

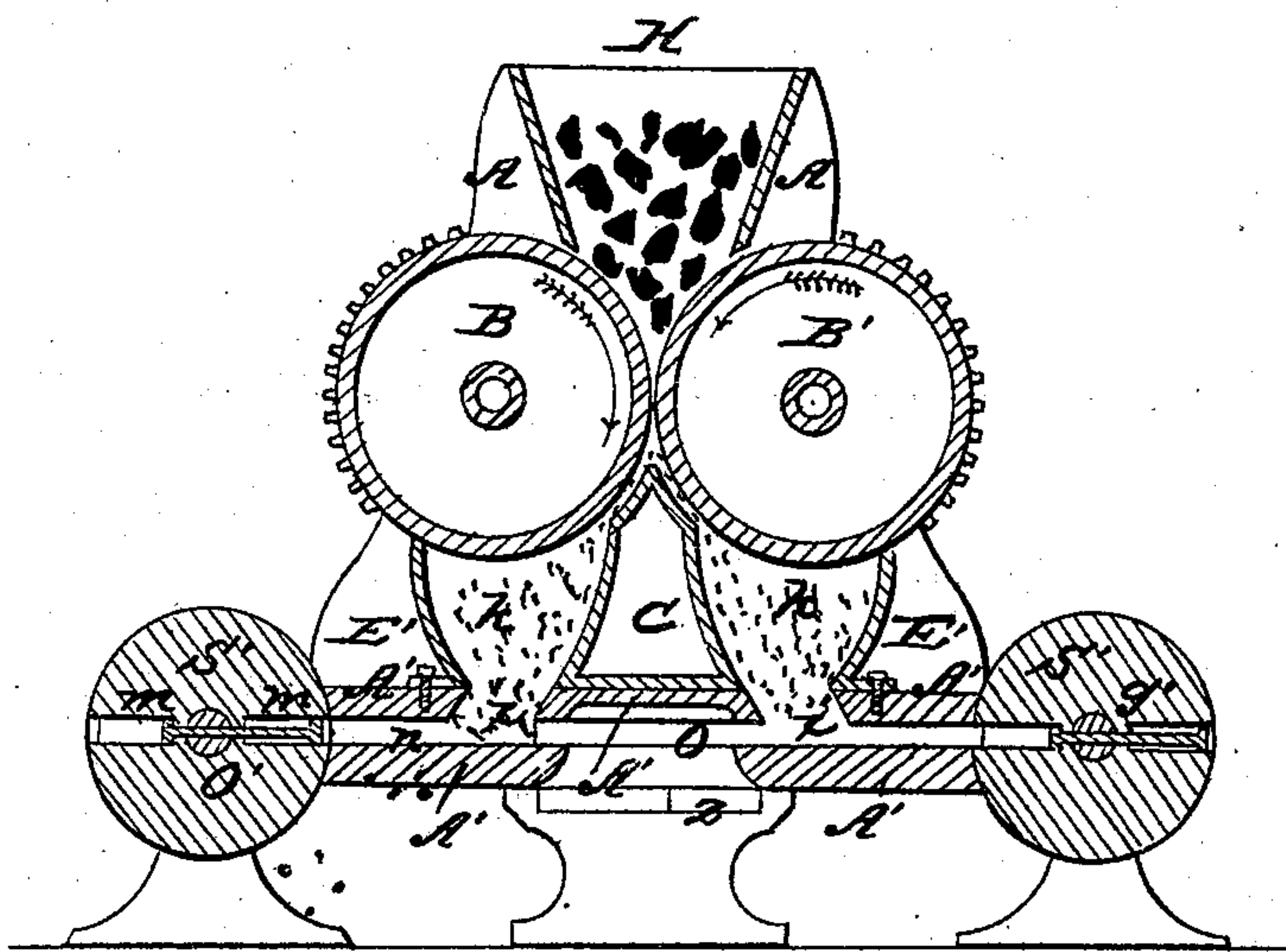
