

No. 762,344.

PATENTED JUNE 14, 1904.

H. E. PARSON.

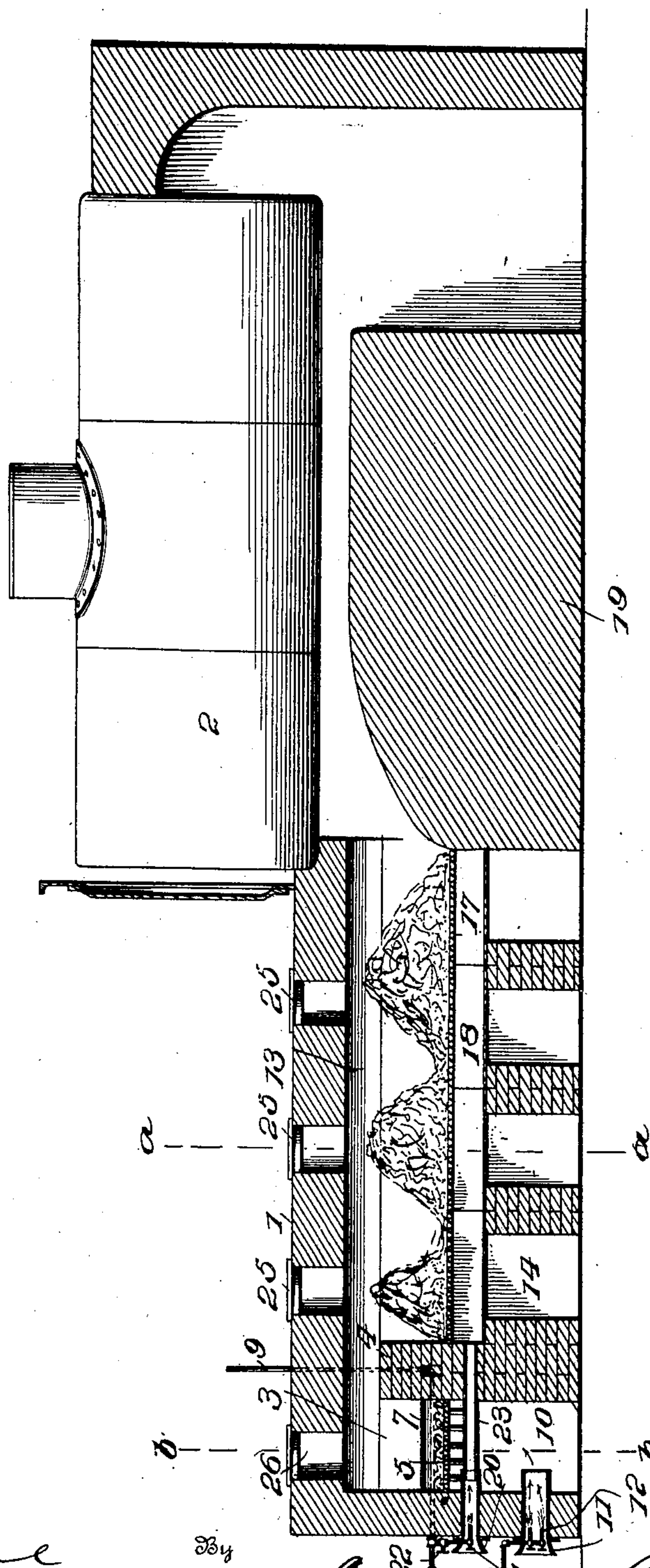
STEAM BOILER FURNACE FOR BURNING WET MATERIAL.

APPLICATION FILED DEC. 16, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

FIG. 1.



Witnesses

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NO MODEL.

2 SHEETS—SHEET 2.

Fig 2.

