

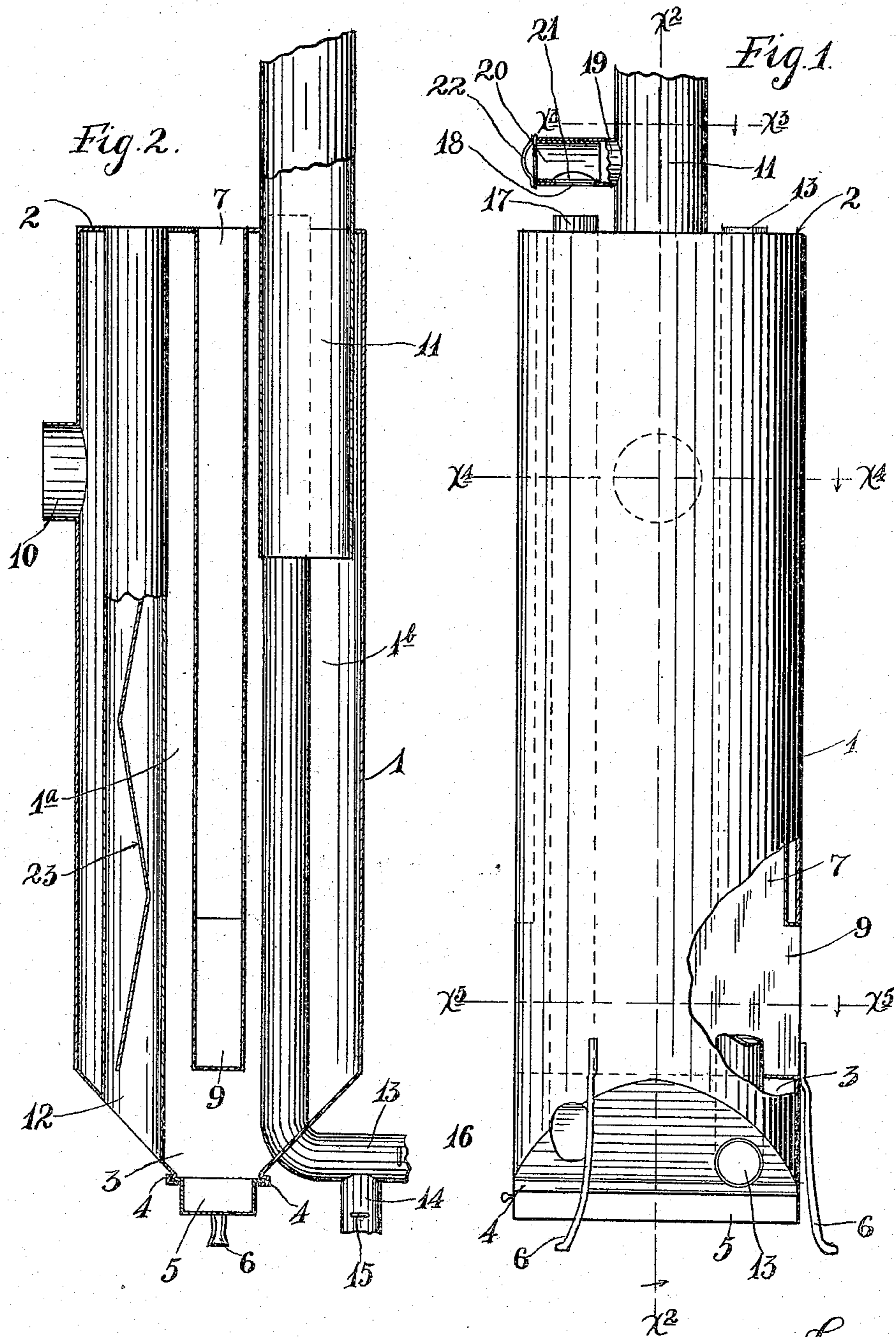
D. D. HARR.
HEATING DRUM.

APPLICATION FILED FEB. 4, 1908.

930,663.

Patented Aug. 10, 1909.

2 SHEETS—SHEET 1.



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Fig. 1 is a perspective view of a circular device. It features a central rectangular opening (2) and several circular openings (13, 11, 12, 12). A cylindrical component (19) is attached to the right side, with a flange (20) and a base (22). A dashed line (17) indicates a hidden part of the cylinder. The device is mounted on a vertical support (10).

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UNITED STATES PATENT OFFICE.