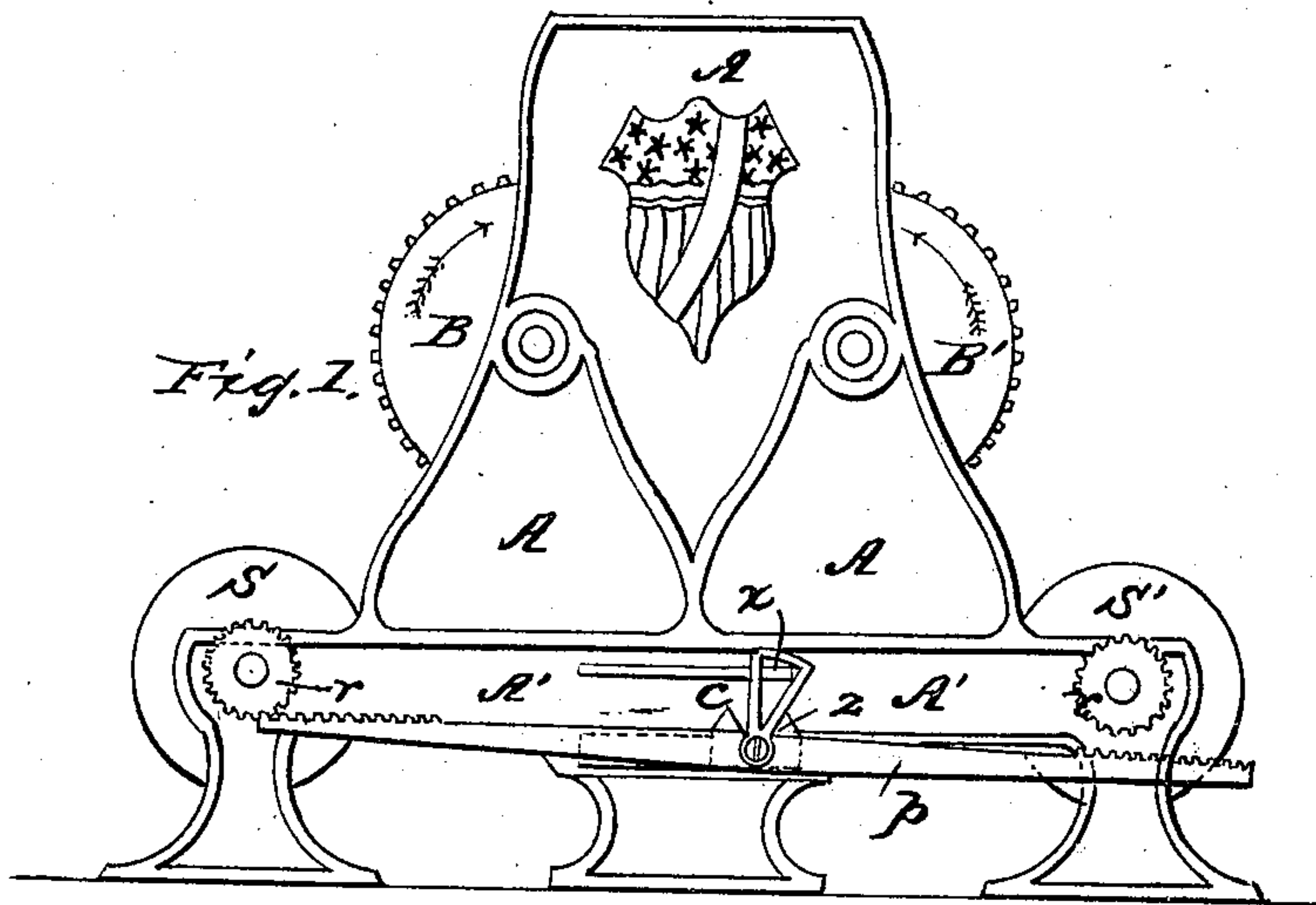
A. MOFFATT.

