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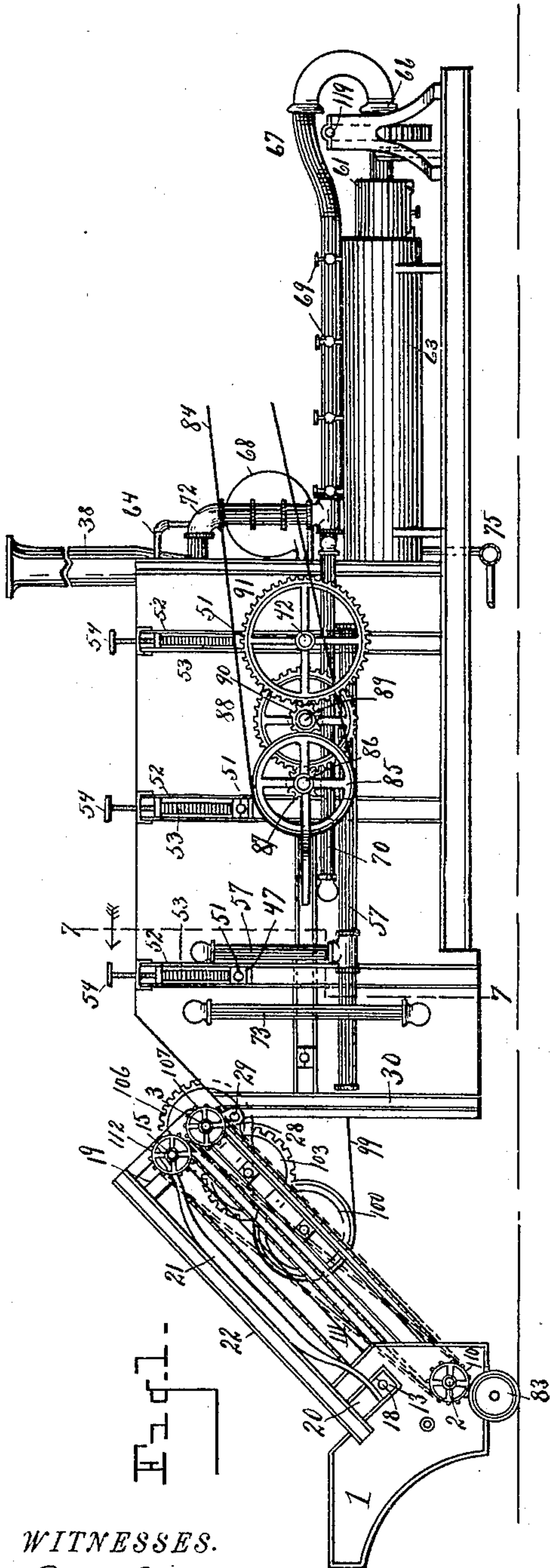
Patented Dec. 3, 1901.

J. W. CARSWELL & S. TROTTER.  
APPARATUS FOR DRYING PEAT.

(Application filed Dec. 13, 1900.)

