

No. 642,037.

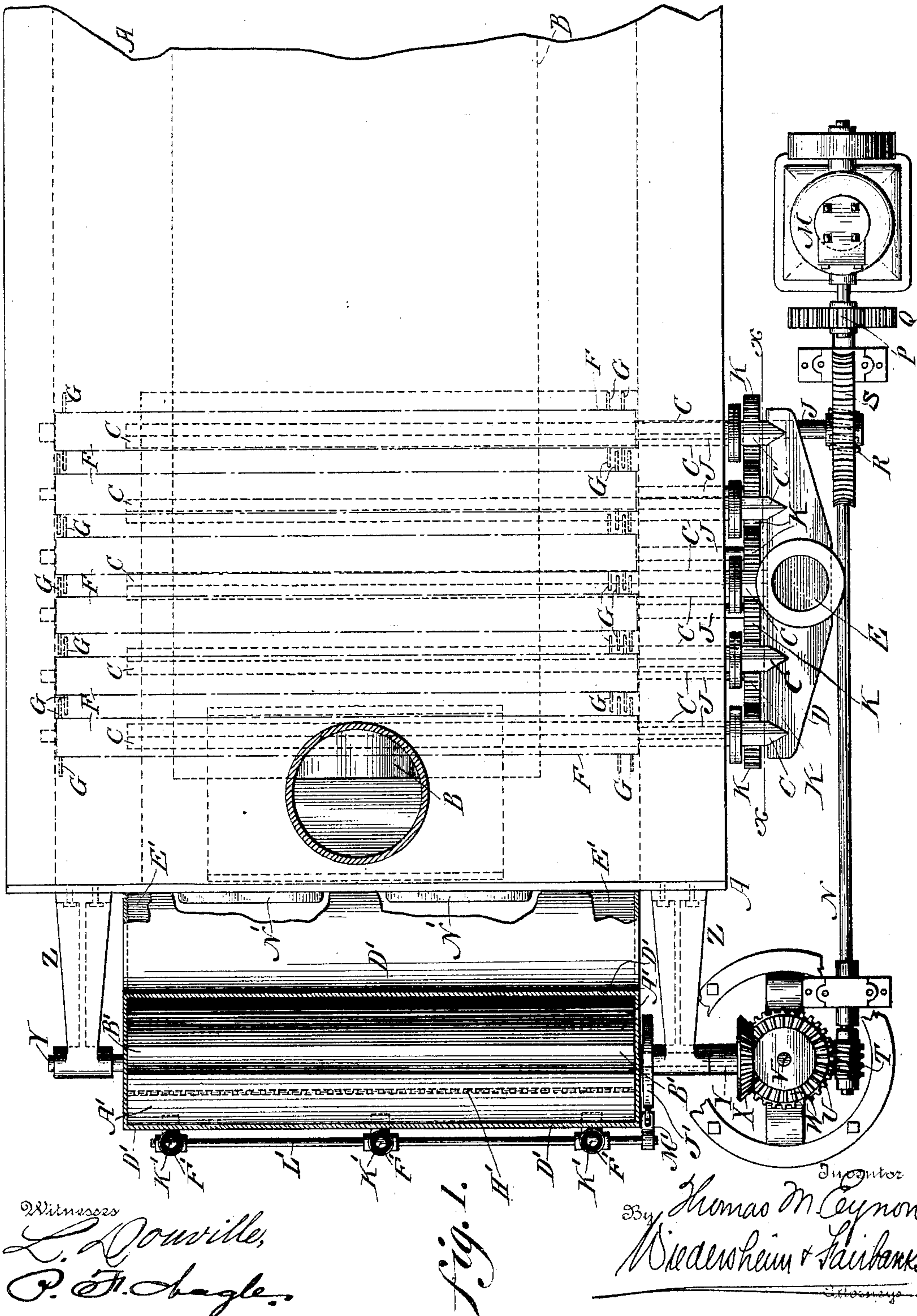
Patented Jan. 23, 1900.

T. M. EYNON.
AUTOMATIC GRATELESS STOKER.

(Application filed June 26, 1899.)