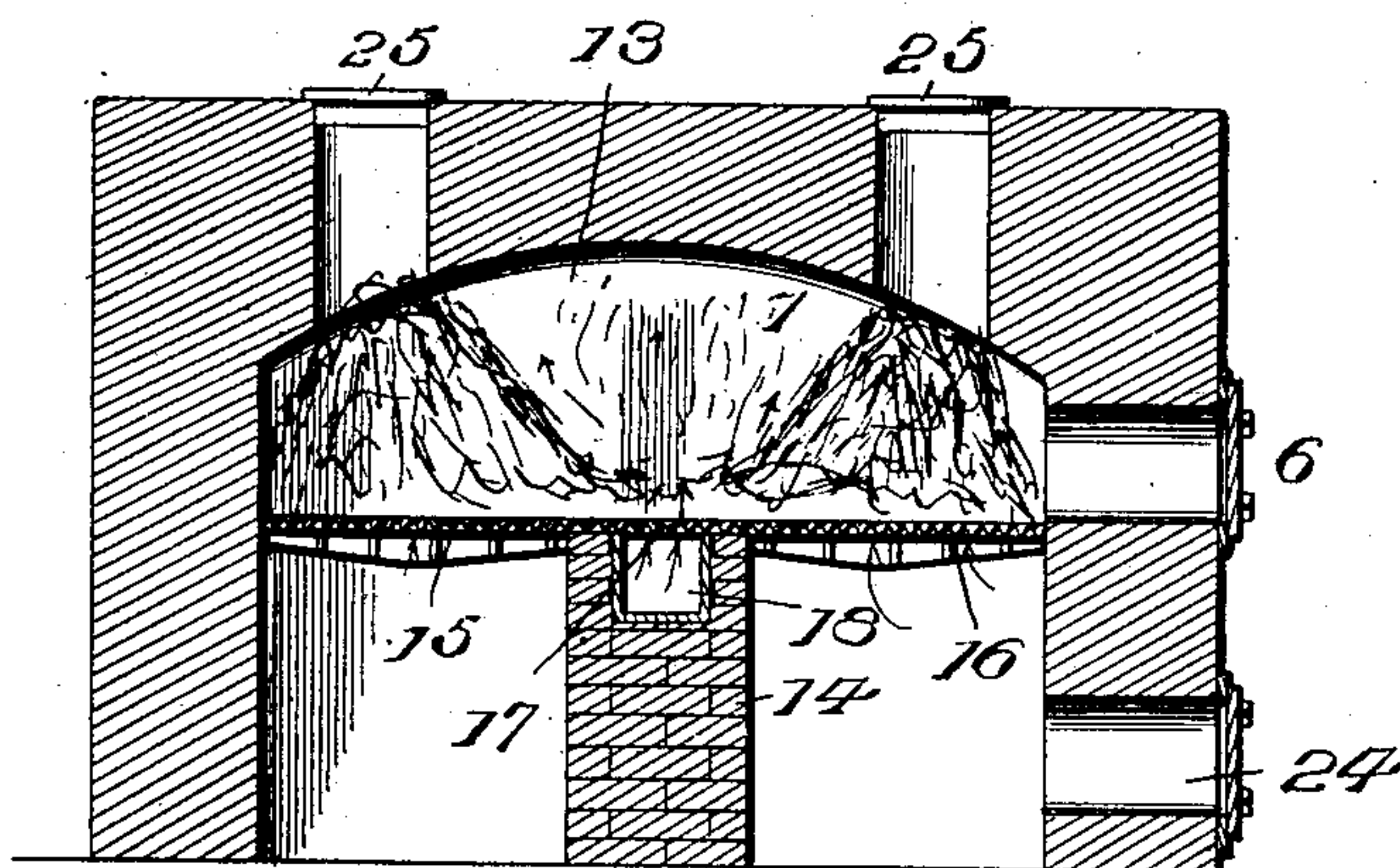