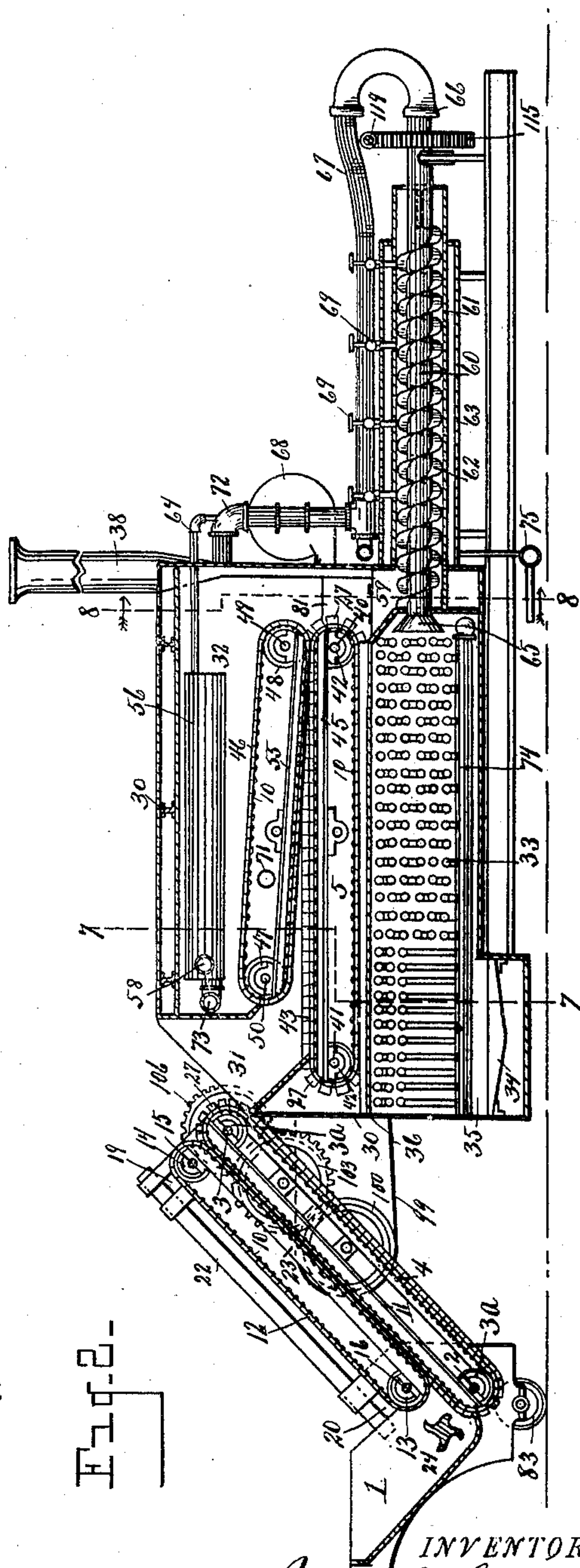
(No Model.)

3 Sheets—Sheet 1.



WITNESSES.

