No. 711,255. Patented Oct. 14, 1902.

J. A. McALLISTER.

SMOKE CONSUMING FURNACE.

(Application filed Nov. 21, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

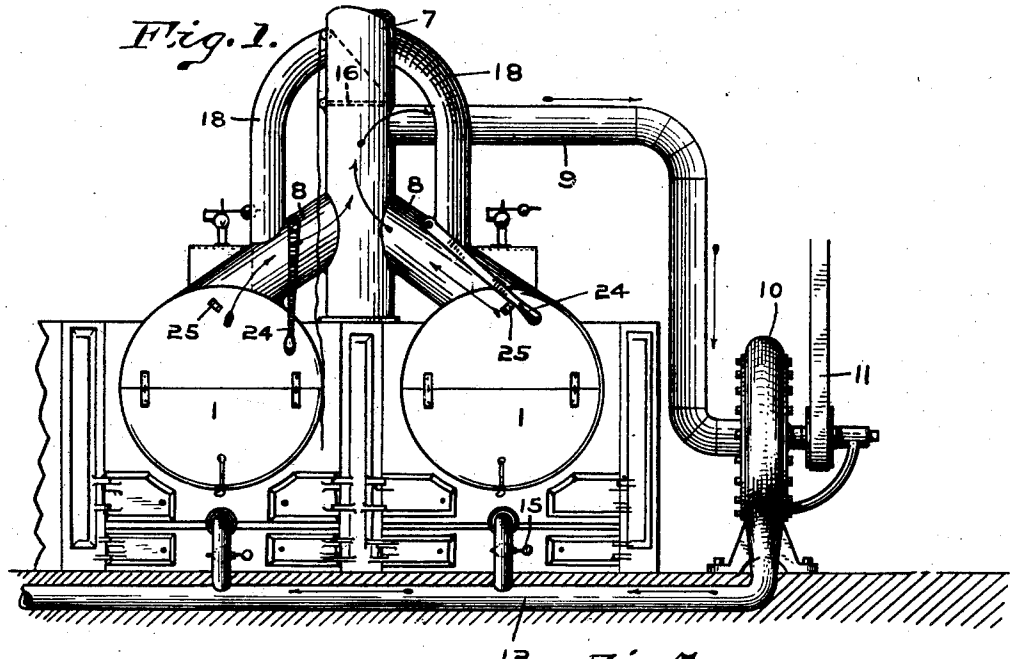


Fig. 3.

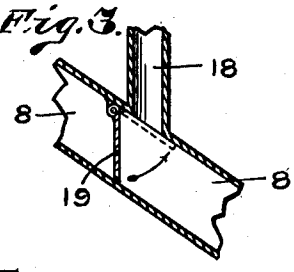


Fig. 2.

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Fig. 4.

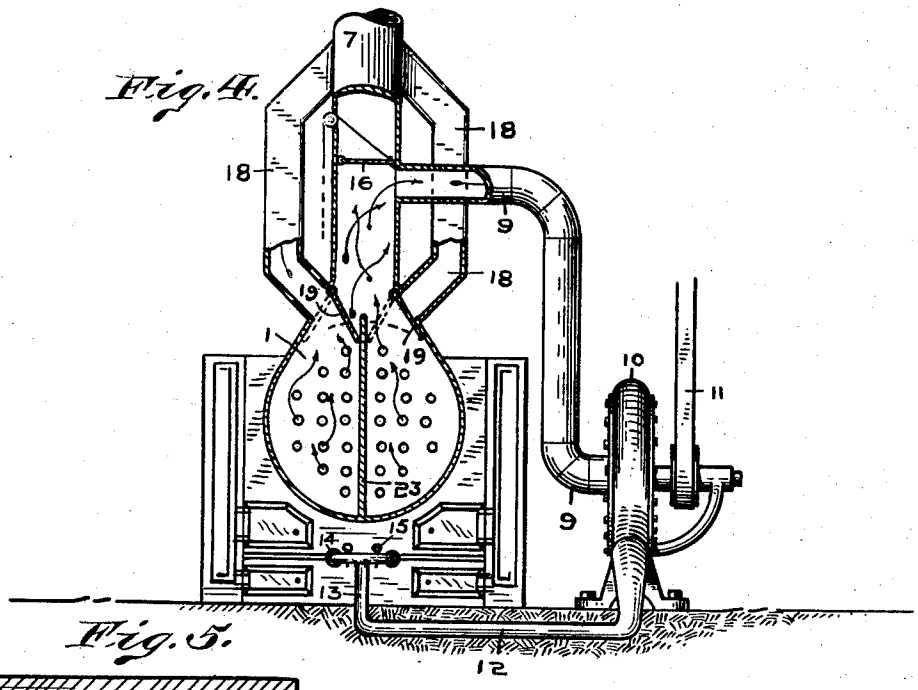


Fig. 5.