DOCK D. HARR, OF MINNEAPOLIS, MINNESOTA.

HEATING-DRUM.

No. 930,663.

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To all whom it may concern:

Be it known that I, DOCK D. HARR, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Heating - Drums; 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 appertains to make and use the same.

My invention has for its object to provide an improved heating drum of simple construction and increased efficiency, adapted for general use in connection with stoves and furnaces as an auxiliary heating device.

To the above ends the invention consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

In the accompanying drawings which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings, Figure 1 is a view in side elevation, showing the improved heating drum, some parts being broken away and some parts being sectioned. Fig. 2 is a vertical section taken approximately on the line $x^2 x^2$ of Fig. 1, some parts being left in full; and Figs. 3, 4 and 5 are horizontal sections taken respectively on the lines $x^3 x^3$; $x^4 x^4$; and $x^5 x^5$ of Fig. 1.

As preferably constructed, the body or outer shell 1 of the drum is a vertically disposed cylinder, but it may take various other forms in cross section. At its upper end the shell is provided with a head 2; and at its bottom it is formed with a downwardly converging hopper 3, the converging sides of which, as shown, are flat and terminate in channel-shaped guides 4, for engagement with the out-turned flanges of a catch-box in the form of a drawer 5. The said shell 1 is supported in an upright position with the drawer 5 above the floor, by means of a plurality of legs 6.

All but the extreme lower portions, to-wit, the hopper section 3, of the outer shell or drum 1, is divided diametrically into two compartments 1^a and 1^b , by means of a partition formed by a vertically extended and transversely elongated hot air pipe 7. This hot air pipe 7 extends slightly less than from side to side of the shell 1, but is connected therewith, at its edges, by small webs 8 (see particularly Fig. 4) that complete the parti-

tion. This construction also permits the air pipe 7 to be surrounded almost entirely by the hot products of combustion from within the shell 1. At its upper end the air pipe 7 opens into the upper end head 2 of the shell 1; and at its lower end it is provided with diametrically extended air inlet ports 9 that open through the sides of the said casing, at points above the hopper 3.

The hot products of combustion from the stove or furnace are conveyed by a smoke pipe (not shown) to an inlet port 10, which port opens through one side of the shell 1 and into the compartment 1^a , at a point very considerably below the top of the shell or casing 1. The hot products of combustion are taken out of the compartment 1^b through an outlet port formed in a smoke pipe 11, the lower end of which extends downward through the head 2 and terminates a very considerable distance below the said head. One or more vertical hot air pipes 12, of which, as shown, there are two, extend completely through the drum compartment 1^a ; and, at their upper ends, open through the heads 2, while at their lower ends they open through one of the flat sides of the hopper 3. A fresh air inlet pipe 13 which may extend from the exterior of the room or building in which the drum is installed, is passed upward through the drum compartment 1^b and, of course, through the head 2 and bottom of the hopper 3. Outside of the drum the fresh air inlet pipe 13 is provided with a short depending branch pipe 14 which has a damper 15, and outward of said branch pipe 14 said pipe 13 is provided with a damper 16, the purpose of which will presently appear. A hot air pipe which is similar to the hot air pipes 12 extends upward completely through the drum compartment 1^b and through the head 2, as well as through the bottom of the hopper 3. The upper end of this hot air pipe 17 terminates below but in direct line with a port 18 formed in a radially extended branch pipe 19 of the smoke pipe 11. In this branch 19 is a rotary sleeve-like valve which has a port 21 adapted to be turned into and out of registration with the port 18 of the said branch pipe 19. The outer end of said valve 20 is closed and, as shown, is provided with a hand-piece 22 by means of which it may be easily rotated so as to open or close the port 18, at will.

In Fig. 2 one of the air pipes 12 is shown as provided with a zigzag partition 23 which

extends nearly or quite from end to end thereof, and when used serves to deflect the up-flowing stream of air in the pipe 12 from one side to the other and to produce agitation thereof, insuring more complete contact of all particles of the air with the hot surface of the said tube. This partition, while in some cases desirable, is not a necessary feature of this invention. The hot products of combustion from a stove or furnace being drawn into the chamber 1^a through the port 10 will be drawn downward through the said compartment at a point below the lower end of the partition-forming air pipe 7, and from thence will pass upward into the drum compartment 1^b. In passing downward through the compartment 1^a, the hot products of combustion will completely surround the air pipes 12, thus heating the same; and, in passing upward through the compartment 1^b, will surround and heat the air pipes 13 and 17. The space between the lower portion of the said pipes 7 and the hopper 3 should be such that the products of combustion in passing from the compartment 1^a to the compartment 1^b will not agitate, to any considerable extent, the air in the bottom of said hopper, and, hence, will permit precipitation of more or less soot into the drawer or catch-box 5. The products of combustion in the drum compartments 1^a and 1^b will also heat the centrally located partition-forming air pipe 7.

