

(No Model.)

2 Sheets—Sheet 1.

N. K. H. EKELUND.

APPARATUS FOR MANUFACTURING COAL POWDER FROM PEAT, &c.

No. 551,113.

Patented Dec. 10, 1895.

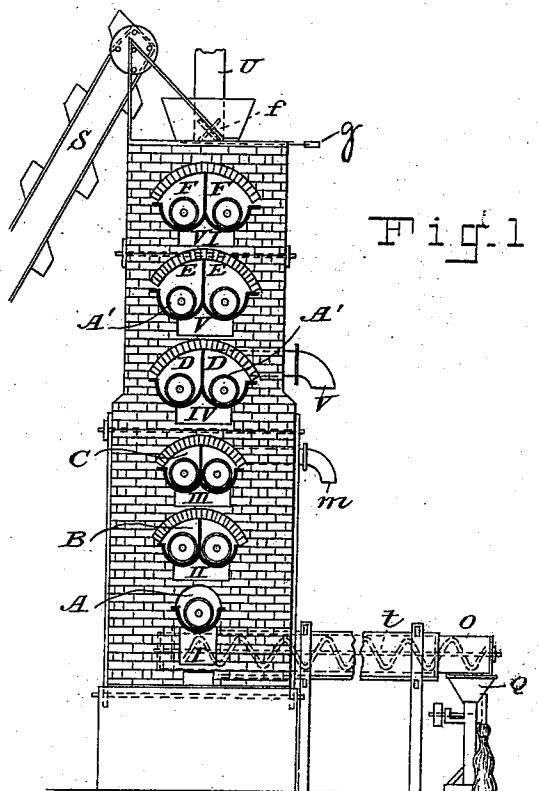
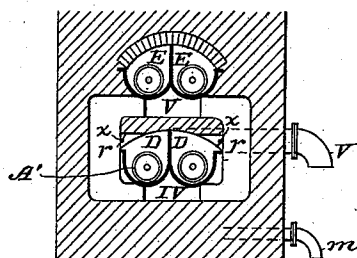


Fig. 1.

Fig. 4.



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Fig. 2.

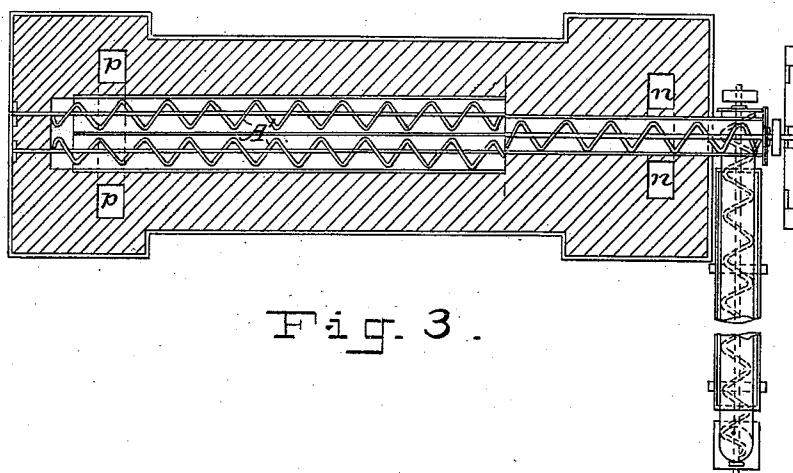
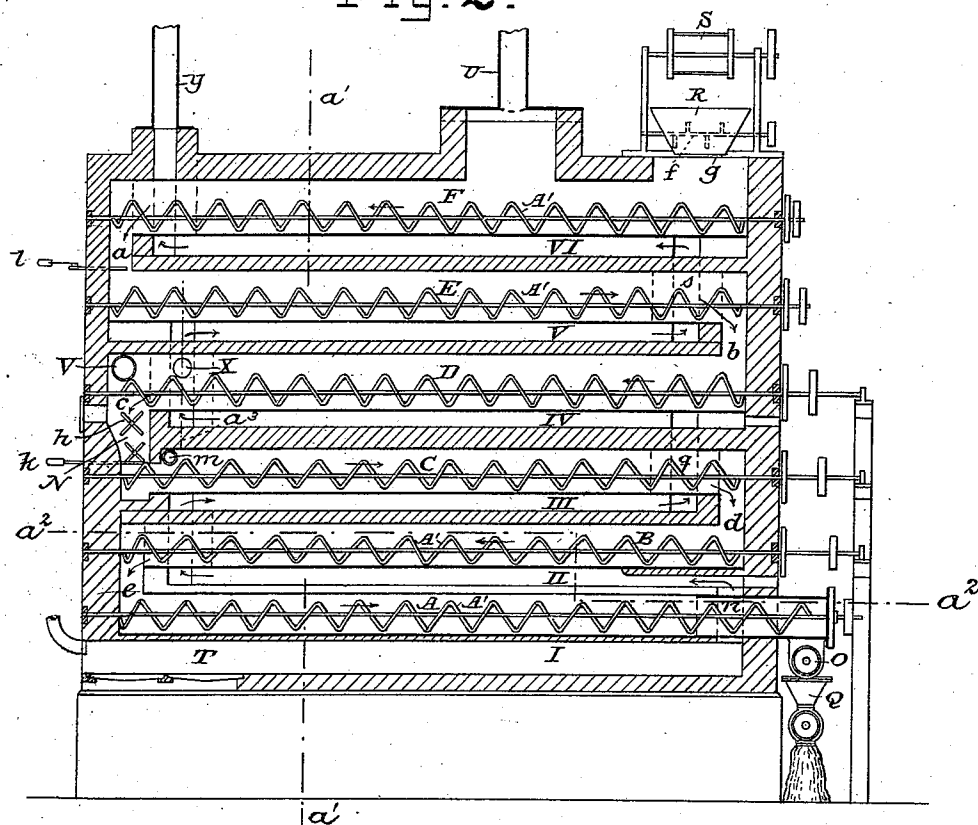


