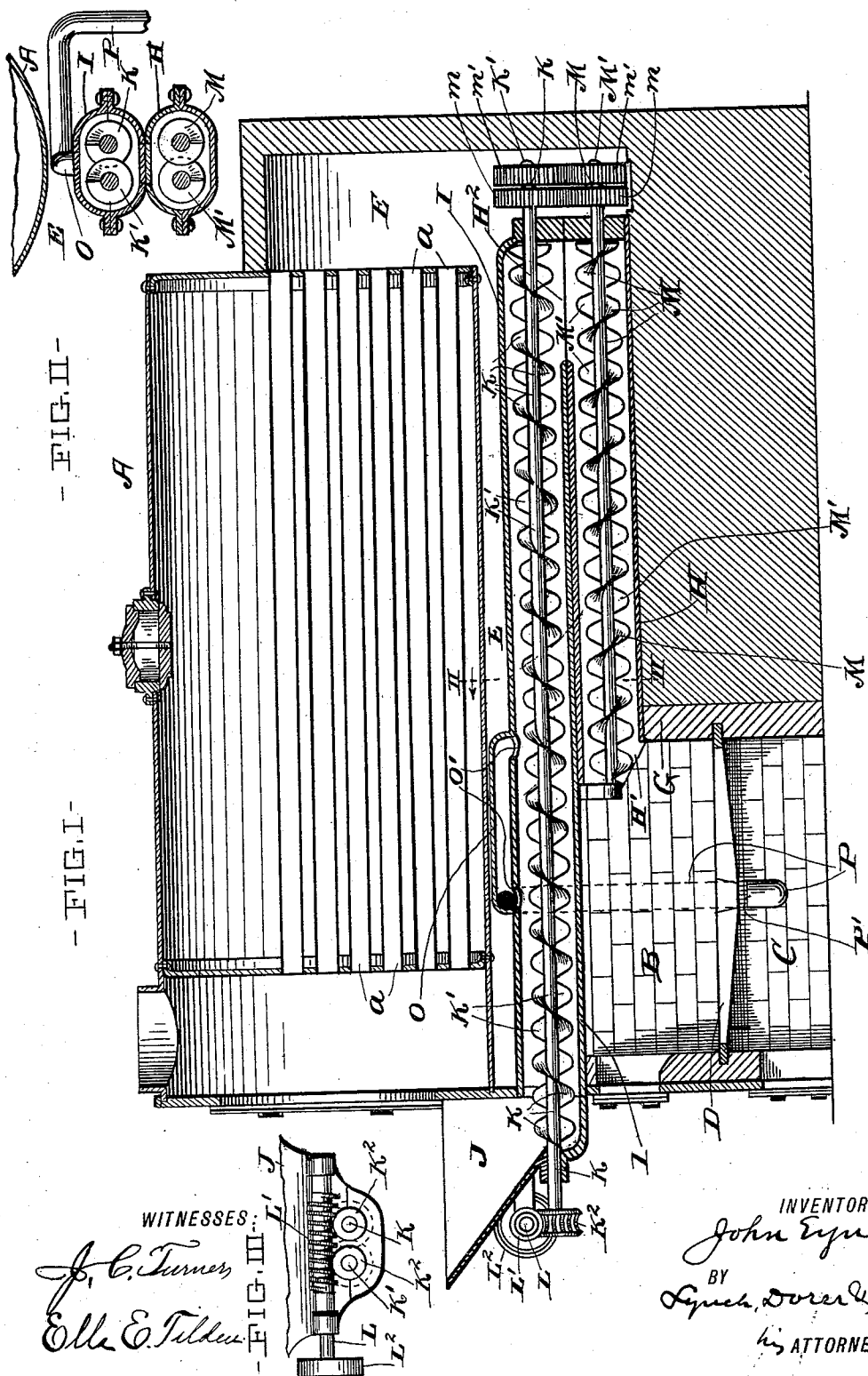


(No Model.)

J. EYNON.
COAL BURNING FURNACE.

No. 581,108.

Patented Apr. 20, 1897.



WITNESSES
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UNITED STATES PATENT OFFICE.

JOHN EYNON, OF CLEVELAND, OHIO.