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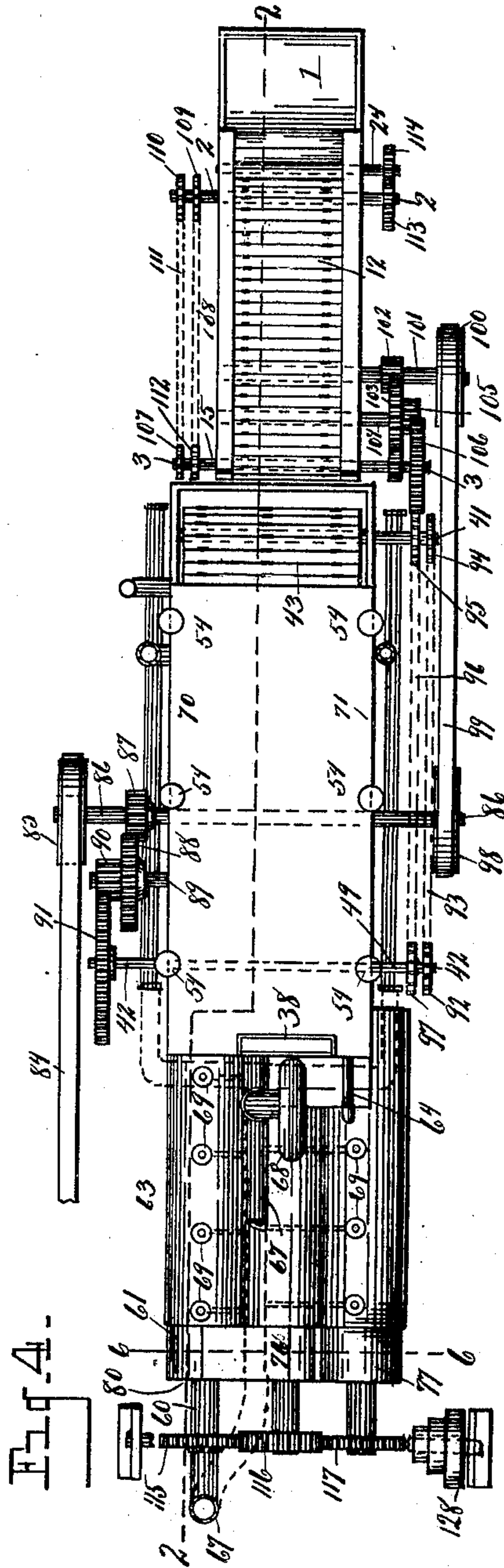
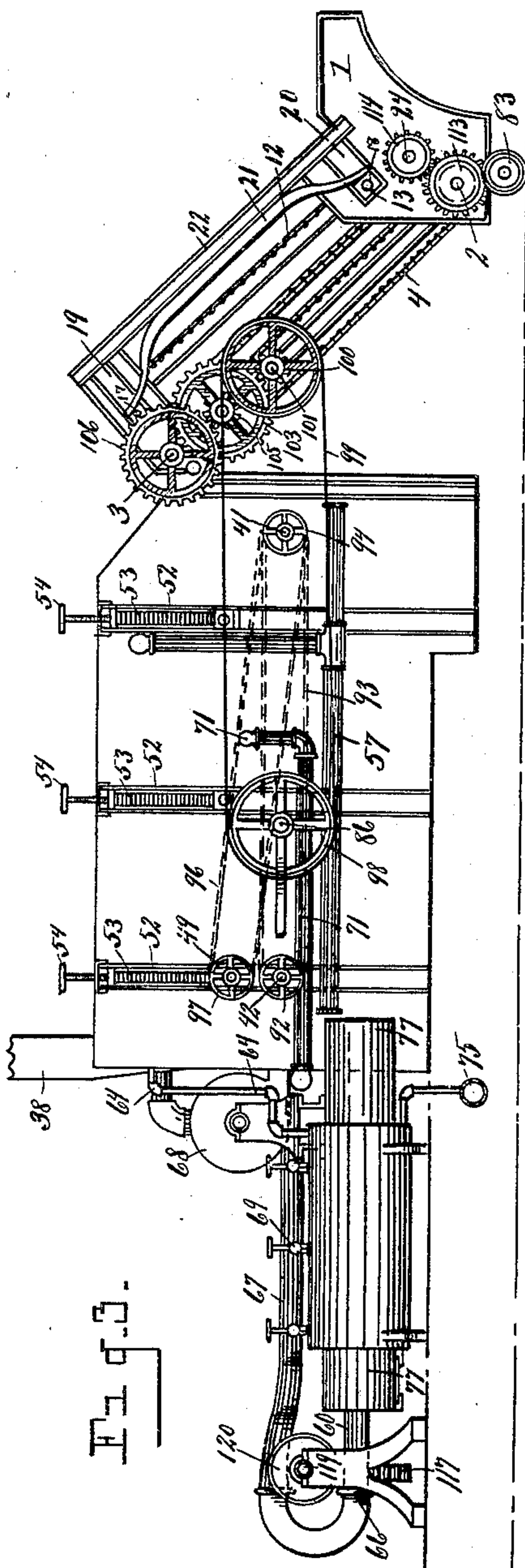
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(No Model.)

3 Sheets—Sheet 2.



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# UNITED STATES PATENT OFFICE.

JAMES W. CARSWELL AND SAMUEL TROTTER, OF CHATHAM, CANADA.

## APPARATUS FOR DRYING PEAT.

SPECIFICATION forming part of Letters Patent No. 688,014, dated December 3, 1901.