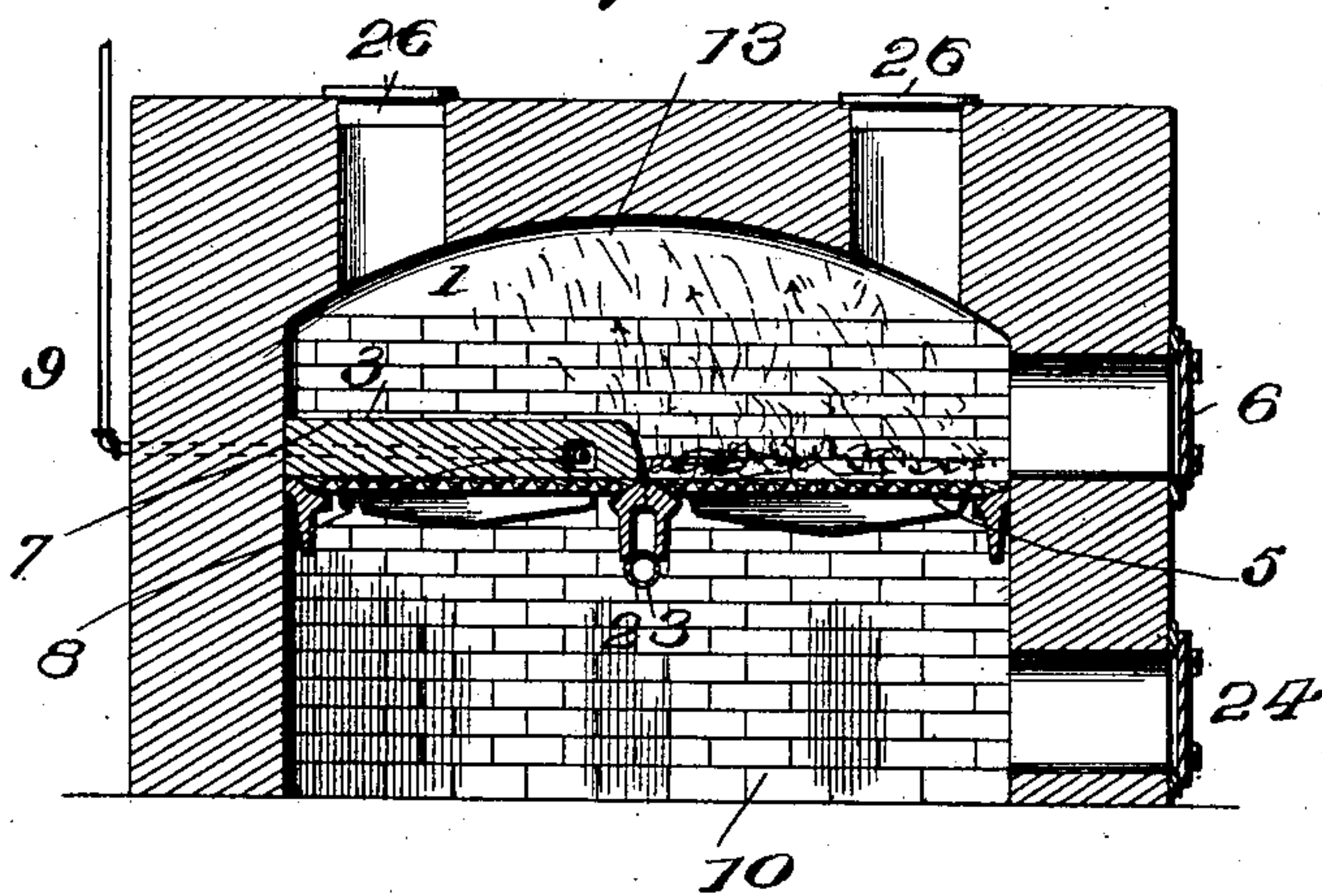