2 Sheets—Sheet 1.

Peat Machine.

No. 55,339.

Patented June 5, 1866.



Witnesses:

Henry T. Munson
H. H. Alberger.

Inventor:

Arthur Moffatt

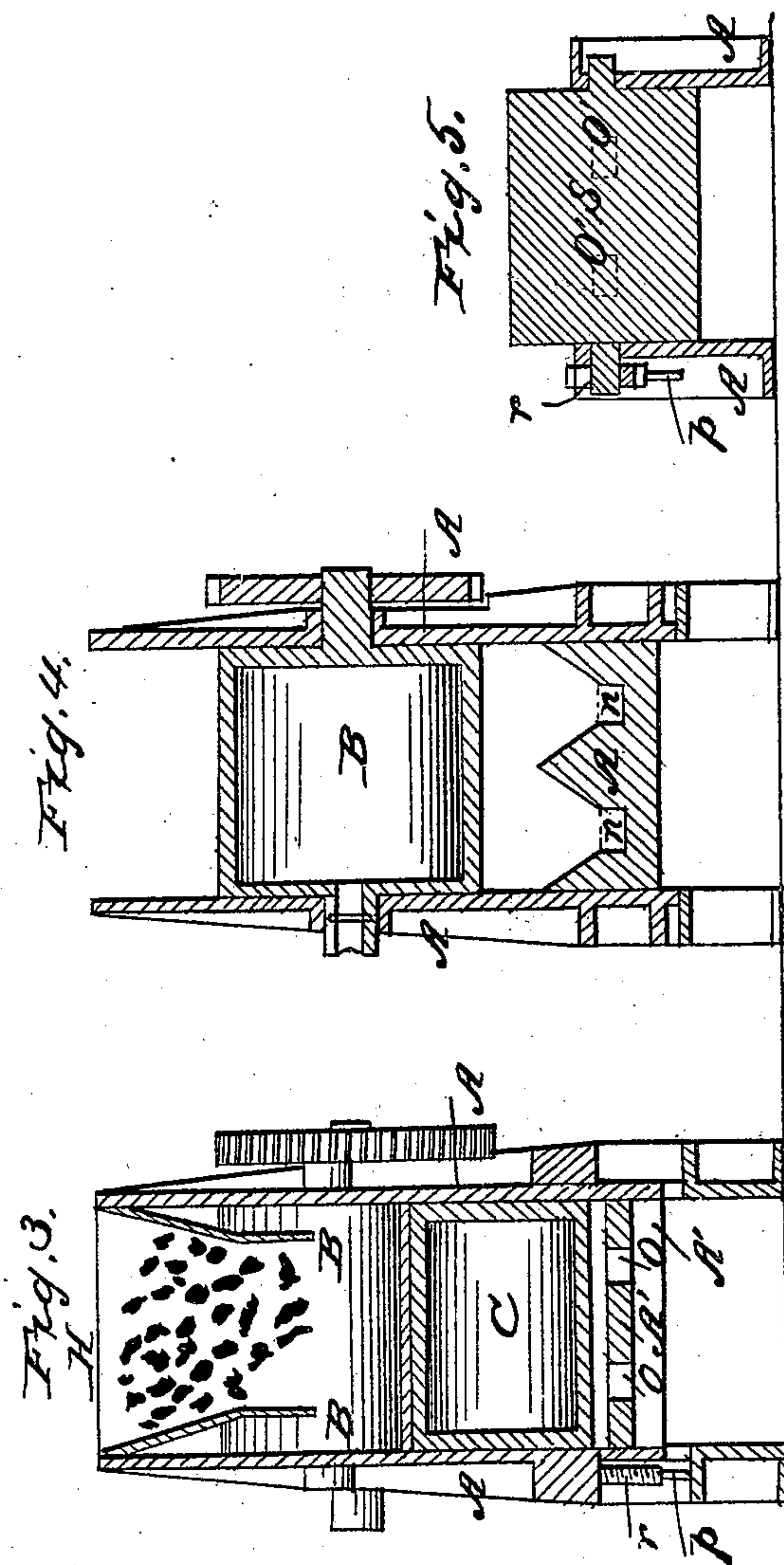
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UNITED STATES PATENT OFFICE.

ARTHUR MOFFATT, OF WASHINGTON, DISTRICT OF COLUMBIA.

IMPROVED PEAT-MACHINE.

Specification forming part of Letters Patent No. 55,339, dated June 5, 1866.

To all whom it may concern:

Be it known that I, ARTHUR MOFFATT, of the city of Washington, District of Columbia, have invented a new and useful Improvement in Machines for Treating or Preparing Peat; and I do hereby declare that the following is a full, clear, and exact description of the nature, construction, and operation of the same, sufficient to enable one skilled in the art to which it appertains to construct and use the same, reference being had to the accompanying drawings, which are made part of this specification, and in which—

Figure 1 is a side view of a machine made according to my invention. Fig. 2 is a longitudinal vertical section of the same. Fig. 3 is a cross-section of the same, taken on the line *x x*, Fig. 1. Fig. 4 is a cross-section taken on the line *y y* of Fig. 1. Fig. 5 is a cross-section taken on the line *z z*, Fig. 1.

Similar letters of reference in the several figures indicate corresponding parts.

This invention relates to an improvement in a machine for treating peat, preparing it for fuel, whereby it is taken in its crude state and subjected to a crushing and grinding process, and is then compressed into blocks or bricks suitable for transportation and use.

It consists in a combination and arrangement of mechanical devices by which the crude peat is reduced to a suitable condition for use as fuel.