Application filed December 13, 1900. Serial No. 39,803. (No model.)

*To all whom it may concern:*

Be it known that we, JAMES W. CARSWELL and SAMUEL TROTTER, citizens of the Dominion of Canada, residing at Chatham, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Apparatus for Drying Peat; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

This invention relates to machines for drying peat; and it consists in the construction and arrangement of parts hereinafter fully set forth, and pointed out particularly in the claims.

The object of the invention is to provide a machine for handling wet peat in which the arrangement is such as to enable the water to be extracted therefrom and said material dried and pulverized ready for compressing it into a suitable form for the market.

The above object is attained by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of our improved machine. Fig. 2 is a longitudinal section therethrough as on line 2 2 of Fig. 4. Fig. 3 is a side elevation of the machine opposite to that shown in Fig. 1. Fig. 4 is a plan view of Fig. 3. Fig. 5 is a rear end elevation of the machine. Fig. 6 is transverse section through the rear end of the heated discharge-cylinders as on line 6 6 of Fig. 4. Fig. 7 is a transverse section through the machine as on line 7 7 of Fig. 2. Fig. 8 is a transverse section as on line 8 8 of Fig. 2. Fig. 9 is a plan view of the under side of the transverse slats forming the endless carriers or conveyers, showing the manner of connecting said slats together. Fig. 10 is a side elevation of one end of the slats forming said endless carriers, showing the projecting flanges at the end thereof. Fig. 11 is a detail in end elevation of a plurality of the slats forming the endless conveyers. Fig. 12 is a detail in vertical section through the rear of the combustion-chamber of the boiler and through a portion of the

stack, showing the direct passage for the products of combustion from the boiler or furnace to said stack.

Referring to the characters of reference, 1 designates a hopper forming a portion of the frame which supports the endless carrier-elevators. Journaled in fixed bearings in the opposite sides of the frame, of which said hopper is a part, are the transverse shafts 2 and 3, which are located at the opposite ends of said frame. Upon each of said shafts are two gear-wheels 3<sup>a</sup>, located such distance apart upon said shafts as to receive and support the slats of the endless carrier-elevator 4, which passes around said gear-wheels and comprises the slats 5. (See Figs. 9, 10, and 11.) Said slats when the carrier is traveling in a straight direction stand edge to edge, so as to support the peat thereon, and they are united by means of interlocking lugs 6 and 7 upon the opposed edges thereof, having eyes or apertures through which a pintle or pin 8 is passed, whereby said slats are hinged together. The under face of said slats is provided with cog-teeth 9, which mesh with the teeth of the gear-wheels 3<sup>a</sup>, whereby movement is imparted to said carrier. Journaled upon the pins 8 at the opposite ends of said slats are the rollers 10, which serve as travelers which run upon supporting-bars 11, extending longitudinally of said endless carrier and being supported at their opposite ends by bearings upon the shafts 2 and 3.

Above the endless carrier 4 is a slightly shorter carrier 12, which is constructed the same as the carrier 4 and which at its opposite ends passes over suitable gear-wheels 13 and 14, mounted upon the transverse shafts 15 and 16, whose opposite ends are journaled in movable boxes 17 and 18, respectively, seated in the slotted openings 19 and 20, respectively, at opposite ends of the frame. The under side of the upper carrier travels in contiguity with the upper side of the under carrier. For the purpose of exerting a suitable pressure upon the upper carrier a spring 21 is employed, having a bearing at its center upon the longitudinal beam 22 of the frame and bearing at its opposite ends upon the boxes 17 and 18, carrying the shafts of the upper carrier, whereby a suitable pressure is



exerted to hold the upper carrier in position and squeeze the water from the peat fuel as it passes between the adjacent faces of said carrier-elevators. The traveling rollers in  
 5 the upper carrier bear upon the supporting-bars 23, extending longitudinally between the sides thereof and supported at their ends by bearings upon the shafts 15 and 16. At the base of the hopper 1 is a rotary feeding-shaft,  
 10 having lateral flanges 24, which by the rotation of said shaft deposit the peat upon the upwardly-moving side of the carrier 4, so that said peat is carried between the adjacent faces of the opposed carrier-elevators and the  
 15 water squeezed therefrom.

