(No Model.) 2 Sheets—Sheet 1.

E. R. WESTON.

SMOKE CONSUMING STOVE AND FURNACE.

No. 319,870. Patented June 9, 1885.

Fig. 1.

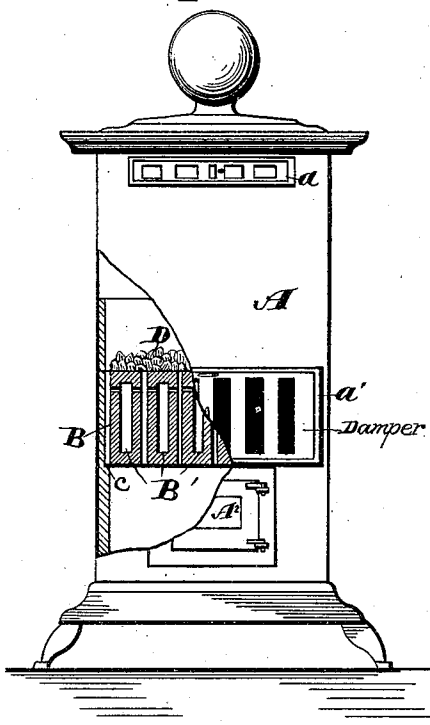


Fig. 2.

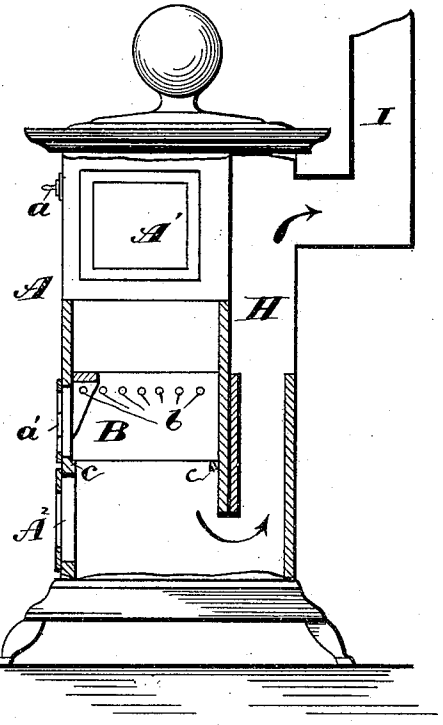


Fig. 3.

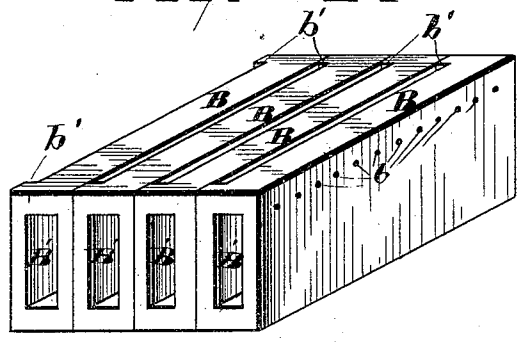
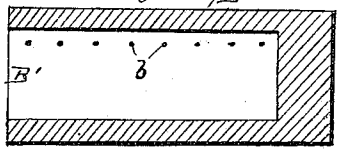


Fig. 7.

Fig 8.