The extensive deposits of peat which are found in different parts of the world have therefore been utilized only to a very limited extent, owing partly to the bulk of the material in its crude state as compared with its weight when cut and dried in the ordinary manner, as well as to its extreme friability, which renders it an unpleasant fuel to use from the amount of fine dirt-like material which results from handling it in this state, and from the rapidity with which, when in this state, it is consumed, owing to its light porous nature; and, further, on account of the difficulties which, despite of numerous and persistent efforts for many years, have attended the attempts made both in this and in foreign countries to cleanse and condense it in such manner as to secure the greatest amount of serviceable fuel in the least space, while at the same time it should be made in form and substance as convenient and attractive as not only to command ready satisfaction

in use, but to admit of being transported to a distance at a cost for space occupied in transit which would place it without objection among the list of merchantable articles of traffic and transportation.

The above difficulties arise from the peculiar nature of the crude material, and any system or process that would overcome them must be based upon a knowledge of its texture and composition.

Peat as found in the bog consists mainly of vegetable matter in a more or less advanced state of decomposition, traversed by fibers and roots, which, through more or less extensive decay, are reduced to a state of hollow capillary tubes, the bark or exterior skin of the root being all that remains of it entire. The mass of decomposed material or true peat is also cellular in its structure, and filled with water and air when first taken from the bog. When dried these cells are freed from water, but not from air, so that the mass is then light, porous, and exceedingly friable, and is consumed quickly when burning. That it is a superior article for fuel is well-known and universally acknowledged. If, then, it can be considerably reduced in bulk, made dense like coal, so as to stand a blast and endure under combustion a proportionately-greater length of time, be rendered tough or tenacious instead of friable, and at the same time be produced in such form that it may be considered a clean fuel when compared with coal, preserving likewise all its properties of generating intense heat, it is evident that it may be considered as in an attractive merchantable condition, and if in addition to the process by which these results are obtained be simple, and the machinery used also simple and inexpensive, it is evident very desirable results in a business point of view have been attained.

Various efforts have been made to overcome the difficulties that arise in treating peat, and by the use of artificial means to divest it of its moisture and reduce its bulk; but owing to the peculiar structure and natural characteristics of the crude material these efforts have all been unsuccessful.

The attempts to accomplish the desired end by submitting the peat to pressure have not met with success, for the water, being held in the capillary tubes before mentioned, is not expelled by simple pressure, and remains in the

interior of the mass to be subsequently expelled, as before, by the tedious process of drying, either by natural or artificial means.

The attempt has also been made to reduce peat to a more homogeneous state, that it might become compact and less bulky as it dried, by raking out and separating the fibers from the thoroughly-decomposed portions; but the partly-decomposed fibers proved to have so little strength that it became necessary to reduce the consistence of the peat by the addition of larger quantities of water, which it was afterward found difficult to eliminate.

After repeated and careful experiments it has been discovered that in order to bring the peat into such a state that it will be as dry as possible and at the same time capable of being packed or compressed into a solid mass, it must first be submitted to pressure for the purpose of crushing its masses and lumps and breaking up and destroying its cohesion, in order to prepare it to be operated upon by a rubbing or grinding mechanism, to which it is subsequently submitted for the purpose of destroying its cellular texture, as will be hereinafter more particularly described.

In the accompanying drawings, A represents the frame that supports the moving and stationary parts of the machine, and may be made of any suitable material or form.

B and B' are cylinders of equal diameters, which revolve toward each other in the direction indicated by the arrows. Above the cylinders is placed a hopper, H, into which the crude peat is inserted. Below the cylinders B and B', and situated between them, is a standard, C, having a hard grinding-surface on each side, which comes in contact with the surface of the cylinders B and B'. This standard C, like the sides of the frame, rests upon a bed-piece, A', which may be supported in any desired manner. A partition, E and E', form an inclosure on either side of the standard, into which the peat enters after it has passed through the crushing and grinding operations.

i and *i'* are openings through which the peat passes into a passage, *n*. In this passage *n* is a piston or plunger, *o*, which is moved forward and backward, and made of such a length that when one end is back, so as to expose the entire opening *i*, the other end projects beyond the passage on the other side, as represented in Fig. 2.

At each end of the passage *n* is a cylinder, S and S', each of which contains two or more chambers, *m*. A rod, *o'*, passes from one chamber to the other. Each end of this rod is attached to a disk of the same size and shape of the caliber of the chamber. The rod *o'* is of such length that when one disk is back against the bottom of the chamber the disk on the other end of the rod, which is in the other chamber, is forced forward to the front end or mouth of the chamber, as shown in Fig. 2.