The endless carrier-elevators are covered with a flexible sheet of finely-perforated metal 25, as shown in Figs. 10 and 11, which will allow the water to pass through the perforations  
 20 thereof as the peat fuel is carried between said carriers, but which will retain the fuel thereon. Crossing the slats of the carrier-elevators 4 and 12 transversely is a series of registering channels 26, which form a continuous channel  
 25 adapted to convey from the carrier-elevators the water which passes through the perforated retaining-sheets 25. The slats forming the lower carrier 4 are provided on the ends thereof with the right-angle flanges 27, be-  
 30 tween which the slats on the lower side of the upper carrier are adapted to lie and which prevent the peat from being squeezed out between the ends of the slats as it is carried upward and compressed between the adjacent  
 35 faces of said carrier-elevators.

The upper end of the frame supporting the endless carrier-elevators 4 and 12 is provided on its under side with a projecting bracket 28, which is apertured to receive a pin 29, by  
 40 means of which it is pivoted to the forward end of the main or drier frame 30, making a hinged connection between said frames, which allows of the inclination of the elevating-tables to be changed according to the charac-  
 45 ter of the work to be performed.

The peat fuel after being elevated between the carrier-elevators 4 and 12 is discharged therefrom into a hopper 31 in the forward end of the drying-chamber 32. This chamber is in-  
 50 closed within a suitable framework sheathed externally and internally, so as to form a space between the sides, in which any suitable non-conducting material may be placed. Located within the chamber 32, at the bottom  
 55 thereof, is a water-tube boiler 33, having suitable grates 34 and a fire-space 35. The boiler is inclosed by a suitable casing 36, which separates it from the remaining portion of the chamber. In the rear of said casing is an  
 60 opening 37 for the escape of the products of combustion, which opening is connected with the smoke flue or stack 38, having a damper 39 therein. (See Fig. 12.)

Journalled in fixed bearings located in op-  
 65 posite sides of the feeding-chamber are the transverse shafts 40 and 41, carrying thereon suitable gear-wheels 42, adapted to mesh with

the gear-teeth on the inner face of the slats 5, comprising the endless carrier 43, which is adapted to travel around said gear-wheels. 70  
 Extending longitudinally of said carrier 43, below the upper side thereof, are the side bars 44 and the central bar 45, whose ends are supported by bearings on the shafts 40 and 41, respectively. These bars form a bear- 75  
 ing for the transporting-rollers journaled between the slats of said carrier and prevent the sagging of said slats. Above the carrier 43 is a similar carrier 46, adapted to pass around gear-wheels 47 and 48, mounted upon 80  
 the transverse shafts 49 and 50, respectively, which cross said chamber transversely and whose ends are journaled in movable boxes 51, adapted to slide vertically in the vertical ways 52 in the sides of the main frame. Bear- 85  
 ing upon said movable boxes in said ways are suitable coiled springs 53, which are adapted to be compressed by the screws 54, whereby any desired pressure may be exerted to force the upper carrier 46 downward, so as to com- 90  
 press the peat between its under face and the upper face of the carrier 43. Extending longitudinally of the upper face of the under side of the carrier 46 is a series of bars 55, which afford parallel bearings for the trav- 95  
 eling rollers of said carrier and prevent the under side thereof from being forced upward by the peat fuel confined between it and the upper side of the carrier 43. The upper car- 100  
 rier 46 is so adjusted by means of the screws 54 as to raise the forward end thereof slightly above the surface of the carrier 43, while the rear of said carrier 46 stands nearly in contact with the upper side of said lower carrier. By  
 105 this arrangement the peat fuel which is discharged into the hopper 31 and falls upon the carrier 43 is subject to a gradually-increasing pressure as it is carried rearwardly between said carriers, whereby the greater per- 110  
 cent. of the remaining moisture is driven therefrom and is evaporated by the heat of chamber 32, which radiates from the sheathing of the boiler, and from the steam-domes 56, located at the top of said chamber and connected with the boiler-tubes through the 115  
 side pipes 57. Said domes are also connected by a cross-pipe 58 to equalize the pressure therein. The presence of the boiler within the main casing not only furnishes the nec- 120  
 essary heat for the drying-chamber, but provides as well for the necessary supply of steam for heating the steam drying-cylinders at the rear of the machine, as hereinafter stated, and for running the engine (not shown) from which power is derived to operate the machine. 125  
 To prevent the pressure from forcing the peat from between the slats of the carriers 43 and 46, the slats of the lower carrier are provided with the vertical end flanges 27. After the peat is discharged from the carriers 43 and 130  
 46 it is directed by an inclined table 59, (see Fig. 8,) which deflects it onto the inner end of a screw conveyer, which crosses a receiving-box at the rear of the heating-chamber.