The products of combustion, in passing through the compartments 1^a and 1^b of the drum, are not by the draft itself carried to the top of the drum, but, on the contrary, a sort of a dead air space is cut off from the draft in the upper end of the said drum. In spite of this direct draft from the inlet port 10 to the outlet port in the lower end of the smoke pipe 11, the very hottest of the hot or burning gases in the drum will, under the action of convection, continuously work their way into the so-called dead air chamber in the upper portion of said drum, and, hence, constantly to keep the upper portions of the air pipes 12, 13 and 17 and the depending portion of the smoke pipe 11 at very high temperature. This is very important because it thus tends to increase the force of upward draft in the said tubes and smoke pipe, and, in the latter instance, augments or increases the draft on the products of combustion and hence, of course, in the stove or furnace.

The transversely extended partition-forming air pipe 7 prevents the setting up of a vortex or spiral motion of the products of combustion in their passage through the drum, and it is itself placed where it will be subject to very intense heat. The hot air pipe 7 draws in air at points above the points where the air is drawn in through the other hot air pipes and minimizes the draft on the

floor. When cold, fresh air is to be drawn in from the outside, the valve 15 in the branch pipe 14 should be closed and the valve 16 in the pipe 13 should, of course, be opened. If when this is done, or at any other time for that matter, it is desired to draw from the room part of the circulating air, this may be done by turning the valve 20 so as to open up the port 18 in the smoke pipe branch 19, thereby causing a large part of the hot air which passes upward through the pipe 17 to pass directly into the smoke pipe 11. When air is thus admitted to the smoke pipe 11, it will produce more or less of a check to the draft of the stove or furnace. When the valve 20 is turned so as to close the port 18, all the hot air passing up through the pipe 17 must, of course, be discharged into the room. When the valve 16 in the pipe 13 is closed and the valve 15 in the branch pipe 14 is opened, the pipe 13 will act simply as a hot air pipe for circulating the air in the room.

The drawer or catch-box 5 is detachably and slidably connected to the flanged bottom of the hopper 3 in such manner that it may be applied thereto from either side. This makes it possible to apply and remove the drawer regardless of which side the drum is located adjacent to a wall or other obstruction.

What I claim is:

1. The combination with an upright heating drum having an air inlet port at one side, located a considerable distance below its top, and having a smoke inlet flue extending a considerable distance downward within said drum, of a transverse vertically extended partition located between said inlet port and the said smoke outlet flue, and dividing the upper portion of said drum into two compartments, both of the said compartments having dead air spaces at the top of the drum, and one of which dead air spaces surrounds the depending portion of said smoke outlet flue, substantially as described.

2. The combination with an upright heating drum having an inlet port at one side located a considerable distance below its top and having a smoke outlet flue extending through the top and depending a considerable distance into the same, of a transversely and vertically extended hot air pipe located between said inlet port and smoke flue and dividing the upper portion of said drum into two compartments, and hot air pipes extending vertically through the two compartments of said drum, substantially as described.

3. The combination with an upright heating drum, having inlet and outlet ports for the products of combustion, of a partition located between said inlet and outlet ports and dividing the upper portion of said drum into compartments, air pipes extending vertically upward through the compartments of

5 said drum, and means whereby one of the said air pipes may be thrown into communication with the outlet port for the products of combustion from said drum, substantially as described.

10 4. The combination with an upright drum having an inlet port and a smoke outlet pipe, of a hot air pipe extending upward through said drum, and a branch pipe from said smoke pipe having a valved port located immediately above the upper end of said air pipe, substantially as and for the purposes set forth.

15 5. The combination with an upright heating drum having inlet and outlet ports for the products of combustion, of a transversely

and vertically extended air pipe located between said inlet and outlet ports and dividing said drum into two compartments, the said partition-forming air pipe having inlet 20 ports that open at diametrically opposite points through the sides of the said drum, and air pipes extending vertically through the compartments of said drum, substantially as described. 25

In testimony whereof I affix my signature in presence of two witnesses.

DOCK D. HARR.

Witnesses:

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