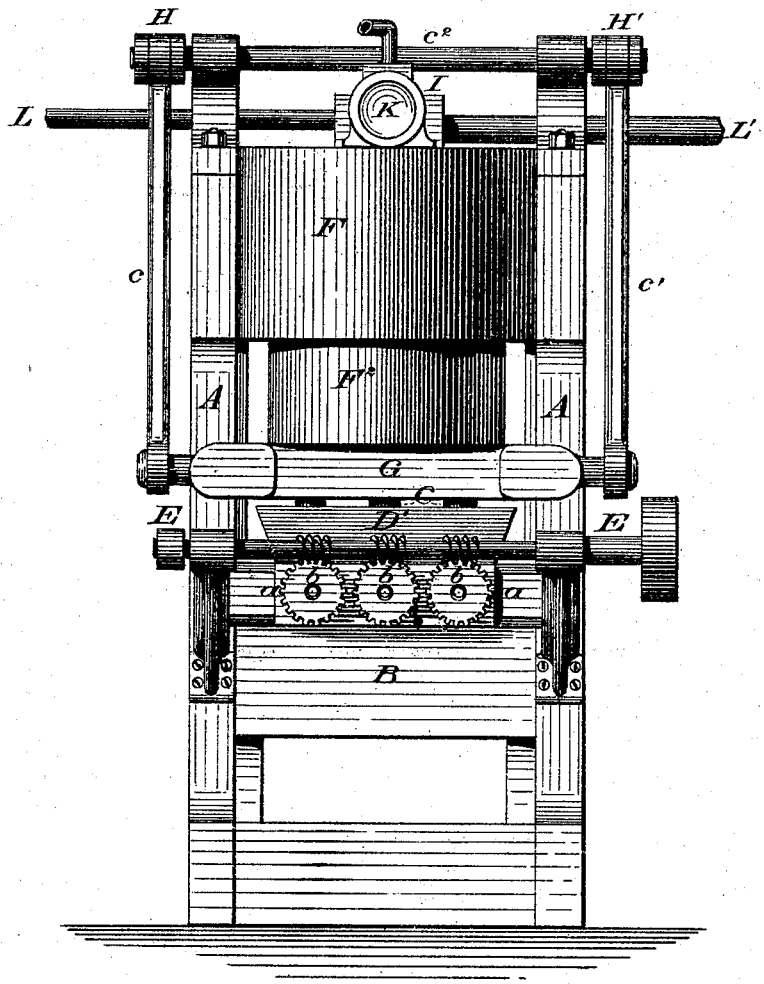
Fig. 2.



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PEAT PRESSING MACHINE.

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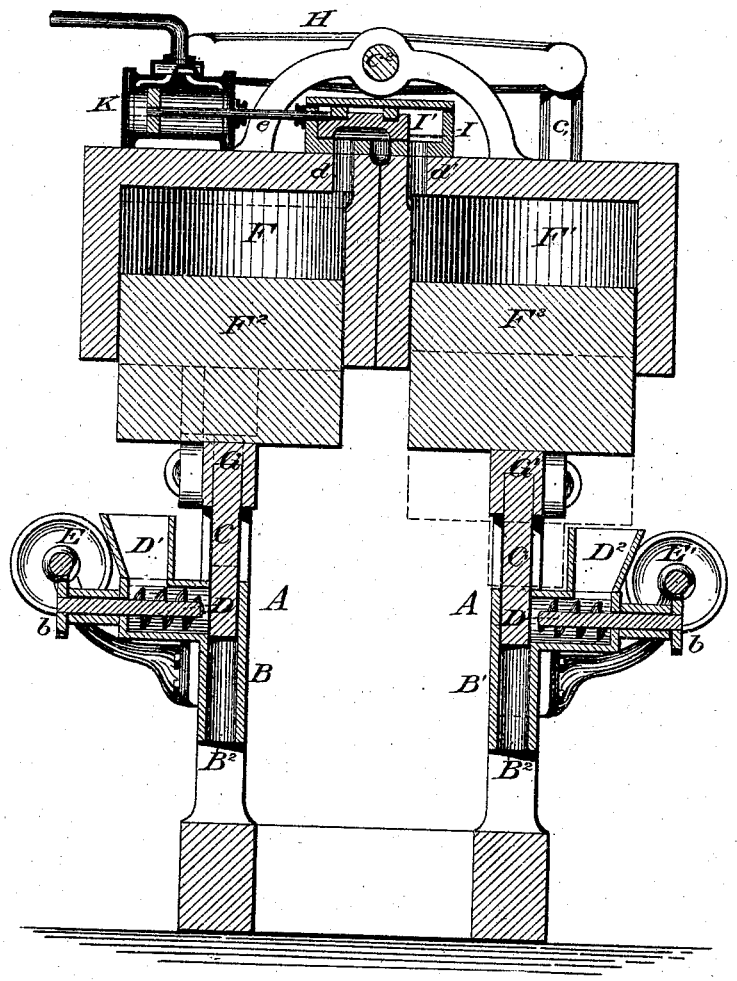
Fig. 3.