Fig. 3.



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## STEAM-BOILER FURNACE FOR BURNING WET MATERIAL.

SPECIFICATION forming part of Letters Patent No. 762,344, dated June 14, 1904.

Application filed December 16, 1902. Serial No. 135,438. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY E. PARSON, a citizen of the United States of America, and a resident of the borough of Brooklyn, county of Kings, city and State of New York, have invented certain new and useful Improvements in Steam-Boiler Furnaces for Burning Wet Material, of which the following is a specification.

My invention consists of a furnace designed to burn wet material for the generation of steam, which wet material, if dry, would be combustible, but which comes from the manufacturing operations in which it is used in a wet state and must either be burned wet or dried before it is suitable to be used as fuel.

The invention is especially applicable to the burning of tanbark in a furnace connected with a steam-boiler for the generation of steam.

Heretofore it has been customary in the burning of tanbark for the generation of steam to charge the furnace with bark while wet and allow the fire to smoulder until sufficient of the bark has been dried to burn at a temperature great enough to generate steam of a sufficient quantity. This method of burning tanbark produced a variable temperature in the furnace and a second variable temperature in the boiler and resulted in a variable pressure. In order that an engine might be kept running constantly, it was necessary that a boiler of such size should be made as would give sufficient pressure for the demands of the engine, even when the fire was lowest, at the period of fresh feeding of wet fuel. Hence a boiler of much larger capacity had to be employed, so as to maintain steam-pressure during the interval when the fire was low.

It is the purpose of my invention to overcome this uneconomical procedure and to burn tanbark at a uniform temperature constantly, making it possible to employ a boiler of minimum capacity for the work required and to maintain a constant steam-pressure. To do this, I employ a method which has been made the subject-matter of another application pending currently with this one, Serial No. 135,439, filed December 15, 1902.

The method carried out in the present apparatus consists in maintaining a uniform fire, a uniform temperature, and a uniform boiler-pressure by burning wet tanbark or other slowly-burning material by the aid of a coal-fire so located that the flame and products of combustion from the coal-fire, driven by a blast will pass into the tanbark-chamber and through it into the fire-chamber below the boiler. The tanbark-chamber has piles of tanbark on each side, which run together at a thin layer in the center, where they lie upon a grate below which there is forced draft. The combined action of the flame and the products of combustion from the coal-fire and the blast of air below the grate on which the thin layer of wet tanbark lies will be to rapidly dry the bark and ignite it. It will burn with a steady constant flame, and as it is consumed fresh quantities of tanbark will roll down the incline of the piles of bark in the furnace onto the central grate and there be dried, ignited, and burned.

In the drawings accompanying this application I have shown an apparatus capable of carrying this method into effect.

In the drawings, Figure 1 is a vertical longitudinal section of a boiler-furnace adapted to burn wet bark by my method. Fig. 2 is a vertical transverse section through the line *a a* of Fig. 1. Fig. 3 is a vertical transverse section through the line *b b* of Fig. 1.

In the drawings similar figures of reference indicate the same parts in all figures.

1 is a furnace-chamber; 2, a boiler. The furnace-chamber is divided into two parts. 3 is a front portion of the furnace-chamber, which is separated from the rear portion by a bridge-wall 4.

Referring to Fig. 3, which is a vertical transverse section through the front portion of the furnace-chamber, 5 is a grate suitably mounted on suitable supports in the chamber 3 next to the furnace-door. 6 is a front door or stoke-hole for the grate 5. Opposite the grate 5 is a banking-platform 7, occupying the other half of the furnace-chamber 3. 8 is a channel through the banking-platform 7, into which passes a steam-pipe 9, by which steam is supplied to the blowers, and which steam is



superheated by the heat of the banking-platform. The banking-platform 7 serves the purpose of enabling me to clean the fire by raking the live part of the fire onto the banking-platform, while withdrawing the ash off the grate and out of the door 6. The live part of the fire is then restored to the grate, fresh coal applied, and the door closed. The grate 5 is of the construction having conical apertures through it, which form twyers through which the blast in the ash-pit is delivered to the fire on the grate. 10 is the ash-pit below the grate in chamber 3. It is closed, and into it projects a forced-draft device 11, which is provided with steam-jet nozzles 12 connected to the steam-pipe 9, supplied with steam from the boiler.

The rear portion of the fire-chamber (marked 13) is constructed as shown in Fig. 2 and is provided with two grates 15 and 16, supported upon the side walls and the central pier 14, and these grates are preferably of the same construction as that used in the chamber 3. Between them is another grate 17, which covers the air-channel 18, which runs through the full length of the chamber 13, which is the tanbark-chamber, from the bridge-wall 4 to the deflecting-bed 19 under the boiler. 20 is a forced-draft device provided with a steam-injector 21, supplied with steam by the pipe 9 and provided with a suitable stop-cock 22 for turning the steam off or on. The injector 21 is connected with the channel 18 by a pipe 23, which crosses the ash-pit 10 and delivers its blast into the channel 18. The space below the grates 15 and 16 is supplied with air through the medium of draft-doors 24 or in any suitable manner.