COAL-BURNING FURNACE.

SPECIFICATION forming part of Letters Patent No. 581,108, dated April 20, 1897.

Application filed January 23, 1897. Serial No. 620,498. (No model.)

To all whom it may concern:

Be it known that I, JOHN EYNON, of Cleveland, Cuyahoga county, Ohio, have invented certain new and useful Improvements in Coal-Burning Furnaces; and I do hereby 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 pertains to make and use the same.

My invention relates to improvements in coal-burning furnaces.

The object of the invention is to more thoroughly burn the fuel, and thereby render the furnace more economical.

With this object in view the invention consists in certain features of construction and combinations of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure I is a side elevation, mostly in central vertical longitudinal section, of a furnace embodying my invention. Fig. II is a vertical section on line II II, Fig. I. Fig. III is a front side elevation of the driving worm-shaft and engaging worm-wheels of the upper coal-feeding screws.

Referring to the drawings, A designates a horizontally-arranged tubular boiler that is supported in any approved manner; B, the fuel-chamber below the forward end of the boiler; C, the ash-pit below the fuel-chamber; D, the grate between the ash-pit and fuel-chamber, and E the chamber formed below the boiler at the rear of the upper portion of the fuel-chamber and extending upwardly at the sides and rear end of the boiler and communicating with the flues α , extending forwardly through the boiler.

G designates the bridge-wall at the rear of the lower portion of the fuel-chamber. Said wall extends rearwardly to the rear end of the furnace.

A horizontally-arranged flue H is supported centrally of the top of the bridge-wall and extends rearwardly to the rear end of the boiler. Said flue at its forward end discharges at H' into the rear end of the fuel-chamber. Said flue at its rear end and at the top is in open relation at H² with a horizontally-arranged flue I, that is located above and extends longitudinally of flue H and extends through the upper portion of the combustion-cham-

ber B and is in open relation at its forward end with the coal-supply hopper J.

One or more suitably-supported screw conveyers K are arranged centrally and longitudinally and extend the entire length of flue I. I prefer to employ two screws K K', arranged side by side and so that the threads of each screw will during the rotation of the screws revolve between the threads of the other screw, and thereby prevent the screws from becoming clogged and avoid interference with their capacity during their feeding operation. The two screws K K' are of course driven uniformly in the same direction and in the direction required to feed the fuel rearwardly. Each of said screws at its forward end and outside of the fuel-hopper is provided with a worm-wheel K², to which power is applied in any approved manner. Both worm-wheels K² correspond in diameter and mesh, preferably, with a worm L', formed upon the driving-shaft L, that is supported from and forward of hopper J and is arranged horizontally and at right angles to screws K K' and is provided with a suitably-operated driving-wheel L². A corresponding number of suitably-supported screws are provided within flue H. Two screws M and M' are therefore provided within said flue H in the case illustrated.

The two screws M and M' are arranged side by side and so that the threads of each screw shall during the rotation of the screws revolve between the threads of the other screw, and thereby prevent the screws from becoming clogged during their operation. Both screws M and M' are of course arranged and driven in the direction required to feed forwardly and extend the entire length of flue H from below the rear ends of screws K K' to and over the rear end of the fuel-chamber B. Screw M is arranged directly below screw K and has its rear end intergeared, as at m , with the rear end of screw K. Screw M' is arranged directly below screw K' and has its rear end intergeared, as at m' , with the rear end of screw K'. The gears of the intergearing between the upper screws and lower screws correspond in diameter, so that the speed of the lower screws is the same as the speed of the upper screws during the coal-feeding operation. The rear journals of