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B. LEACH.

PEAT PRESSING MACHINE.

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Fig. 4

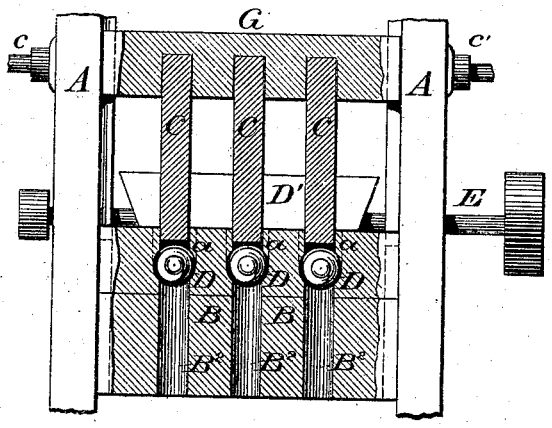


Fig. 5.

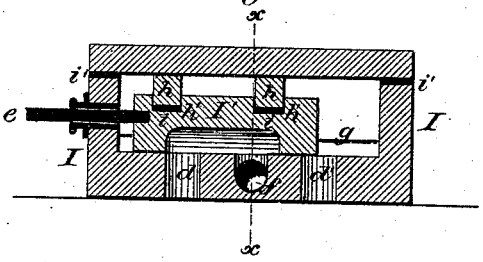
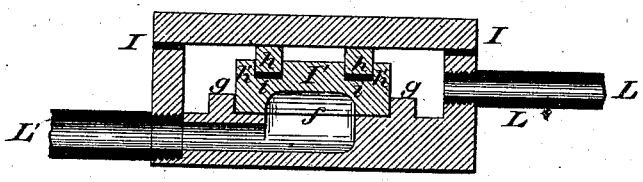


Fig. 6.



Attest:
Chas. Thurman.
R. T. Dyer.

Inventor:
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Attys.

UNITED STATES PATENT OFFICE.

BOYNTON LEACH, OF OWEGO, NEW YORK.

IMPROVEMENT IN PEAT-PRESSING MACHINES.

Specification forming part of Letters Patent No. **182,205**, dated September 12, 1876; application filed June 13, 1876.

To all whom it may concern:

Be it known that I, BOYNTON LEACH, of Owego, in the county of Tioga and State of New York, have invented a new and useful Improvement in Machines for Pressing Peat: and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention relates to the pressing of peat into a solid form, to adapt it for transportation and for use as a fuel, or for pressing other materials for different purposes; and its object is a machine operated by hydraulic pressure, which will press great quantities of peat or other material in a very expeditious manner and at a small cost, and one which will be simple in its construction and operation.