This screw-conveyer comprises a hollow shaft 60, passing longitudinally through a cylinder 61 and having the spiral flanges 62, whereby by the rotation of said shaft the peat fuel is carried longitudinally of said cylinder. Surrounding said cylinder is a steam-jacket 63, affording a steam-space between it and the wall of the cylinder, which is supplied with steam by the steam-pipe 64, which communicates with the steam-dome, whereby a high temperature is created within the cylinder which serves to evaporate any contained moisture from the peat fuel as it is conveyed there-through. It will be seen upon referring to Fig. 2 that the inner end of the hollow shaft 60 is provided with a funnel 65, which projects through the sheathing into the boiler or the combustion-chamber thereof. Attached to the outer end of said hollow shaft by a rotary joint 66 is an exhaust-pipe 67, which is connected to the exhaust-fan 68, whose discharge end communicates with the stack 38. After the fire has been started the damper 39 (see Fig. 12) in the stack 38 is closed and an artificial or forced draft is provided by means of the exhaust-fan, which draws the smoke and burning gases from the furnace through the shaft 60 and discharges them into the stack, whereby a strong draft is provided and additional heat is supplied within the cylinder 61 to assist in evaporating the moisture from the peat fuel therein. To remove the moisture which is driven from the peat fuel within the cylinder 61, a series of valve-controlled pipes 69, which communicate with the interior of said cylinder, are connected with the exhaust-pipe 67, whereby the moisture within the cylinder is extracted. Extending from the exhaust-pipe 67 are the branch pipes 70 and 71, respectively, which are provided with elbows that enter through the opposite sides of the heating-chamber and afford means for drawing off the moisture from the peat on the endless carriers therein. Also communicating with the upper portion of the heating-chamber for the purpose of extracting moisture therefrom is a branch pipe 72, which is connected with the exhaust-fan. A pipe 73 connects the steam-domes of the boiler with the mud-drum 74 thereof. Leading from the steam-space around the cylinder 61 is a pipe 75 to convey away the water of condensation, which pipe may be connected with a pump (not shown) for returning said water to the boiler.

