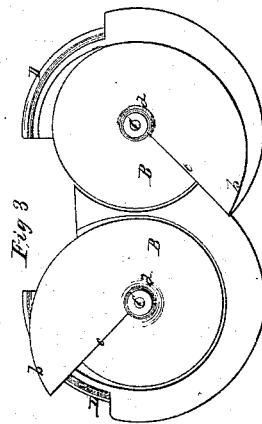
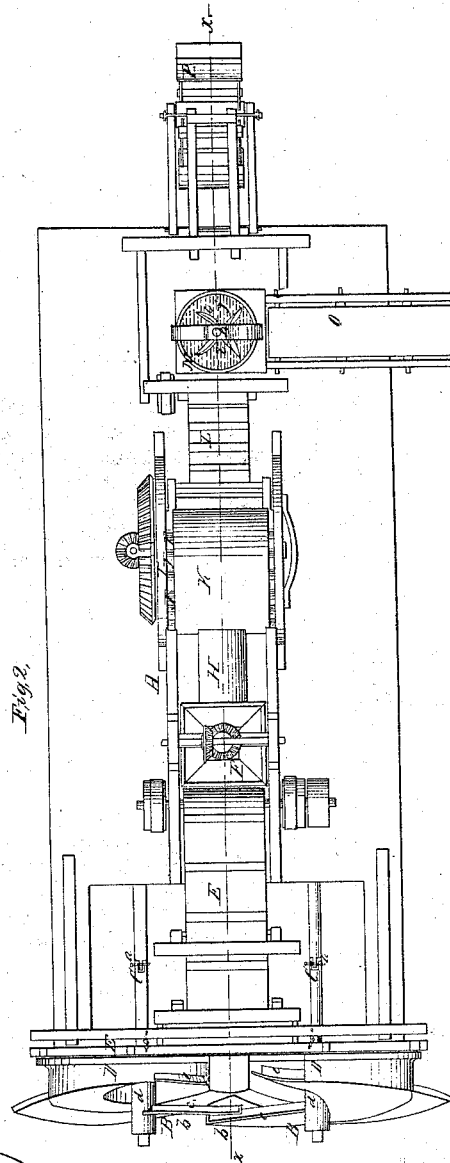
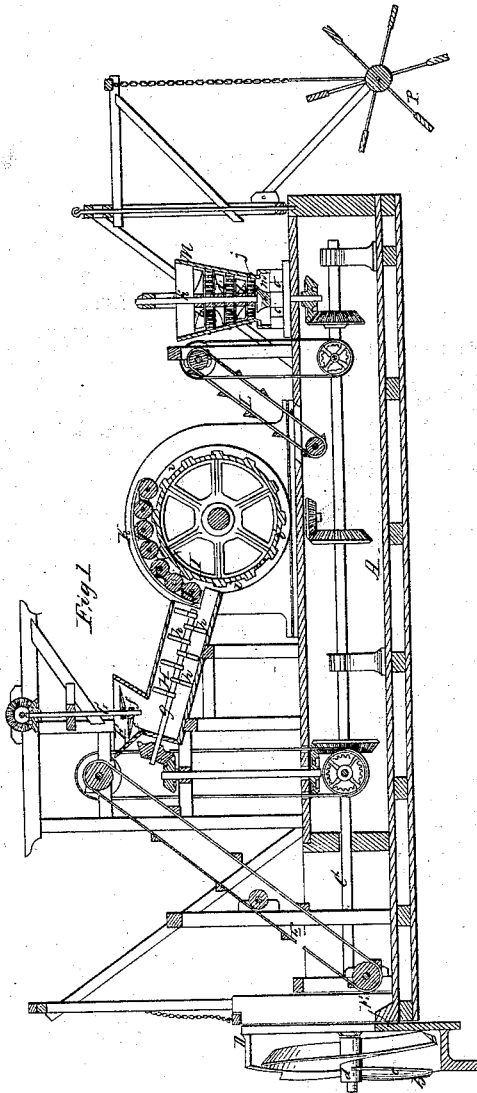


No. 47,908.