My invention therein consists principally in the combination of a series of reciprocating plungers, operated by hydraulic pressure, and a series of stationary molds, open and unobstructed at their discharge ends; second, in the combination of the stationary molds and the peculiar plungers operated by hydraulic pressure; third, in the combination of two sets of stationary molds and suitable plungers, operated by hydraulic pressure, adapted to operate alternately and forming a double press; fourth, in the peculiar valve for governing the induction and eduction of the pressing-liquid; fifth, in the means for operating the press; and, further, in the several combinations of the various operative parts, all as more fully hereinafter explained.

To enable others skilled in the art to manufacture and use my device, I proceed to describe the same in connection with the drawings, in which—

Figure 1 is a perspective view of the principal operative parts of my machine; Fig. 2, a side elevation of the same parts; Fig. 3, a vertical central section of the same; Fig. 4, a longitudinal section of one set of the molds detached from the frame of the machine; Fig. 5, a detached sectional view of the valve-chest on the line of the valve-stem; and Fig. 6, a sectional view on the line *x x* in Fig. 5.

Like letters denote corresponding parts in each figure.

A represents any suitable frame, in the lower part of which are mounted two sets, B B^1, of stationary molds. Each of these sets is composed of any desired number of cylindrical frictional molds, B^2, open at both ends. These molds may be made in one piece, or in halves bolted together, the latter construction allowing the molds to be cleared of the peat or other material being pressed at any time by loosening the bolts. The molds B^2 may taper a little downwardly, and are mounted, preferably, in a vertical position. Two sets of plungers, C C′, reciprocated vertically by means hereinafter described, the same in number as the molds B^2, and of size and shape to fill them closely, enter the molds from the top, and, their stroke not being arbitrary, may pass only part way through the said molds to press the peat, or entirely through the same to force the peat or other material being pressed out of the molds. Opening into the side of each of the molds B^2, below the lower end of the plungers, at the upper limit of their stroke, is a trough, *a*, in which revolves a spiral feeder, D, to deliver the peat or other material in regular quantities to the molds. These troughs may be placed perpendicular to the molds, or at any inclination thereto, and extend to suitable hoppers D^1 D^2, placed at a proper distance from the molds.

The feeders D are spirals or sections of spirals, adjusted to the size of the molds, and project through the sides of the hoppers, where they are provided with cog-wheels *b*, engaging with worms or cogs on revolving shafts E E′. The feeders for each set of molds thus would be revolved together; but each spiral feeder may be connected with a separate shaft, and revolve independently.

The shafts E E′ are revolved by suitable belt-connections or gearing, so that the peat or other material is uniformly fed in the desired quantities through the ports at the ends of the troughs into the molds, and, by suitable connections with the moving parts of the press, the revolution of the spirals and the feeding of the peat may be stopped while these ports are closed by the plungers.

The peat or other material to be pressed is conveyed into the hoppers by suitable carriers or elevators. (Not shown.)

It will thus be seen that the hoppers may be placed at any distance from the molds, and that the troughs and feeders may be at any angle thereto.

In the upper part of the frame are situated two large cylinders, F F^1, in which slide the pistons F^2 F^3, suitably packed in the cylinders, closing the lower ends of the same. The pistons are connected, through cross-heads G G′, with the two sets of plungers C C′, the said cross-heads sliding in ways in the uprights of the frame above the molds. The ends of the cross-heads are connected by rods c c^1 with walking-beams H H′, and the walking-beams are supported on a shaft, c^2, journaled in the frame above the cylinders, so that the two pistons and their connecting-plungers will operate alternately. The upper ends of the cylders F F^1 are closed, except where they connect by the ports d d' with the valve-chest I. This valve-chest is mounted upon the cylinders, extending part way on each, and the stem e of the valve I′ sliding therein is connected with the piston of a small steam-engine, K, which is placed preferably upon the head of one of the cylinders. The valve of this engine is connected, by levers and connecting-rods, with the moving parts of the press, so that the engine will be reversed at the end of the stroke of the plungers, and the valve I′ moved, and the press thereby reversed. The valve on this engine may also be reversed by the rising of a safety-valve on the pressing-cylinder when the pressure reaches the desired limit.