WITNESSES

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 5

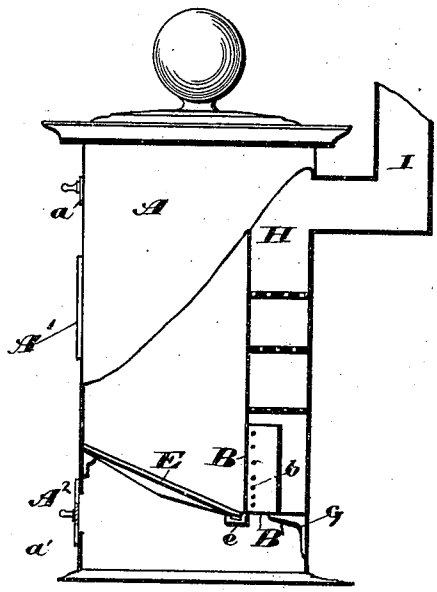


Fig. 4

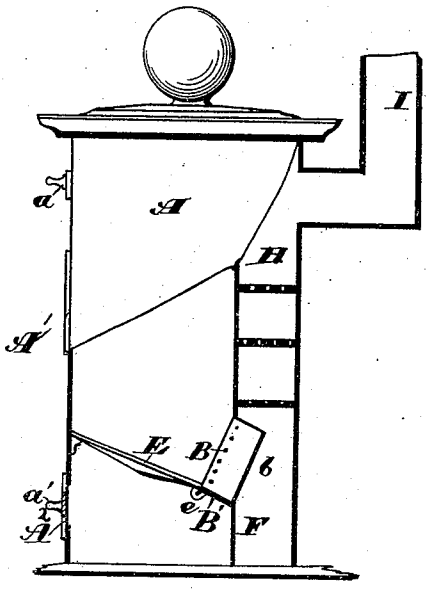
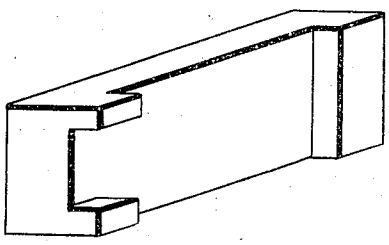


Fig. 6



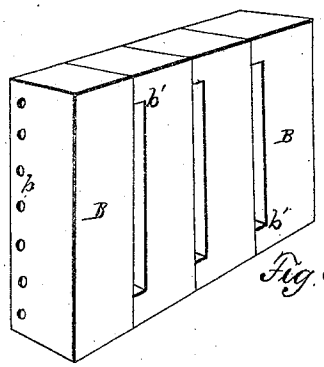


Fig. 7.

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UNITED STATES PATENT OFFICE.

EMILE R. WESTON, OF BANGOR, MAINE.

SMOKE-CONSUMING STOVE AND FURNACE.

SPECIFICATION forming part of Letters Patent No. 319,870, dated June 9, 1885.

Application filed March 15, 1884. (No model.)

To all whom it may concern:

Be it known that I, EMILE R. WESTON, of Bangor, in the county of Penobscot and State of Maine, have invented certain new and useful Improvements in Smoke-Consuming Stoves and Furnaces; 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 pertains to make and use the same.

My invention relates to smoke-consuming stoves and furnaces having preferably a more or less downward draft and having air-heating bricks or equivalent devices preferably arranged to more or less support the fuel, the object being to provide bricks or their equivalents made from some refractory material, preferably fire-clay, and so arranged that by the burning fuel coming in contact with them and by the products of combustion passing between them the bricks are so intensely heated as to ignite the gases as they pass between the bricks. A further object is to provide air-chambers in or between the bricks, into which air may be introduced and heated and discharged in jets to commingle with the said gases and render them more combustible. A further object is to provide perforated diaphragms separated so as to form combustion-chambers between them and in such proximity to the said heated bricks and so arranged that the combustion-chambers will concentrate and retain a high degree of heat, and that the escaping gases in passing through these chambers will be entirely consumed, so that no smoke will be formed.

With these objects in view my invention consists in certain features of construction and in combination of parts, hereinafter described, and pointed out in the claims.

The essential features of my invention are the means for concentrating and retaining a high degree of heat to ignite the gases, and for heating and commingling air with the gases to render them more combustible. With one construction shown the air-heating bricks are arranged so that they entirely support the fuel, and thereby save the expense of the ordinary grates, and when such construction is had the downward draft necessarily follows.

In the accompanying drawings, Figure 1 is a front elevation, and Fig. 2 a side elevation, of my improved stove with portion of the outer walls in each broken away, showing the internal construction. Fig. 3 is a view in perspective of hollow perforated bricks that support the fuel vertically or laterally, according to the construction of the stove or furnace. Fig. 4 is a vertical section of the stove, showing the hollow bricks in an inclined position. Fig. 5 is a vertical section showing the hollow bricks in a vertical position. The positions of the perforated diaphragms and air-chambers are also shown. Fig. 6 is a view in perspective of a solid brick that may be used in place of the hollow bricks. Fig. 7 shows a brick having a knife-edge that prevents the accumulation of ashes; and Fig. 8 is a view in longitudinal vertical section of one of the bricks shown in Fig. 3; and Fig. 9 is a view in perspective from the rear, showing the bricks arranged vertically, as in Fig. 5.

A represents a stove with a door, A′, for supplying the fuel, and a door, A^2, opening into the ash-pit, and the damper *a*, for supplying air for combustion, and the damper *a′*, for admitting air to the chambers in the bricks.