Lying parallel with and adjacent to the cylinder 61 are the cylinders 76 and 77, (see Fig. 6,) having like conveyer-screws 78 and 79 therein. The conveyer-screw 78 is driven in the opposite direction to that of the screw 62, while the screw 79 is driven in the same direction as said screw 62. The rear of said cylinders, as shown at 80 in Fig. 4, extends beyond their steam-inclosing jackets, forming a sort of a box into which the peat is deposited by the screw 62 and in which it is

forced by said screw laterally into contact with the screw 78, which carries the peat forwardly in said cylinder to the forward end thereof, where it is passed into contact with the screw 79, which again carries the peat rearwardly and discharges it from the end of the cylinder 77. The cylinders 76 and 77 are steam-heated, like cylinder 61, whereby the peat fuel is subjected to the action of the heat as it is carried from end to end of all of said cylinders, so that when discharged from the rear end of the cylinder 77 it is as dry as required. Should the condition of the fuel be such that it is unnecessary to pass it through three cylinders, it may be divided as it is discharged from the endless carriers in the heating-chamber by raising the pivoted section 81 of the inclined table 59 to a vertical position, as shown by dotted lines in Fig. 8, when the peat will fall onto the oppositely-inclined platform 59 and will be directed onto the screws or conveyers 62 and 79, respectively, of the outside cylinders and will be conveyed by said screws directly through said cylinders, a slide 82 at the rear of the cylinder 61 enabling the peat to be discharged directly therefrom, thereby facilitating the passage of the peat fuel through the machine. If found convenient, the main frame of the machine may be mounted on transporting-wheels to facilitate its movement about the peat-beds, while the frame carrying the elevating-carriers is provided with transporting-wheels 83.

Power to drive the various operative parts of the machine may be derived from a steam-engine, (not shown,) which may be mounted on the frame of the machine itself or otherwise suitably disposed and from which a drive-belt 84 leads to the pulley 85 on the outer end of the main shaft 86, passing transversely through the machine. Upon the shaft 86 is a pinion 87, which meshes with a gear-wheel 88 on the stub-shaft 89, carrying the pinion 90, which meshes with the large gear-wheel 91 on the shaft 42 of the lower endless carrier 43 in the heating-chamber, whereby movement is imparted to said carrier. The opposite end of the shaft 42 carries upon the opposite side of the machine, as shown in Figs. 3 and 4, a sprocket-wheel 92, connected by the chain belt 93 with a sprocket-wheel 94 on the projecting end of the shaft 41 of the forward end of said carrier 43, whereby the shafts at the opposite ends of said carrier are driven in unison. Also mounted upon the projecting end of the shaft 41 is a sprocket-wheel 95, connected by a chain belt 96 with the sprocket-wheel 97 upon the projecting end of the shaft 49 of the upper endless carrier 46, whereby movement is imparted to said upper carrier.

Power to drive the elevating-carriers at the front of the machine is derived from a pulley 98 on the end of the shaft 86 opposite to that carrying the pulley 85. From said pulley 98



a belt 99 leads to a pulley 100 on the end of the shaft 101, journaled in the elevator-frame and carrying a pinion 102, adapted to mesh with a gear 103 on a shaft 104, carrying a pinion 105, which meshes with a gear-wheel 106 on the end of the shaft 3 of the lower carrier 4 of said elevating-carriers. On the opposite end of said shaft 3 is a sprocket-wheel 107, which is connected by a chain belt 108 with a sprocket-wheel 109 on the end of the shaft 2 of the lower of said elevating-carriers. On the extreme outer end of the shaft 2 is a second sprocket-wheel 110, which is connected by a chain belt 111 with a sprocket-wheel 112 on the outer end of the shaft 15 of the upper carrier 12, whereby said elevating-carriers are driven in unison. On the opposite end of the shaft 2 is a gear-wheel 113, which meshes with a like gear 114 on the end of the feeding-shaft 24, whereby the feeder is driven to deposit the peat upon the lower of the elevating-carriers. The screw conveyers in the steam-heated cylinders are rotated by means of the gears 115, 116, and 117 on their respective shafts, the outside gears 115 117 meshing with the interposed gear 116, whereby the central screw is driven in a reverse direction to the two outside screws. Movement is imparted to said gears through the medium of the worms 118, (see Fig. 6,) mounted on the transverse shaft 119 and carrying the cone-pulley 120, through the medium of which its speed may be regulated.