(No Model.)

2 Sheets—Sheet 1.



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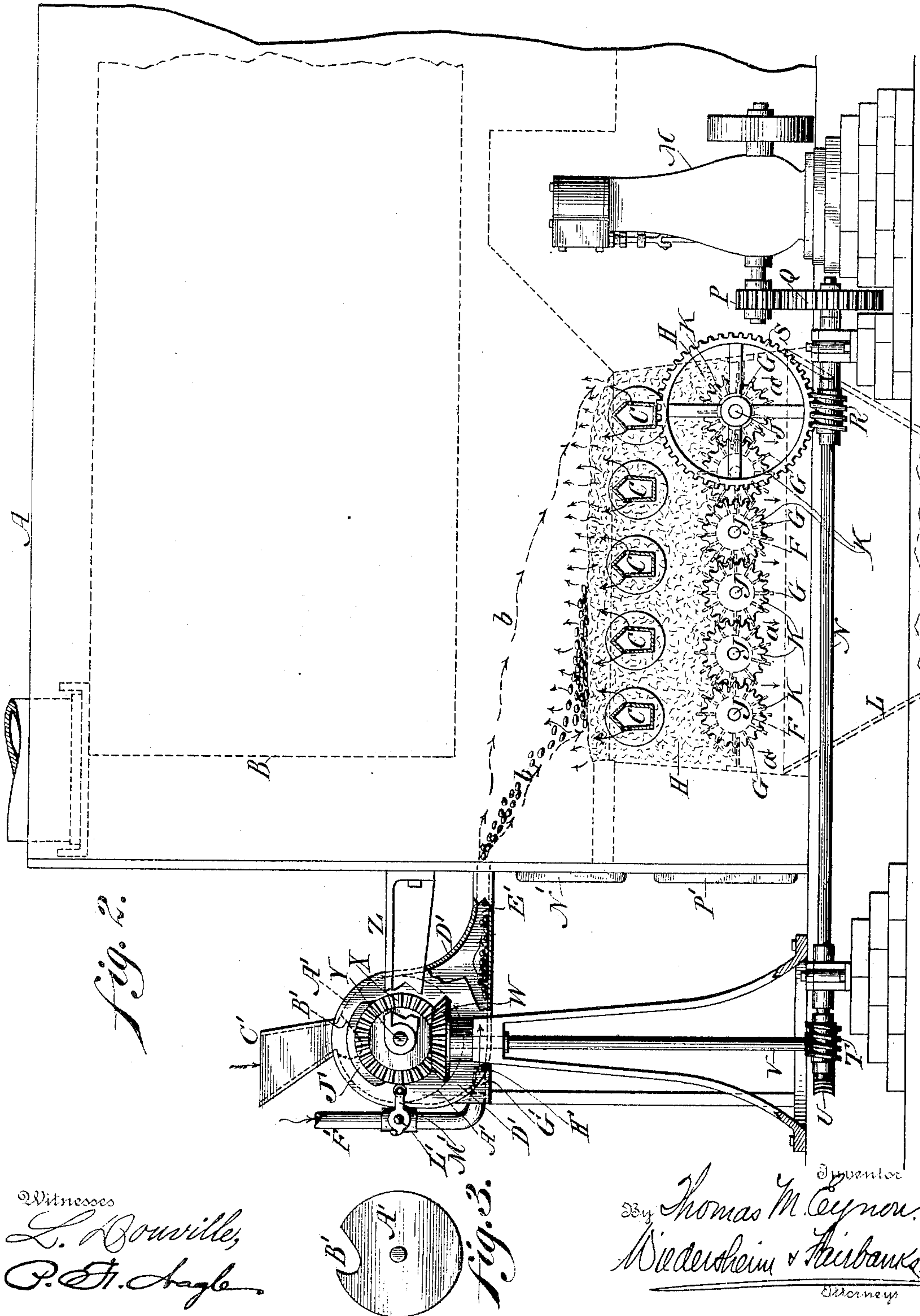
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2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

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AUTOMATIC GRATELESS STOKER.