This engine for moving the main or pressing valve, instead of being operated by steam, as described, may be connected with the induction-pipe leading from the pump into the valve-chest, and thus operated by hydraulic pressure instead of steam, its valve, as before stated, being reversed by connection with the moving parts of the press or with the stem of a safety-valve in one of the cylinders, weighted to the pressure desired to be used.

Out of the side of the valve-chest I opens the water-induction pipe L leading to the steam pump or pumps, and the eduction-pipe L′, of larger diameter than the induction-pipe, connects with an eduction, f, opening through the bottom plate of the valve-chest between the ports d d'. The valve I′ is rectangular in form, and has its under side hollowed out in the usual manner. This valve moves between the bottom plate of the valve-chest and the cover, the valve being prevented from moving sidewise by ribs g on the bottom plate.

Upon the valve is placed a metallic balance-packing, h, in the shape of the top of the same, and sunk into a groove, h', in its top, near the edges thereof. In the groove h', under the metallic packing, is placed a thin elastic packing, i, consisting of rubber, leather, or other suitable material. The metallic packing h moves against the under surface of the valve-chest cover, and a thin elastic packing, i', is placed between the top of the valve-chest and said cover, so that by forcing the cover down the valve will slide between two surfaces, and in perfect contact with each. That part of the valve surmounted by the metallic packing will not be exposed to the pressure of the water, and an aperture may be made in the center of the valve-chest cover, through which the small leakage of water may pass. The construction of the valve with relation to the ports d d' admits of a larger opening for the eduction than is necessary for the induction of the pressing-liquid.

It will be seen that the space for the eduction of the liquid may be so regulated, if desired, as to be always smaller than that for the induction, thus obtaining a more rapid exhaust of the liquid, and a consequent saving of power and increase of speed.

It will thus be seen that the smallest possible surface of the valve will be exposed to the pressure of the water, and that it will have a certainty of motion under any pressure, with a minimum expenditure of power.

Suitable knockers (not shown) may be connected with the moving parts of the press, by which the compressed peat, as it is forced from the molds, may be knocked off into proper conveyers; or knives may be used instead of the knockers, which will cut off the peat, and give a neater finish.

My machine being constructed as above described, its operation is as follows: The stream of water which operates the hydraulic press receives its force from steam or other force pumps, or from other proper means, the induction-pipe L being connected with the water-eduction port of the pumps, or with the source of power. The induction and eduction of the liquid with relation to the cylinders F F′ is controlled by the balanced valve I′, it being so arranged, as before described, that a larger passage is opened for the eduction of the liquid than is required for its induction.

The peat is fed from the hoppers by the revolution of the spirals, first into one set of molds, and the proper resistance being applied to the lower open ends of the molds, the press is started, and the peat is compressed to the desired density, and remains in the molds. The press being reversed, a like quantity of peat is compressed in the other set of molds in the same manner. This first peat pressed on the starting-plugs acts as a resistance by its friction in the molds, by which the following peat is pressed, and its length and density regulate the density of the succeeding charges.

While the first peat is being compressed in the second set of molds a second charge is fed into the first set, and, upon the reversing of the press, this peat is forced upon the starting-plugs, which are pushed out of the molds, and knocked or cut off into carriers, and conveyed to any desired point. This operation is continued, the peat being fed into one set of molds while the plungers are operating upon

that in the other, a part of the compressed charge always remaining in the molds to give the necessary resistance for the succeeding charge.

The press, in operating upon the peat, commences at its minimum pressure, and increases uniformly throughout the entire stroke. The pumps do not have to be stopped at the end of each stroke, but may be throttled down automatically at the first part of the stroke, as but little power is required at that time. It will thus be seen that by my means peat can be pressed in great quantities in a single machine, and at a great reduction in the cost over the ordinary methods.

It is evident that the position, construction, and arrangement of many of the parts of my machine may be changed or modified without departing from the spirit of my invention.

Instead of mounting the cylinders and molds in a vertical position, as described and shown, a single horizontal cylinder may be used, having a piston-rod extending through each end of the cylinder, and connected at each end with a cross-head and series of plungers working in stationary horizontal molds. In this case the peat is fed into the molds by spirals, the same as in the vertical press, and the induction and eduction of the pressing-liquid in relation to the cylinder is controlled by the same means as used in the vertical press.