PATENTED MAY 23, 1865.

J. HODGES.
EXCAVATOR.



Witnesses,
Attest my hand
J. M. Compton

Inventor,
James Hodges
By J. M. Compton

UNITED STATES PATENT OFFICE.

JAMES HODGES, OF PENNY HILL, BAGSHOT, ENGLAND.

IMPROVEMENT IN EXCAVATORS.

Specification forming part of Letters Patent No. 47,908, dated May 23, 1865.

To all whom it may concern:

Be it known that I, JAMES HODGES, of Penny Hill, Bagshot, Surrey, England, have invented a new and Improved Machine for Manufacturing Fuel from Peat-Excavating Canals and for Similar or Analogous Purposes; 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 is a longitudinal vertical section of my invention taken in the line *x x*, Fig. 2; Fig. 2, a plan or top view of the same; Fig. 3, a front view of the screw excavators pertaining to the same.

Similar letters of reference indicate corresponding parts.

This invention relates to a new and improved machine for excavating, and, at the same time, manufacturing peat for fuel, as hereinafter fully shown and described.

A represents the hull of a vessel on which the machinery is placed. This vessel may be either a barge or flat-bottom scow, of wood or iron, and, for ordinary use, about ninety feet in length by sixteen feet in width and five feet in depth, strongly put together, and carrying a steam-engine of sufficient capacity to drive the machinery hereinafter described.

B B represent two screw-excavators, which may be of iron, about eleven feet in diameter, placed at the forward end of the vessel A, and rotated by two shafts, C C, to which they are attached. These screws are so arranged as to cut to a depth of five feet six inches below the surface of the water and two feet above it with a width of nineteen feet, thus forming in one cut a canal of nineteen feet by seven feet six inches in depth, with a forward movement of four inches per minute, or a total movement of two hundred and forty feet in a working day of twelve hours. Where the peat is of considerable depth one screw may be used in place of two, in which case it will be placed in the center line of the vessel and provided with the same arrangement, as before described.

D D represent shields of wrought-iron inclosing the screws and confining the peat when excavated until it is delivered by the scraper back of the screws onto the deck of the vessel.

The shields D D are attached to a frame, E, at the end of the vessel, arranged in such a manner that it may be adjusted higher or lower to regulate the depth of the cut of the screws, as may be desired. The shafts C C are provided with universal joints *a*, to admit of this adjustment of the screws. The outer parts of the screws B B are formed with projecting ends *b*, having cutters or cutting-edges *c c*, which extend from the hubs *d* of the screws outward to the ends *b*. (See Fig. 3.) The cutters *c c* may be made separate from the screws and bolted to them, so as to admit of their ready removal for sharpening and other purposes, and said cutters may be attached to hinged flaps or arranged in any other suitable way to admit of them being adjusted with a greater or less rake or pitch to regulate the cut, as may be desired. The inner parts of the screws are provided with flanges *e*, to serve as scrapers, the latter rubbing against the shields and bringing the peat or other material excavated to the opening in the rear. The peat or other material excavated is discharged upon an inclined endless apron, E, which carries it to a hopper, F. (See, more particularly, Fig. 1.) This hopper F is provided with a vertical revolving-shaft, G, to which are attached stirrers *f*, the latter facilitating the movement of the peat into the hopper.

H is a feeder for filling the pockets of the squeezer, and is a cylinder, of iron or other material, within which rotates a shaft, *g*, carrying arms *h*, so arranged as to force the peat into the pockets of the squeezer I. This squeezer I consists of a large skeleton cylinder, of iron, about eight feet in diameter and three feet face, upon the circumference of which are formed perforated pockets *i*. These pockets are about three feet in length by sixteen inches in width and of a depth varying from five to eight inches. The sides of these pockets, as well as the bottoms, may be perforated in order to admit of the water readily passing out from them, and the perforations may be covered with strong, coarse canvas or other suitable material to prevent the peat passing through under the pressure of rollers J.

