

(No Model.)

J. L. PESLIN.
SMOKE CONSUMING FURNACE.

No. 348,863.

Patented Sept. 7, 1886.

Fig. 1.

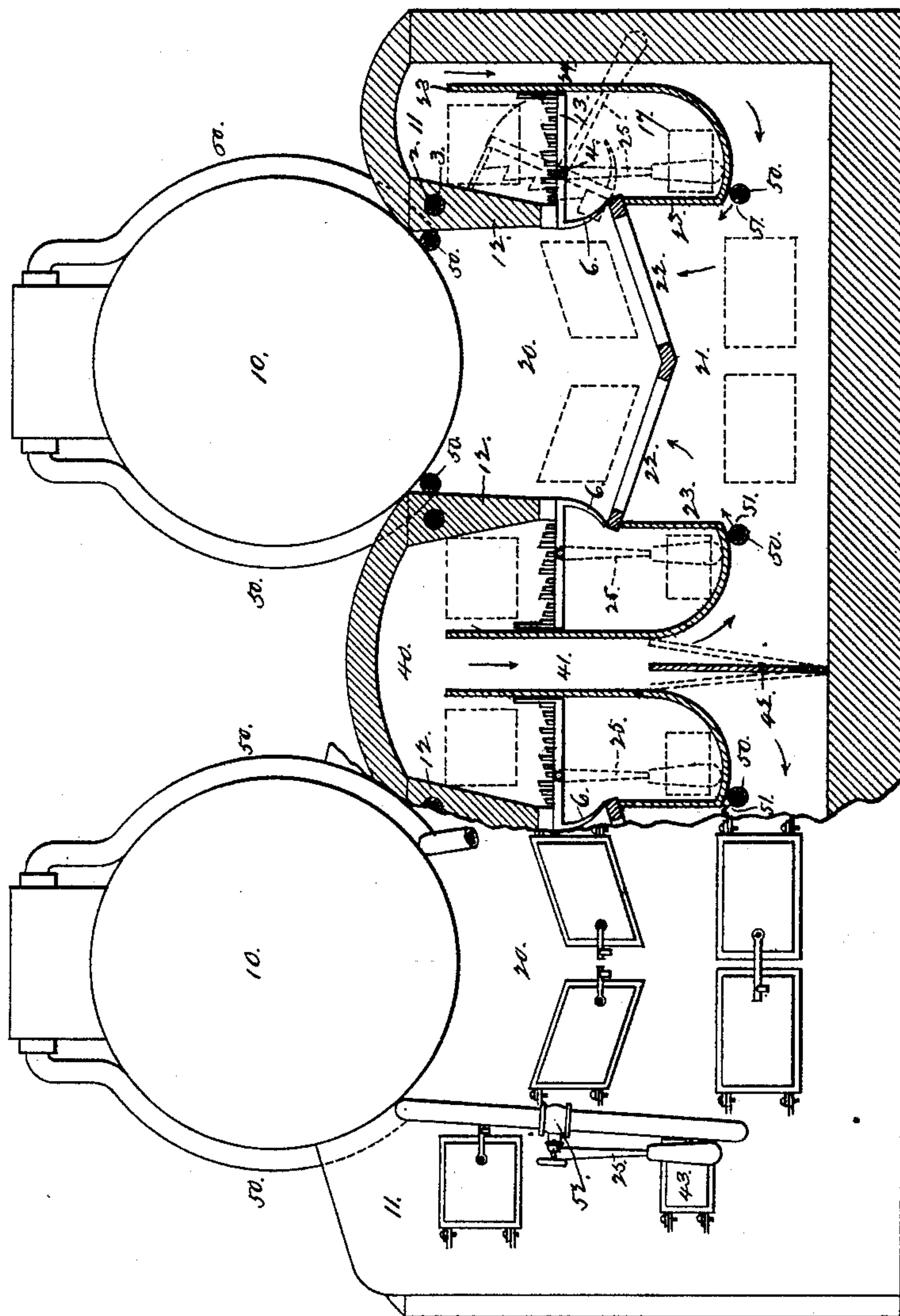


Fig. 2.

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JOHN LEWIS PESLIN, OF APPLETON, WISCONSIN.

SMOKE-CONSUMING FURNACE.

SPECIFICATION forming part of Letters Patent No. 348,863, dated September 7, 1886.

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To all whom it may concern:

Be it known that I, JOHN LEWIS PESLIN, of Appleton, in the county of Outagamie and State of Wisconsin, have invented a new and Improved Smoke-Consuming Furnace, of which the following is a full, clear, and exact description.