screws K' and M' extend rearwardly of the rear journals of screws K and M to accommodate the location of the gearing between said screws K' and M'. The fuel becomes heated 5 and coked in its passage through flues I and II, and consequently is placed in the best condition possible for the economical utilization of the fuel before it is deposited in chamber B. The gases generated or emitted from the 10 fuel in the passage of the latter through flues I and II are discharged, partially, into the fuel-chamber at the forward or discharging end of flue II, and gases are also conducted from said flue I into flue O, arranged longitudinally and above the forward portion of said 15 flue I. Flues O and I are in open relation with each other by means of any suitable number of apertures O', formed between said flues I and O. A flue P, that at one end communicates with flue O, leads downwardly 20 along one side of the combustion-chamber and in under and into the ash-pit, and at its other end discharges upwardly at P' through the grate into the combustion-chamber B. It will therefore be observed that by my improved construction the coal is not only coked, and thereby placed in a desirable condition for the subsequent economical consumption of the fuel, but any gases emitted during the 30 coking process are conveyed into the combustion-chamber, and thereby subjected to the live bed of fuel upon the grate. It will also be observed that any heat radiated from the coking-flues is not wasted and that the construction involved is exceedingly simple, 35 and consequently inexpensive.

What I claim is—

1. In a coal-burning furnace, the combination with the boiler; fuel-chamber, and the 40 coal-feeding hopper: of a flue communicating, at one end, with the hopper and extending over the fuel-chamber and in under the boiler; a suitably-operated screw within said flue and arranged to feed the fuel from the hopper to 45 said flue's discharging end; another or second flue extending from and in open relation with the discharging end of the first-mentioned flue and leading to and discharging into the fuel-chamber, and a suitably-operated screw within the second flue and arranged 50 to feed the fuel delivered thereto to the fuel-chamber, substantially as and for the purpose set forth.

2. In a coal-burning furnace, the combination with the boiler; fuel-chamber, and the 55 coal-feeding hopper: of a flue communicating, at one end, with the hopper and extending over the fuel-chamber and in under the boiler; a suitably-operated screw within said flue and arranged to feed the fuel from the 60 hopper to said flue's discharging end; another or second flue extending from and in open relation with the discharging end of the first-mentioned flue and leading to and discharging into the fuel-chamber; a suitably-operated screw within the second flue and arranged 65 to feed the fuel delivered thereto to

the fuel-chamber, and gears establishing operative connection between the two screws and corresponding in diameter, substantially 70 as and for the purpose set forth.

3. In a coal-burning furnace, the combination with the boiler; fuel-chamber and coal-feeding hopper: of a flue in open relation, at one end, with the hopper and extending over 75 the fuel-chamber and in under the boiler, and discharging at its opposite end; two parallel screws arranged within and longitudinally of said flue, and furthermore arranged to feed the fuel from the hopper and to cause the 80 threads of one of said screws to revolve, during their rotation, between the teeth of the other screw; another or second flue arranged below the rear portion of the first-mentioned flue, and in open relation, at one end, with 85 the discharging end of the first-mentioned flue, and communicating, at its opposite end, with the fuel-chamber; two parallel screws within and arranged longitudinally of the lower flue, and furthermore arranged to feed 90 fuel to the fuel-chamber and to cause the threads of one of said screws to revolve, during their rotation, between the threads of the other screw; mechanism for uniformly driving the screws located in the upper flue, and 95 mechanism for transmitting motion to the lower screws from the upper screws and for driving the lower screws in unison, or approximately in unison, with the upper screws, 100 substantially as set forth.

4. In a coal-burning furnace, the combination with the boiler A, fuel-chamber B, bridge-wall D, chamber E and coal-feeding hopper J; of the flues II and I, screws K K' and M M', the worm-wheels K² K², the suitably-driven 105 worm L' and the gears *mm'*, all arranged and operating substantially as shown, for the purpose specified.

5. In a coal-burning furnace, the combination with the boiler; the fuel-chamber; the 110 grate; the ash-pit, and the coal-feeding hopper: of a flue communicating, at one end, with the hopper and extending over the fuel-chamber and in under the boiler; a suitably-operated screw within said flue and arranged 115 to feed the fuel from the hopper to said flue's discharging end; another or second flue extending from and in open relation with the discharging end of the first-mentioned flue and leading to and discharging into the fuel- 120 chamber; a suitably-operated screw within the second flue and arranged to feed the fuel delivered thereto to the fuel-chamber, and another passage-way for conducting gases from the first-mentioned flue into the ash-pit 125 and discharging upwardly through the grate, substantially as and for the purpose set forth.

In testimony whereof I sign this specification, in the presence of two witnesses, this 16th day of January, 1897.

JOHN EYNON.

Witnesses:

C. H. DORER,
ELLA E. TILDEN.