Having thus fully set forth our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a machine for drying peat, the combination of the endless elevating and compression carriers adapted to compress the peat as it is carried upward, a heating-chamber, endless compression-carriers located in said chamber which receive the peat from the elevator and carry it through said chamber under gradually-increasing pressure, a conveyer-screw at the rear of the endless carriers, said conveyer-screw passing through a steam-heated cylinder whereby moisture is extracted from the peat and it is dried as it passes through the machine.

2. The combination of a furnace and heating-chamber, endless carriers, located in said heating-chamber, a hollow smoke-pipe communicating with the fire-space of the furnace, said pipe being located at the rear of the conveying-tables and having a screw mounted thereon, a suction-fan attached to the outer end of said smoke-pipe, a cylinder embracing said smoke-pipe and screw, said cylinder having an embracing steam-jacket, substantially as set forth.

3. The combination with a heating-chamber, of means for simultaneously compressing the peat and elevating it into a hopper in said chamber, endless compression-carriers in said heating-chamber adapted to receive the peat and convey it therethrough, the upper of said

carriers being adjustable vertically by a series of screw-compressed springs whereby a varying pressure may be applied to the peat between said carriers, and a conveyer at the rear of said carriers adapted to carry the peat through a heated cylinder.

4. The combination with a drying-chamber, of means for elevating the peat into said chamber, endless compression-carriers within the chamber adapted to receive and compress the peat, a heated cylinder at the rear of said carriers, means for passing the peat through said heated cylinder and means for extracting the moisture from between said carriers in said drying-chamber and means for extracting moisture from the interior of said cylinder.

5. In a machine for drying peat fuel, the combination with the means for compressing the peat and extracting the moisture therefrom, of a heating-chamber through which the peat is conveyed and subjected to a high temperature, a furnace for supplying heat, a screw conveyer at the rear end of said chamber adapted to receive the peat, said conveyer having a hollow shaft communicating with the furnace, a cylinder embracing said conveyer, a steam-jacket around said cylinder whereby steam heat may be applied thereto.

6. In a machine for drying peat, the combination with means for extracting the moisture from the peat, of a drying-chamber through which the peat is adapted to be conveyed, a boiler, or furnace, for supplying heat to said chamber, a conveyer-screw at the rear of said chamber having a hollow shaft which communicates with the combustion-space of said furnace or boiler, a stack, a suction-pipe connected with the shaft of said screw and an exhaust-fan connected with said suction-pipe and with said stack.

7. In a machine for drying peat fuel, the combination with means for squeezing the water from the peat, of a drying-chamber through which the peat is carried, a furnace for generating steam and supplying heat to said chamber, a screw conveyer at the rear of the chamber adapted to receive the peat, said conveyer having a hollow shaft which extends into the combustion-chamber of the furnace, an exhaust-pipe connected with the opposite end of said shaft and an exhaust-fan connected with said pipe, a steam-heated cylinder embracing said screw conveyer and a series of pipes passing into the interior of said cylinder and connected with said exhaust-pipe.

8. In a machine for drying peat fuel, the combination with means for extracting water from said fuel, a drying-chamber through which said peat is passed, a furnace for supplying heat to said chamber, means for conveying the peat from said chamber, an exhaust-pipe communicating with the interior of said chamber to carry the moisture therefrom and an exhaust-fan connected with said exhaust-pipe.



9. In a machine for drying peat fuel, the combination with a suitable drying-chamber, of a series of endless carriers and compressors for conveying the peat into and through said chamber, one of said carriers comprising a series of hinged slats united to form an endless apron adapted to pass around suitable driving-gears, said slats having transverse registering channels in the outer face thereof and

a thin sheet of perforated metal lying upon and moving with said slats.

In testimony whereof we sign this specification in the presence of two witnesses.

JAMES W. CARSWELL.

SAMUEL TROTTER.

Witnesses:

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