My invention relates to the construction of a smoke and gas consuming furnace wherein the main fires having been once started are fed by partially-coked coal, the smoke and gas generated during this process of partial coking being delivered beneath and forced to pass through the main fire of the furnace.

From the peculiar construction and arrangement of my furnace I am able to utilize every particle of heat-generating material entering into the composition of the coal, and consequently I am able to maintain my fires without contaminating the atmosphere with soot or disagreeable odors, and, owing to the perfect combustion which I obtain the boiler-flues are not clogged or coated with soot, and consequently I am able to generate a greater amount of steam from a given amount of fuel than would be possible in cases where the flues were coated with soot, for, as will be readily understood, soot being a non-conductor of heat will prevent the heat passing through the flues from acting to the fullest extent as a steam-generating agent.

Another decided advantage which I obtain by constructing my furnace in the manner to be hereinafter described is that it never becomes necessary to open the doors leading to the main combustion-chamber, and consequently I avoid all sudden cooling of the boiler, and thereby not only am I able to maintain a steady steam-pressure, but I materially decrease the wear and tear upon the boiler.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures of reference indicate corresponding parts in both the figures.

Figure 1 is a front view of a battery of boilers, the furnaces of which are constructed in accordance with the terms of my invention, part of the front plate being broken out; and Fig. 2 is a detail view illustrating the construction of the grate of the coking-chamber.

Although I have illustrated my furnace as arranged in connection with a battery of boil-

ers, I wish it to be distinctly understood that the principle is equally applicable to single boilers, and I also wish it to be understood that the coking-chamber, instead of being arranged at the sides or side of the boiler, could be arranged in front of it.

In the construction illustrated, 10 represents the boilers, of which there are two in the battery.

Upon the outer side of each of the boilers I arrange a coking-chamber, 11, that is divided from the main combustion-chamber by a wall or partition, 12, which is made from blocks of fire-clay that are formed with apertures 2, through which there is passed a rod, 3, which is properly mounted in the rear wall of the battery-casing and the front plate of the same; or the entire wall 12 could be made of a single block of fire-clay.

20 is the main combustion-chamber beneath the boiler, and 21 is the ash-pit; the main grates 22 being arranged upon an incline, as indicated.

From the outer edge of the main grate there is arranged a downwardly-extending partition or wall, 23, that is preferably made of sheet-iron, and which, after extending downward for some distance, is carried toward the outer wall of the battery, and then runs upward parallel with said outer wall, forming the flue 24, the material of which the wall or apron 23 is made being supported by the rear wall of the furnace and the front plate.

The frame of the grate upon which the coal to be coked is placed is shown at 13, and is provided with trunnions 4, that are mounted in proper bearings that permit of the tilting of the frame to the position in which it is shown in dotted lines on the right in the drawings. The forward edge of the frame 13 abuts against the lower edge of the dividing wall or partition 12, and from the lower side of the grate there is a downwardly-extending flange, 6, the outer face of which is formed in the arc of a circle that is concentric with the axes of the trunnions upon which the grate is swung. The circular face of this flange 6 rests closely against the upper outer edge of the main grate 22.

The grate-bars 7, 8, and 9 are each provided with dovetail projections which fit within correspondingly-formed recesses in the frame 13,

and these grate-bars are arranged in series in the order named, the bars 9, which are deeper than the bars 7 or 8, being farther removed from the inner edge of the frame 13 than are the bars 7 or 8 of the same series. The forward trunnion, 4, of the grate-frame 13 projects outward through the front plate of the furnace, and to this forwardly-projecting end there is fitted a lever-arm, 25.

Communication with the coking-chamber, the combustion-chamber, the ash-pit, and the air-space beneath the grate of the coking-chamber is established through the medium of doors that are mounted in the usual manner upon the front plate of the furnace, as shown upon the left in the drawings, the position of these doors being indicated by dotted lines upon the right of the drawings.

Between the two boilers there is a double coking-chamber, 40, provided with partition-walls 12, as in the case of the coking-chamber 11, and with a flue, 41, which leads to the ash-pit beneath the combustion-chamber 20 of each of the boilers shown. In case it should be necessary to let out the fire in one of the combustion-chambers, then communication between the flue 41 and the ash-pit of the combustion-chamber in which the fire was so drawn would be cut off through the medium of a damper, 42, that is arranged directly beneath the center line of the flue 41, and so mounted that, although it will normally stand in the position in which it is shown in full lines in the drawings, it may be thrown to either of the positions indicated by dotted lines.