25 25 are a series of charging or stoke holes in the top of the furnace-chamber, through which wet bark may be charged into the furnace upon the grates.

26 is a stoke-hole, through which coal may, if desired, be charged onto the grate 5, and a similar stoke-hole is located over the banking-platform 7.

The operation of the device is as follows: When wet tanbark is stoked into the holes 25 25, it will fall upon the grates 15 and 16 in piles under the stoke-holes and extending up as far as the roof of the furnace-chamber. These piles will run off to a thin edge and meet one another over the grate 17, which is in the center of the chamber and over the channel 18. The piles of tanbark will thus leave an open channel-way between them over channel 18 and under the roof of the fire-chamber. If now a coal-fire be ignited upon the grate 5 and the forced-draft device 11 be started and the coal-fire blown up to a high temperature, the products of combustion will pass over the bridge-wall 4 into the channel-way between the piles of wet tanbark and over the thin layer of tanbark which overlies the grate 17, covering the channel 18, and

will impinge upon the thin layer of bark. If now the forced-draft device 20 is started and a blast of air mixed with steam be driven into the channel 18, this blast will rise through the twyers in the grate 17 and unite with the products of combustion passing through the grate 17 and produce at that point an intense fire. Thus a strata of intense heat will be maintained in the center of the fire-chamber, which will be constantly supplied with fuel, both gaseous and solid, from the piles of tanbark on either side. By this means a fire of uniform intensity may be maintained and uniform steam-pressure maintained. Hence a minimum boiler may be used to do the work desired.

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

1. In a furnace for burning wet and slowly-combustible fuel in combination with a furnace adapted to burn highly-combustible fuel, means for feeding air under pressure thereto, a combustion-chamber adapted to receive the wet and slowly-combustible fuel, said chamber having a fuel-supporting surface, means for forcing air through a portion of the fuel-supporting surface to maintain combustion thereon.

2. In a furnace adapted to burn a slowly-combustible fuel, the combination of, a fire-chamber provided with a grate and forced-draft mechanism, adapted to burn highly-combustible fuel, with a fire-chamber adapted to burn a slowly-combustible fuel, consisting of three grate-surfaces, a central grate-surface provided with an independent channel or ash-pit below it, into which is delivered an independent forced draft, and a grate on each side of the central one, below which is an ash-pit, the grates on each side of the central one being adapted to bear a large portion of the slowly-combustible fuel, substantially as described.

3. In a furnace adapted to burn slowly-combustible fuel, the combination of, a furnace-chamber provided with a vertical transverse wall extending from the floor to a height somewhat less than the chamber, and dividing the chamber into two parts, each part being provided with a grate, one adapted to bear highly-combustible fuel, and the other to bear slowly-combustible fuel, with a forced-draft mechanism delivering a forced draft into the closed ash-pit below the grate adapted to bear highly-combustible fuel, and a forced-draft mechanism adapted to supply a forced draft below a portion only of the grate adapted to bear slowly-combustible fuel.

4. In a furnace for burning slowly-combustible material, the combination of, a furnace-chamber provided with a vertical transverse wall extending from the floor to a height somewhat less than the chamber, and dividing the chamber into two parts, with a series of grates



mounted horizontally across the chamber, and  
below the top of the wall, the wall serving as  
a bridge-wall for one of the grates, a closed  
ash-pit below the portion of the grate on one  
5 side of the bridge-wall, and a forced-draft  
mechanism supplying air under pressure to  
said closed ash-pit, a closed ash-pit below a  
portion only of the grate on the opposite side  
of the bridge-wall, and forced-draft mechan-

ism for supplying air under pressure thereto, 10  
substantially as described.

Signed by me at New York, in the county  
and State of New York, this 8th day of De-  
cember, 1902.

HENRY E. PARSON.

Witnesses:

SIDNEY R. PERRY,

EMMA W. FINLAYSON.