SPECIFICATION forming part of Letters Patent No. 642,037, dated January 23, 1900.

Application filed June 26, 1899. Serial No. 721,852. (No model.)

To all whom it may concern:

Be it known that I, THOMAS M. EYNON, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Automatic Grateless Stokers, which improvement is fully set forth in the following specification and accompanying drawings.

My invention relates to improvements in mechanical stokers; and it consists of a novel construction of ash-bed, air-passages, and means therethrough for maintaining a uniform height of the fuel-bed.

It also consists in the employment of an ash-bed for supporting the fuel instead of the furnace-grate now in use.

It also consists of a series of air tubes or passages which are normally embedded in the ash-bed and a novel construction of ash-removers thereunder.

It further consists of novel details of construction, all as will be hereinafter fully set forth, and particularly pointed out in the claims.

Figure 1 represents a plan view, partly in section, of a mechanical stoker embodying my invention. Fig. 2 represents a partial side elevation and partial vertical section of the stoker, the section being taken on line *xx*, Fig. 1. Fig. 3 represents an end view of a drum for feeding fuel to the furnace.

Similar letters of reference indicate corresponding parts in the figures.

Referring to the drawings, A designates a boiler-furnace, and B the boiler located therein.

C designates air tubes or passages; which in the present instance extend transversely of the furnace A and serve to conduct air to the fuel through the ash-bed thereunder.

D designates a chamber, into which steam, compressed air, &c., may be admitted through the opening E, it being noted that the tubes C are in communication with said chamber D, so that the steam, air, &c., may pass from said chamber into the tubes C, and from thence are directed to the fuel, while serving to prevent said tubes from becoming overheated.

Below the tubes C, which are normally covered by the ash-bed, is the ash-removing de-

vice, which consists of drums F, provided with radial projections G, which support the ashes H, that drop between the tubes C.

It will be noted on referring to Figs. 1 and 2 that the fingers or projections G on one drum are arranged relatively to those of an adjacent drum in staggered order or so as to cause them to pass each other when the drums are rotated without interference. The projections G in Fig. 1 are shown only on the ends of the drums F, although in practice they are placed along the entire length of the same.

The shaft J of each drum F has secured thereto a gear-wheel K, said gear-wheels intermeshing, so that all the drums are rotated by imparting motion to one of the same. It is noted that the projections G on adjacent drums revolve in opposite directions, so that when said drums are in operation they will cause said projections to force the ashes H in the direction indicated by the arrows *a* in Fig. 2 and discharge them into a hopper L, which latter may be connected to a flue for directing the ashes to any desired place, or said hopper may discharge directly into a car, wagon, &c., (not shown,) and be removed to wherever desired.

M designates an engine employed for driving a shaft N by means of the pinion P, gear-wheel Q, the gear-wheel K being rotated therefrom by means of a worm R and worm-wheel S, as best seen in Fig. 2, it being noted that the worm-wheel S is secured to one of the shafts J. The shaft N is also provided with a worm T, which meshes with a worm-wheel U, secured to a shaft V, which latter carries a bevel gear-wheel W, meshing with a similar gear-wheel X, secured to a shaft Y, journaled in brackets Z, said shaft Y having secured thereto a drum A'. The drum A' is provided with a pocket B', into which drops the fuel as fed through a hopper C'. The drum A' is inclosed in a casing D, the latter being provided with a throat E', through which the fuel may pass from said casing into the furnace A.

F' designates pipes for steam, compressed air, &c., said pipes discharging into a chamber G', provided with a perforated wall H', which permits the steam, compressed air, &c., to escape from said chamber in the form of

jets, which forcibly eject the fuel through the throat E' into the furnace A, as indicated by the arrows b in Fig. 2.

The shaft Y has secured thereto a cam J', adapted to open the valves K' at intervals to permit the contents of the pipes F' to enter the chamber G', in order to produce the jets hereinafter referred to.