In operation, the fires are kindled in the ordinary manner within the combustion-chambers 20, and at the same time other fires are kindled in the coking-chambers, the necessary draft to these coking-chambers being obtained through openings leading into the air-chamber 17, that is formed by the wall or partition 23, the position of the opening upon the right of the furnace being indicated by dotted lines, while the opening upon the left is represented as being closed by a door, 43. As the gas, smoke, &c., is driven off from the coal it will pass in the direction of the arrows shown in the drawings from these several coking-chambers to the ash-pits beneath the combustion-chambers 20, and thence will pass through the burning material resting upon the main grate-bars 22, and into the combustion-chambers proper, so that all combustible and heat-generating matter will be consumed before reaching the smoke-stack, which is arranged in the ordinary manner in connection with the combustion-chambers. After the coal placed within the coking-chambers has been practically coked and deprived of its smoke-producing and volatile heat-producing constituents the lever 25 is grasped and thrown upward in the direction of the arrow, thus causing the greater portion of the coke to fall upon the fire within the main combustion-chamber, but owing to the peculiar arrangement of the grate-bars carried by the frame 13 a sufficient quantity

of ignited coal will be held upon the upwardly-extending side faces of the grate-bars 9 to start the process of coking and partial combustion of the next supply of fresh coal that is placed within the coking-chamber.

In case the natural draft of the furnace should prove to be insufficient to carry on the necessary coking process within the coking-chambers, I employ a jet of superheated steam, which I obtain by means of a pipe, 50, that leads from the steam-drum through the upper portion of the main combustion-chamber, out through the front plate of the boiler, downward in front of said plate, and finally is again carried through the front plate and into the flue leading from the coking-chamber to the ash-pit beneath the main combustion-chamber, the pipe being carried inward in a horizontal line and being located as indicated in the drawings. This pipe is provided with a series of perforations, 51, through which the steam spurts out in the direction of the arrow shown in connection with the pipe upon the right in the drawings. When the steam is not required, it is shut off by means of a valve, 52, arranged as shown on the left in the drawings.

Now, although I have described my furnace as arranged in connection with a boiler, it will of course be understood that other forms of furnace could be arranged in accordance with the terms of my invention, and it will also be understood that the invention could be applied to the boilers of locomotive-engines as well as to stationary boilers.

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

1. The herein-described method of consuming gases and smoke, which consists in generating said gases and smoke in a coking-chamber by means of an auxiliary fire, causing the gases and smoke so generated to pass by way of a flue to a pit beneath the fire of the main combustion-chamber, and thence through the fire and into the combustion-chamber, substantially as described.

2. The herein-described method of burning coal, which consists in placing the coal in a coking-chamber, generating the gases and smoke contained therein and causing the gases so generated to pass through the main fire and into the main combustion-chamber, and in finally dumping the coke formed in the coking-chamber into the main combustion-chamber, substantially as described.

3. The herein-described method of burning coal, which consists in starting combustion in a main and an auxiliary chamber, carrying the products of combustion of the auxiliary chamber through the body of the fire in the main combustion-chamber, continuing the operation until the fuel in the auxiliary chamber is partially coked, in then dumping the greater portion of the fuel from the auxiliary chamber into the main chamber, leaving only a few glowing coals, in then adding fresh fuel

to the auxiliary chamber, again driving off the gases and again dumping the greater portion of the mass, substantially as described.

4. In a furnace, the combination, with a
5 main combustion-chamber, of a coking-chamber, a flue leading from the coking-chamber to a point beneath the grate of the main chamber, and a dumping mechanism arranged in connection with the grate of the coking-chamber, substantially as described.
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5. In a furnace, the combination, with a main combustion-chamber, of a coking-chamber and its grate formed with a downwardly-extending flange, a partition arranged between the main combustion-chamber and the
15 coking-chamber, ash pits or chambers arranged in connection with the main combustion-chamber and the coking-chamber and separated from each other, and a flue leading

from the coking-chamber to a point beneath 20 the grate-bars of the main combustion-chamber, and a dumping mechanism arranged in connection with the grate of the coking-chamber, substantially as described.

6. The combination, with a combustion- 25 chamber, of two coking-chambers, flues leading from the coking-chambers to points beneath the grate of the main combustion-chamber, and mechanisms arranged in connection with the grates of the coking-chambers, where- 30 by such grates may be dumped and their load delivered to the main combustion-chamber, substantially as described.

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Witnesses:

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