Fig. 3.

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UNITED STATES PATENT OFFICE.

NILS KARL HERMAN EKELOUND, OF JÖNKÖPING, SWEDEN.

APPARATUS FOR MANUFACTURING COAL-POWDER FROM PEAT, &c.

SPECIFICATION forming part of Letters Patent No. 551,113, dated December 10, 1895.

Application filed June 26, 1894. Serial No. 515,782. (No model.)

To all whom it may concern:

Be it known that I, NILS KARL HERMAN EKELOUND, manager, a subject of the King of Sweden and Norway, and a resident of Jönköping, in the Kingdom of Sweden, have invented certain new and useful Improvements in Apparatus for the Manufacture of Coal-Powder from Peat, Sawdust, or Like Materials, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to an apparatus for the manufacture of coal-powder of peat, sawdust, and such like, and is characterized thereby that the comminuted peat is transported through a comparatively long canal or piping and while distributed in this way subjected to heating from another conduit which is in connection with a fireplace and running along the former, so that the peat gets dried and coked by degrees. It will thus be possible to execute the coking with great exactitude, so that the final product becomes uniform and of the best quality.

In the accompanying drawings, Figure 1 represents the apparatus in cross-section on line $a'a'$ in Fig. 2. Fig. 2 represents the same in longitudinal section, and Fig. 3 is a horizontal section of the apparatus on line a^2a^2 in Fig. 2. Fig. 4 is a sectional view of a part of the structure of Fig. 1.

The apparatus consists of a rectangular brickwork building containing a number of horizontal canals A, B, C, D, E, and F, the one above the other. These canals, which may be more or less numerous than shown in the drawings, communicate with each other alternately at the one and the other end by means of vertical canals $a, b, c, d,$ and $e,$ so as to form together with these a conduit running in zigzag. Through this conduit the comminuted peat is transported, and this is effected by means of spirals A' , a screw, running scoops, or any other known device of transportation adapted in each horizontal canal. There can be either two or more such spirals abreast or only one, and the bottom of the canal, which is made of plates or brickwork, is formed to correspond, as shown in the drawings. The raw peat-powder is by means of the conveyer S brought up into the

hopper R, situated at the one end of the canal F, from which hopper R it is fed down by the feeding apparatus f . The damper g serves for the regulation. The powder is fed by the spiral placed in the canal F to the other end of the canal, where it drops down into the next canal, and so on. Beneath the said horizontal canals run the heating-canals I, II, III, IV, V, and VI, which also communicate with each other alternately at the one and the other end by means of double canals $n, p, q, r,$ and $s,$ running at the sides of the canals A to F, so as to form also a zigzag conduit. Below there is the fireplace T, from which the said conduit leads and terminates at the chimney Y. The conduit for the peat-powder is at one place closed, so as to form two divisions. In the first one, which may conveniently consist of the first three canals, the powder is dried, and in the other, consisting of the remaining canals, the powder is coked. The closing is effected simply by causing the powder to accumulate in the somewhat enlarged canal $c,$ so as to fill the same completely. In the said canal, forming a compartment N, a damper k is adapted, and above the damper there are pin-rollers h and $i,$ serving as feeding devices.

Outside the apparatus the canal A is extended, and this extension connects with a refrigerating-pipe O, in which the powder is advanced by means of a screw, a spiral, or another device. This pipe is located in a box $t,$ which for the refrigeration is more or less filled with water, the pipe opening into a receptacle Q, communicating immediately with a mill or a briquet-press.