The operation is as follows: The fuel, generally the smaller sizes of coal, is fed through the hopper C', enters the pocket B', and fills the same, the engine M rotating continuously and imparting motion to the drum A' by the intermediate mechanism, the rotation of said drum causing the pocket B' to discharge its contents into the lower portion of the casing D'. The rotation of the shaft Y causes the cam J' to open the valves K' at the proper time, and thus fill the chamber G' with the steam, compressed air, &c., contained in said pipes and cause the same to escape through the perforations in the wall H' in the form of jets, the pressure being of sufficient force to cause the fuel to escape through the throat E' and enter the furnace A. At the same time that the fuel is being fed to the fire in the furnace A the drums F are being rotated by the mechanism hereinbefore described and are causing portions of the ashes H to drop into the hopper L, and thus make room for the fuel fed to the furnace. The valves K' are secured to a rod L', which is provided with an arm M', which is lifted by the cam J', so as to rock the rod L' in order to open the valves K'. When the cam K' has passed the arm M', the latter drops by gravity and closes the valves K' by rotating the rod L'.

It is to be observed that the jets of steam, compressed air, &c., referred to occur only at intervals and that when there is no fuel in the lower portion of the casing D' the steam or air is shut off.

The space between the tubes C and drums F is at all times filled with ashes H, which act as a non-conductor of heat and prevent the ash-removing device from becoming overheated, and the tubes C being likewise embedded in the ashes H will also be prevented from becoming overheated. In addition to this the steam, compressed air, &c., which are passed through the tubes C assist in keeping them cool.

Should it be desired to add fuel to the furnace through the doors N' or remove ashes through the doors P', the stoker herein described will in no way interfere with this.

I desire to call especial attention to the fact that I dispense with grate-bars and employ in lieu thereof the ash-bed and air-passages thereunder, the top of the ash-bed being normally above said air-passages under all conditions and serving to receive and support the fuel.

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

1. In a furnace, the combination of an ash-

bed adapted to support fuel, air tubes or passages therethrough and slightly below the surface thereof and means for maintaining a uniform height of said ash-bed or fuel-bed.

2. In a furnace, a bed of ashes, adapted to serve as a fuel-bed, a series of air-passages in the latter located slightly below the surface of said bed and ash-removers located below said passages.

3. A furnace provided with a bed of ashes adapted to serve as a fuel-bed, an ash-removing device consisting of a plurality of rotatable fingered members situated below the surface of the fuel-bed, whereby a substantially uniform height of said bed is maintained, means for supplying fuel to said bed, air-supplying devices located slightly below the surface of said bed and means for operating said ash-removing device and said means for supplying fuel.

4. In a furnace, a fuel-bed consisting of ashes, air-supplying devices located slightly below the surface of said bed and an ash-removing device situated below said fuel-bed, and consisting of a plurality of rotatable fingered members.

5. In a furnace, a fuel-bed consisting of ashes, air-supplying devices located slightly below the surface thereof, an ash-removing device situated below the surface of the fuel-bed and consisting of a plurality of fingered members geared together so as to cause adjacent bars to rotate in opposite directions.

6. In a furnace, a fuel-bed consisting of ashes, air-supplying devices located slightly below the surface thereof, an ash-removing device situated below the surface of the fuel-bed and consisting of a plurality of rotatable fingered members, the fingers of adjacent members overlapping each other and situated out of alinement.

7. In a furnace, a fuel-bed consisting of ashes, a plurality of air-tubes located slightly below the surface of said bed and embedded therein, said tubes communicating at one end with a chamber, means for supplying a fluid to said chamber, and an ash-removing device situated below said grate-bars and consisting of a plurality of rotatable fingered members.

8. In a furnace, a bed of ashes adapted to serve as a fuel-bed, a series of air-passages located therein and slightly below the surface of said bed, an ash-removing device located below the surface of said bed and consisting of a plurality of fingered members and means for actuating said members.

9. In a furnace, the combination of a bed of ashes, adapted to support fuel, air-supplying devices located slightly below the surface of said bed, and adapted to furnish air to support combustion, devices for maintaining a substantially constant height of said ash-bed and means for operating said devices.

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