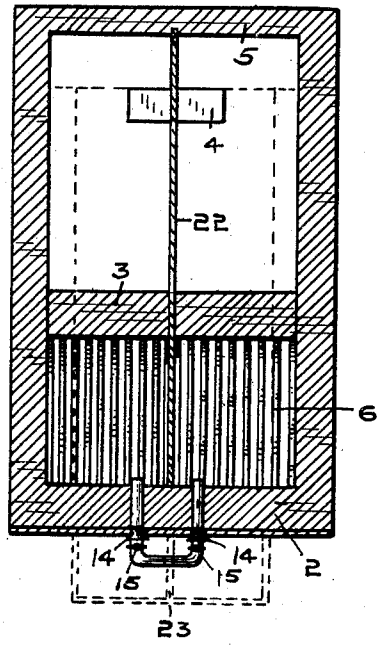
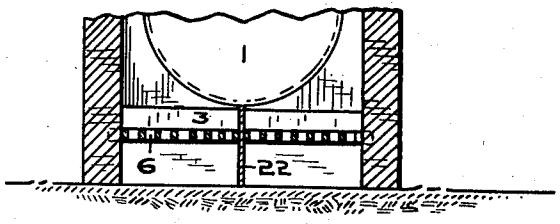


Fig. 6.



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UNITED STATES PATENT OFFICE.

JAMES A. McALLISTER, OF INDIANAPOLIS, INDIANA.

SMOKE-CONSUMING FURNACE.

SPECIFICATION forming part of Letters Patent No. 711,255, dated October 14, 1902.

Application filed November 21, 1901. Serial No. 83,119. (No model.)

To all whom it may concern:

Be it known that I, JAMES A. MCALLISTER, of Indianapolis, county of Marion, and State of Indiana, have invented a certain new and useful Smoke-Consuming Furnace; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which like numerals refer to like parts.

The object of this invention is to make a furnace for heating boilers and the like which will consume substantially all the smoke, and thereby be saving of fuel and avoid the discharge of smoke from the smoke-stack.

The full nature of the features of my invention will be understood from the accompanying drawings and the following description and claims.

In the drawings, Figure 1 is a front elevation of a battery of boilers, showing two furnaces and boilers with parts broken away. Fig. 2 is a central vertical longitudinal section of one of said furnaces with the boiler in side elevation, parts being broken away and in section. Fig. 3 is a vertical cross-section through a portion of the pipes leading from a furnace. Fig. 4 is a front elevation of a modified form where only one boiler is used, parts being in vertical cross-section and parts broken away. Fig. 5 is a horizontal cross-section of Fig. 4 under the boiler. Fig. 6 is a vertical cross-section of the same on the line A A of Fig. 3.

Referring now to the details of what is shown in the drawings for the purpose of illustrating the general nature of my invention, 1 represents the boilers; 2, the front wall of the furnace under the boilers; 3, the bridge behind the fire-chamber; 4, a support for the rear of the boiler, and 5 the rear wall of the furnace. Grate-bars 6 support the fuel in the fire-chamber, and through the boiler there are suitable tubular flues (seen in Fig. 4) leading from the rear to the flue-chamber at the front, as is well known. A pipe 8 leads from the flue-chamber at the front end of the boiler to the smoke-stack, thus forming a conduit from the furnace-chamber through the boiler to the smoke-stack.

A return smoke-pipe 9 leads from the smoke-stack 7 to a fan 10, that is driven by the belt 11 or any suitable source of power. A pipe 12 extends from the fan 10 to a position in front of the furnaces. Branch pipes 13 lead from said pipe 12 into the various furnaces through the front wall 2, there being an air-mixer 14 in each of said pipes and a valve 15.