B are bricks with air-chambers B′, that receive air from the damper *a′*, and with perforations *b* leading laterally from the air-chambers, and with ribs *b′* at the ends that separate the bricks, leaving passage-ways between them, as shown in Figs. 1 and 3. These bricks are preferably made whole and hollow, as shown in Fig. 3, but may be made in two or more pieces, if preferred. The air-chamber B′ should not extend quite the length of the brick, so that one end of the chamber is closed. With the arrangement shown in Figs. 1 and 2 these bricks are laid horizontally and supported, preferably, by ledges *c*, extending from the stove-lining, and with the open ends next to the damper *a′*. The fuel is laid on the bricks, as shown at D. As aforesaid, the air for combustion is admitted through the damper *a*, and the force of the draft carries it down through the fuel, and the entire products of combustion pass down between the bricks to the ash-pit, and from thence through the chamber H to the smoke-pipe I. By contact with the fuel, and by the products of combustion passing between them, the bricks become intensely heated, after which air is admitted through the damper *a′* to the chambers B′,

when the air is discharged in jets through the orifices *b* and commingled with the escaping gases, rendering them more inflammable, and the accumulation of heat at this point is sufficient to ignite the mixture of air and gases, causing such a perfect combustion of the same that no smoke is formed. It will be seen that with this arrangement of parts no grates are necessary to support the fuel. A stronger draft, however, is required than with the arrangement of parts shown in Figs. 4 and 5.

In Fig. 4 the bricks B are inclined, as shown, with the open ends downward, so that the air-chambers B′ may receive air from the ash-pit, and in this case the damper *a′* may be in the ash-pit door A^2. Inclined grates E are provided, the lower end resting on the cross-bar *e*, that may also support one edge of the brick, the other edge resting on the partition F. With this arrangement the fuel is partially supported by the bricks, and it will be observed that the deepest, and consequently the hottest, part of the fire is close to the bricks, so that they are probably heated as intensely as with the arrangement first described, and the heating of the air in the chambers B′ and the manner of discharging it therefrom are the same as before described. A sufficient amount of air should pass through the grate E to prevent its being overheated, and the balance of air required for combustion should be admitted, as before, through the damper *a*.

The arrangement shown in Fig. 5 is similar to that just described, except the bricks are placed vertical, and the rear edges of the bricks rest on the brackets G, that also close the passage-way from the ash-pit to the chamber H, except by the way of the chamber B′.

With the arrangement shown in Fig. 4 less draft is required than with that shown in Figs. 1 and 2, and that shown in Fig. 5 requires still less.

K are perforated diaphragms with the opening arranged in any manner so as not to register, and separated as shown, forming combustion-chambers between them. The products of combustion impinge against the diaphragms and are reverberated and retained in these heating-chambers until the gases are entirely consumed.

If preferred, the door A′ and the damper *a* may be dispensed with, and a portion of the front of the stove omitted, leaving an open grate; but in such a case a damper had better be placed in the pipe I to control the draft.

I am aware that it is not broadly new to provide a stove with a hollow grate having a series of perforated radiating arms for the escape of air, and having, also, a smoke-pipe connected to the stove below the grate.

In my device the bricks can form the grate, or they can form a portion of the fire-wall, as shown in Figs. 4 and 5. In either instance they are independent and can be removed and replaced at a small cost, while in the device above referred to the grate proper and radiating arms are cast in a single piece, and hence if any portion of the grate be broken the entire grate has to be removed and replaced.

I am aware that a hollow perforated furnace grate-bar, open at one end and closed at the other, is not broadly new, and that a grate composed of a series of hollow perforated bars, and a damper for controlling the admission of air to said bars, have also been used, and hence I make no broad claim thereto; but

What I claim is—

1. The combination, with a stove, the chamber H, communicating therewith at a point below the fuel, and a smoke-pipe connected with said chamber, of a series of hollow perforated bricks located between the fuel and the chamber H, each brick being provided on one side near opposite ends with lugs for holding it away from the next brick, a damper located above the bricks, and a damper for regulating the admission of air to the hollow bricks, substantially as set forth.

2. The combination, with a stove, the chamber H, communicating at its lower end with said stove and divided into a series of combustion-chambers by one or more perforated diaphragms, and a smoke-pipe connected to the upper end of said chamber H, of a hollow grate having side perforations for the passage of air and a damper located above the fuel, whereby the products of combustion are caused to pass downwardly through the grate and become intimately mixed with the hot air issuing from said grate and pass from thence into the combustion-chambers, substantially as set forth.

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Witnesses:
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F. C. WESTON.