I would remark that the depth of the pockets *i* may be varied by having their bottoms adjustable, so that they may be moved far-

ther in or out from the center of the wheel. There are seven rollers, J, of iron placed in position relatively with the face of the cylinder, as shown clearly in Fig. 1, and between its flanges said rollers extending over about one-third of its circumference and covered by a band, K.

I do not confine myself to the use of the rollers J, for other means may be used and the same end obtained—for instance, a strong cast-iron plate accurately fitted and planed to the shape of the proper curve and regulated or adjusted by set-screws may be employed. The peat is discharged from the squeezer upon an inclined endless apron or elevator, L, which conveys it to the pulping-machine M.

This machine is in the form of an inverted frustum of a cone, with a cylindrical bottom or base six feet in diameter at top and three feet at bottom, with a total height of seven feet. Within this cone are placed perforated diaphragms *j*, any proper number being used, and so arranged as to be removable when desired. A vertical shaft, *k*, carrying knives, cutters, or rubbers, *l*, passes through the center of the diaphragms, and when revolving the knives force the peat through the perforated diaphragms, and at the same time cut and crush its fiber, thereby reducing it to a homogeneous mass of pulp. After the pulp has been forced through the last or lowest diaphragm, it passes into a cylinder, *m*, in which it is expressed by spiral arms *n* and molded into the required shape and density by the form of the opening *o*. It is made to pass through in leaving cylinder *m*. The molded peat is discharged upon an endless band, *o*, which projects from the side of the vessel, as shown in Fig. 2, and may be supported and arranged in any proper manner.

P is a propelling or steering wheel arranged at the stern of the vessel.

The entire operation of the machinery is as follows: The vessel being properly located in the bog or peat, the machinery is put in motion by the action of a steam or other engine. Any proper arrangement of gearing may be employed for communicating motion to the several parts. The revolution of the screws or excavators cuts off a continuous slice of peat four inches in thickness, which is deposited upon the elevator or carrier E, which conveys it to the hopper F, from whence it passes through the feeder H into the pockets of the squeezer I in its passage through which some forty per cent. of its weight is expressed in the form of water, and the remainder passes from the pockets by means of the elevator L into the pulping-machine M, in which the

compressed masses of peat are broken up, the fiber cut into short lengths and entirely destroyed, and the whole reduced into a homogeneous pulp and forced into the molding apparatus, which it leaves in the shape and with the density of bricks, the band O conveying them to the site of the racks or frames, upon which they are stacked for drying. Up to this last stage no manual labor has been expended, the whole having been performed by machinery.

The bricks, when deposited upon the racks are equal in bulk to about sixty per cent. of the mass of peat excavated, water equal to about forty per cent. of its weight or bulk having been squeezed out during the process of manufacture. It now remains exposed to the action of the weather until the bricks become hard, or of nearly the weight and density of coal, which will require about a fortnight, by which time a considerable further reduction both in bulk and weight will take place simply by evaporation, and the bricks, without further preparation or drying, will be fit for market or conversion into charcoal.

A modification of the preceding machinery placed on wheels may also be advantageously used in the construction of tunnels or of canals.

I claim as new, and desire to secure by Letters Patent—

1. The excavating of peat or other substances by means of rotating screw-excavators, one or more, arranged with shield and scraper, or their equivalents, all placed on or connected with a floating vessel or a carriage mounted on wheels, substantially as described.

2. The squeezer composed of the rotating cylinder provided with pockets and a series of pressure-rollers, or their equivalents, when used in connection with the screw-excavators, for the purpose specified.

3. The pulping-machine composed of the perforated diaphragms and revolving knives, arranged within a suitable case, to operate substantially as described.

4. The combination of the screw-excavators, endless elevators or carriers, squeezing device, and pulping mechanism, all arranged on or applied to a floating vessel, or a vehicle mounted on wheels, substantially as and for the purpose herein set forth.

London, February 20, 1865.

JAMES HODGES.

Witnesses:

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