Above the outlet of the smoke-pipe 9 from the smoke-stack 7 a valve 16 (shown in Fig. 4 and in dotted lines in Fig. 1) is provided for closing the smoke-stack at such point. It is controlled by the cord 17. A flue-pipe 18 leads also from the flue-chamber at the front of each boiler or, as shown in Figs. 1, 2, and 3, from the pipe 8 to the smoke-stack at a point above the valve 16, and valves 19 are provided in said pipes 8 between the flue-pipes 18 and the smoke-stack, said valves being controlled by the levers 24, that are caught on lugs 25. So a second conduit is formed from the furnace-chamber through the boiler to the smoke-stack.

In Figs. 1 and 2 there are two furnaces or furnace-chambers which are fired alternately at different times. Therefore one holds a green fire, while the other is a live fire. When a green fire is made, the valve 19 in the pipe 8, leading from such fire, is opened, whereby the smoke from the green fire goes into the smoke-stack, and the valve 16 being closed it is drawn through the pipe 9 by the fan 10 and is forced into the furnace-chamber having the live fire, the valve 15 in the pipe 13, leading to the green fire, being at such time closed. As the smoke passes through the pipe 13 to the live fire some air is mixed with it in the mixer 14, and the live fire consumes the combustible atoms and material in the smoke. The valve 19 in the pipes 8 leading from the live fire is closed, so that the unconsumed gases from the live fire and the draft pass through pipe 18 into and through the smoke-stack. As the green fire grows hot and more alive the quantity of smoke therefrom diminishes in substantially the same ratio as the intensity of the live fire diminishes. The parts are kept in this condition until it is desired to fire the other furnace, and then the valves 19 in the two pipes 8 and the valves 15 in the pipes 13 are reversed and the other furnace fired, the operation and results being the same as has been described. Alternate firing and changing the valves, as explained, are all that is necessary to enable the device to accomplish the result.

In Figs. 4, 5, and 6 there is shown the application of my invention to the furnace for a single boiler. There two furnace-chambers under the boiler are provided by reason of the central longitudinal wall or partition 22, and the pipe 13 enters each of these furnace-chambers. This central longitudinal wall or partition extends clear back through the furnace to the rear wall 5. There is also a partition 23 in the flue-chamber of the boiler that leads directly to the smoke-stack and out of which pipe 8 leads to the smoke-stack above. Otherwise the arrangement is the same as in the battery of boilers and furnaces shown in Fig. 1. Likewise the operation and manipulation is the same, and it produces the same effect, one of the fire-chambers under the single boiler containing a live fire, while the other holds a green fire.

I do not limit my invention to two furnaces under a single boiler or under two boilers, as the invention may be adapted to any number of boilers provided there be a plurality of furnace-chambers; nor do I limit my invention to the exact construction of pipes 8, 9, and 18, that is shown herein, as the conduits may be otherwise made. The advantage of the construction I here show, with the pipes 8 leading into the smoke-stack and the smoke-pipe 9 leading therefrom, is that valve 16 may be opened and the furnace be operated in the old way.

One advantage of the invention besides that of consuming the smoke is that the draft through the furnaces is increased rather than diminished. This arises from the fan 10 drawing the smoke from the green fire through the various flues and pipes. The fan also makes a blast through the pipes 12 and 13 into the live fire and through the smoke-stack.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a smoke-consuming furnace, a plurality of furnace-chambers, a smoke-stack, a valve-controlled conduit leading from each of said furnace-chambers to the smoke-stack, a fan, a pipe leading from the smoke-stack to the fan, a valve-controlled conduit from the fan to each furnace-chamber, a valve in the smoke-stack above the pipe leading to the fan, and a valve-controlled conduit leading from each furnace-chamber to the smoke-stack above said smoke-stack valve.

2. The combination with a boiler having flues extending through the same and a flue-chamber at the front end, of a furnace under said boiler, a central longitudinal partition from the front to the rear of said furnace dividing the same into two chambers, a smoke-stack, a valve-controlled conduit leading from each flue-chamber at the front end of the boiler to the smoke-stack, a fan, a pipe leading from the smoke-stack to said fan, a valve in the smoke-stack above said pipe, a valve-controlled conduit leading from the fan to each furnace-chamber, and a valve-controlled pipe leading from each flue-chamber at the front end of the boiler to the smoke-stack above the valve therein.

In witness whereof I have hereunto affixed my signature in the presence of the witnesses herein named.

JAMES A. McALLISTER.

Witnesses:
V. H. LOCKWOOD,
F. E. BRYANT.