The cylinders S and S' are revolved by means of an automatic adjustable sliding rod, *p*, having cogs on each end, which operate in combi-

nation with a cogged wheel, *r*, on the cylinder. The rod *p* is made of such a length that when the cylinder has been revolved so as to present the empty chamber *m* to the passage *n* the rod *p* is detached from the cog-wheel. The rod *p* is connected to a sliding block, *z*, by means of a pin, on which it vibrates. It also has an arm, *c*, extending upward, which is acted upon by a pin, *x*, projecting from the piston *o*. As soon as the piston *o* moves forward and is free from the chamber *m* the pin *x* comes in contact with the arm *c*, which, acting as a lever, throws the cogged end of the rod *p* into gear with the cogged wheel on the cylinder which the piston is leaving. At the same time it throws the other end out of gear with the cogged wheel on the cylinder that the piston is moving toward.

The cylinders B and B' and the standard C are made hollow, and steam is introduced for the purpose of drying or evaporating a portion of the moisture that is in the peat as it is being prepared in the machine, so that when it leaves the machine it is not necessary to subject it to any further drying operation, it being ready for use. Hot air may also be inserted into the inclosure K and K' to aid in expelling the moisture, but it is believed the application of steam as above mentioned, as well as to other parts of the machine, is all that is necessary, as the peat, before being inserted into the hopper H, is gathered from the surface of the bog-meadow in as dry a condition as possible.

The operation of this machine is as follows: The peat is placed in the hopper H and conveyed hence between the cylinders B and B' through the grinding-surfaces of the standard C, into the apartments K and K', at the same time crushing its masses, fibers, and cells preparatory to its being ground, which operation is performed as it passes through between the cylinders and the standard-surfaces, where it is subjected to a rubbing and grinding process. At the same time the high degree of heat generated by the steam evaporates or absorbs the moisture in the peat and expands its tarry and adhesive properties. These cylinders B and B' perform several functions—viz: feeding, grinding, crushing—and are the means of applying heat for the purposes above described. It is now found that the peat is completely free from air and in a homogeneous plastic mass, ready to be molded into blocks or bricks, the water it contained having been expelled or disseminated through the entire mass. It now passes from the apartment K through the opening *i* to the passage *n*, and as the piston *o* moves toward the cylinder S it conveys a quantity of peat in front of it, which is forced into the chamber *m*, where it is compressed as the piston *o* moves to its extreme limit. As the piston *o* returns it performs a like operation on the other end, and causes the sliding rod *p* to move into gear, which revolves the cylinder S until the empty chamber is in line with the passage *n* and the chamber containing the compressed peat is opposite to the pis-

ton *o*. As the piston returns it throws the rod *p* into gear on the other side and out of gear with the cylinder that it is approaching, so that one cylinder only is moved at a time, which is the one the piston is leaving. As the piston moves forward it forces the peat against the disk on the rod *o'*, driving it back against the bottom of the chamber. At the same time the disk in the opposite chamber is driven forward, forcing the brick of compressed peat out of the chamber, as represented in the drawings, Fig. 2. This operation is performed at each end of the machine as the piston moves in one direction or the other.

Power may be applied to the piston and to the cylinders in any known way, and, if desired, the action of the engine might be applied directly to the plunger or piston *o*.

It is obvious that this machine might be applied, with very slight modification, for a variety of purposes without departing from its main principle, which is the arrangement of the cylinders *B* and *B'*, in combination with the standard *C*, for the purpose of feeding, crushing, and grinding; also, the arrangement of the cylinders *S* and *S'*, in combination with the plunger or piston *o*, (with or without the ejecting-rod *o'*), by which the compressing and ejecting process is done automatically as the plunger moves forward and backward.

Having thus fully described the nature, con-

struction, and operation of my improved machine for treating and preparing peat, what I claim as new, and desire to secure by Letters Patent, is—

1. The cylinders *B* and *B'*, in combination with the standard *C*, arranged for the purpose of feeding, crushing, and grinding, substantially as and for the purpose herein set forth.

2. The application of heat to the different parts of the machine, substantially as and for the purpose herein described.

3. The cylinders *S* and *S'*, having chambers *m*, in combination with the plunger *o*, operating substantially as and for the purpose herein described.

4. The piston *o*, having an endward movement forward and backward, in combination with the feeding-openings *i* and *i'*, operating substantially as and for the purpose herein specified.

5. The ejecting-rod *o'*, provided with a disk in each chamber, and operating as herein described, for the purpose set forth.

6. The vibrating rod *p*, in combination with the cogged wheel *r*, and operating substantially as described.

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Witnesses:

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