Instead of pressing the peat in a continuous length, as described, a second series of movable plungers may be used in the horizontal as well as the vertical press, entering the molds at the opposite ends from the pressing-plungers. This second set of plungers is connected, by a cross-head, with a hydraulic ram or piston, the same as the pressing-plungers, the induction of the liquid being accomplished by valve-connection with the pumps, or with the main induction-pipe. The eduction is controlled by the rising of a safety-valve on the cylinder, weighted to the desired pressure. This second series of plungers or resisting-plungers are entered the desired distance into one end of the molds by the induction of the liquid into the secondary cylinder, and are held in that position by the non-compressibility of the liquid which remains in the cylinder. The peat is then fed into the molds in the desired quantities, when the pressing-plungers descend, and compress the peat in the molds between the two series of plungers.

When the pressure reaches the desired limit the safety-valve in the secondary cylinder rises, allowing the confined liquid to escape and the second series of plungers to recede from the molds. The pressing-plungers continue their stroke and force the peat from the molds, which is then knocked into proper conveyers. When one set of molds is cleared the press is reversed, and the same operation repeated on the other side. The reversing of the press through suitable connections opens the induction-valve to the secondary cylinder, thereby forcing the second series of plungers back into place, when the induction-valve closes, holding the plungers in that position till another charge of peat is forced upon them by the pressing-plungers.

By the use of stationary molds, wherein the peat is pressed in the molds and then forced from them, as by my methods, the employment of movable and opening molds is avoided, and the complicated mechanism necessary for their proper working is done away with; also, by the use of stationary molds, less material to give the necessary strength is required, and the molds can thereby be made cheaper and more durable.

The advantages of using hydraulic pressure, as applied to the pressing of peat in stationary molds, are numerous, a maximum power being obtained at a minimum cost. By hydraulic pressure the length of the stroke can be adjusted to any point desired. The pressure used is not arbitrary, but will, within the power and capacity of the pumps, adapt itself to the resistance.

Having thus fully described my invention and explained some of its advantages, what I claim as new therein, and desire to secure by Letters Patent, is—

1. In a machine for pressing peat or other material, the combination of a series of reciprocating plungers, operated by hydraulic pressure, and a series of stationary molds, open and unobstructed at their discharge ends, and of the same, or nearly the same, internal area throughout, substantially as and for the purpose set forth.

2. In a machine for pressing peat or other material, the combination of two sets of stationary molds and two sets of reciprocating plungers, operated alternately, and forming a double press, substantially as described and shown.

3. In a machine for pressing peat or other material by hydraulic pressure, the combination of the valve-chest I, the valve I′, the metallic packing *h*, and the elastic packing *i* and *i′*, substantially as described and shown.

4. In a machine for pressing peat or other material by hydraulic pressure, the combination, with the pressing-cylinders F F′, of the valve-chest I, the valve I′, the metallic packing *h*, the elastic packing *i i′*, the ports *d d′ f*, and the induction and eduction pipes L L′, substantially as described and shown.

5. In a machine for pressing peat or other material by hydraulic pressure, the combination, with the pressing-cylinder, of the small engine K, mounted upon the same, and adapted to control the valve for the induction and eduction of the pressing-liquid, substantially as and for the purposes set forth.

6. In a machine for pressing peat or other material by hydraulic pressure, the combination of the cylinders F F^1, pistons F^2 F^3, cross-heads G G′, plungers C C′, walking-beams H

H′, and connecting-rods c c^1, substantially as described and shown.

7. In a machine for pressing peat or other material by hydraulic pressure, the combination of the pressing cylinders and pistons, the plungers, the stationary molds, and the spiral feeders, substantially as described and shown.

This specification signed and witnessed this 12th day of June, 1876.

BOYNTON LEACH.

Witnesses:
R. N. DYER,
CHAS. THURMAN.