From the drying-canal F highest up projects the pipe U, leading to a suction-fan or to the chimney. Into the drying-canal D open the pipes V and X, of which the former is an air-pipe and the latter communicates with the canal $r.$ (See Fig. 4.) From the coking-canal C at the top projects the gas-pipe $m,$ which enters into a condenser and continues from this to the fireplace T. The canal a contains the damper $l.$

In order to attain the end in view with the apparatus, the powder advanced in the canals must during a longer time be subjected to a uniform heating. This is best obtained by

firing with peat coal-powder, which gives a very long flame with a specially uniform temperature. The above apparatus is therefore arranged for firing with such powder. The powder is blown in and ignited in the fireplace T. The flame and the hot combustion-gases pass from the fireplace beneath all the coaking and drying canals through the canals I to VI and out in the chimney Y.

When the apparatus is well heated, the peat is fed into the hopper R. This hopper ought to be constantly filled so as to let no air into the canals. By means of the feeding device *f* and by regulating the damper *g* only the wanted quantity will be introduced into the canal F. The powder is by means of the spirals advanced through the canals F E D to the compartment N. When this is filled, the damper *k* is opened so much that the feeding in and out in the compartment N will be equal, and the said compartment thus always kept filled with powder. The latter is then brought forward farther until it finally gets into the pipe O, where it is cooled to a suitable temperature. The peat-powder is heated during its whole passage through the canals more and more as it is moving in an opposite direction to the combustion-gases, and the heating takes place from below as well as from the top, excepting at the canal at the top, where the heating only comes from below. In the drying-canals D E F the powder comes in contact with a heated air-current. This takes place in such a way that the suction-fan at the pipe U draws in air through the pipe V. If now the valve to the pipe X is opened, hot combustion-gases are drawn in through it from the canal *r*. By adjusting the valves to the pipes V and X the temperature of the air led through the drying-canals in this way may be regulated so as to be as high as possible without igniting the powder.

The gases produced in the coking in the canals A, B, and C are confined in the said canals by the powder in the compartment N and in the receptacle Q, and escape thus through the pipe *m*. After the water and tar which the gas may contain have been condensed the said gas is conducted to the fireplace in order to be burned. If the powder is to be used as powder, it must be ground still more. This is performed in a mill placed under the receptacle Q, after having been previously cooled in the pipe O, so that the production of gas has ceased. If, on the other hand, the powder must be briqueted, the press is brought in direct combination with the receptacle Q. If a particular adhesive is wanted, this may be added in the receptacle.

The degree of coking can be regulated by the firing by augmenting or diminishing the feeding by means of the damper *g* and by increasing or decreasing the speed of the spirals.

The apparatus may be used with equally

good results with other materials—such as sawdust, brown coal, and the like.

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

1. In a coking apparatus for manufacturing coal-powder of peat, saw-dust and the like, the combination of a zigzag shaped drying and coking conduit A F, provided with transport screws for moving the mass, a heating canal extending beneath and along said conduit, this canal communicating below with a fire-place; a compartment N, forming a part of the conduit A F and situated at a distance from one end of the same, feeding rollers *h*, *i*, situated in the compartment N, and a damper *k*, serving to regulate the feeding so as to maintain the compartment N filled with the mass, whereby the conduit A F is divided into two divisions, viz., one upper division for the drying and one lower division for the coking, substantially as described.

2. In a coking apparatus for manufacturing coal-powder of peat, saw-dust and the like, the combination of a zigzag shaped drying and coking conduit A F, provided with transport screws for moving the mass, a heating canal extending beneath and along said conduit, this canal communicating below with a fire-place; a compartment N, forming a part of the conduit and situated at a distance from one end of the same, feeding rollers *h*, *i*, situated in the compartment N, and a damper *k*, serving to regulate the feeding, so as to maintain the compartment N filled with the mass, whereby the conduit A F is divided into two divisions, viz., one upper division for the drying and one lower division for the coking; a pipe or outlet U, extending upward from the drying division and provided with a fan and with other pipes V and X, which below open into the drying division and of which one communicates with the heating canal and the other with the atmosphere, so that an air current can be led up through the drying division, substantially as described.

3. In coking apparatus for manufacturing coal-powder of peat, saw-dust and the like, the combination of a zigzag shaped drying and coking conduit A F, provided with transport screws for moving the mass, a heating canal I to VI, extending beneath and along said conduit, this canal communicating below with a fire-place T, a compartment N, forming a part of the conduit A F and situated at a distance from one end of the same, feeding rollers *h*, *i*, situated in the compartment N, and a damper *k*, serving to regulate the feeding, so as to maintain the compartment N, filled with the mass, whereby the conduit A F is divided into two divisions, viz., one upper division for the drying and one lower division for the coking, a pipe or outlet U, extending upward from the drying division and provided with a fan and with pipes V and X, which below open into the drying division,

one communicating with the heating canal
I to VI and the other with the atmosphere,
a pipe or box *t*, forming a continuation of the
conduit A F and filled with water, this pipe
5 or box serving to cool the powder, and a re-
ceptacle Q connected with the pipe O, sub-
stantially as described.

In witness whereof I have hereunto signed
my name in the presence of two subscribing
witnesses.

NILS KARL HERMAN EKELUND.

Witnesses:

SVEN BLANK,
JOHN SWENSON.