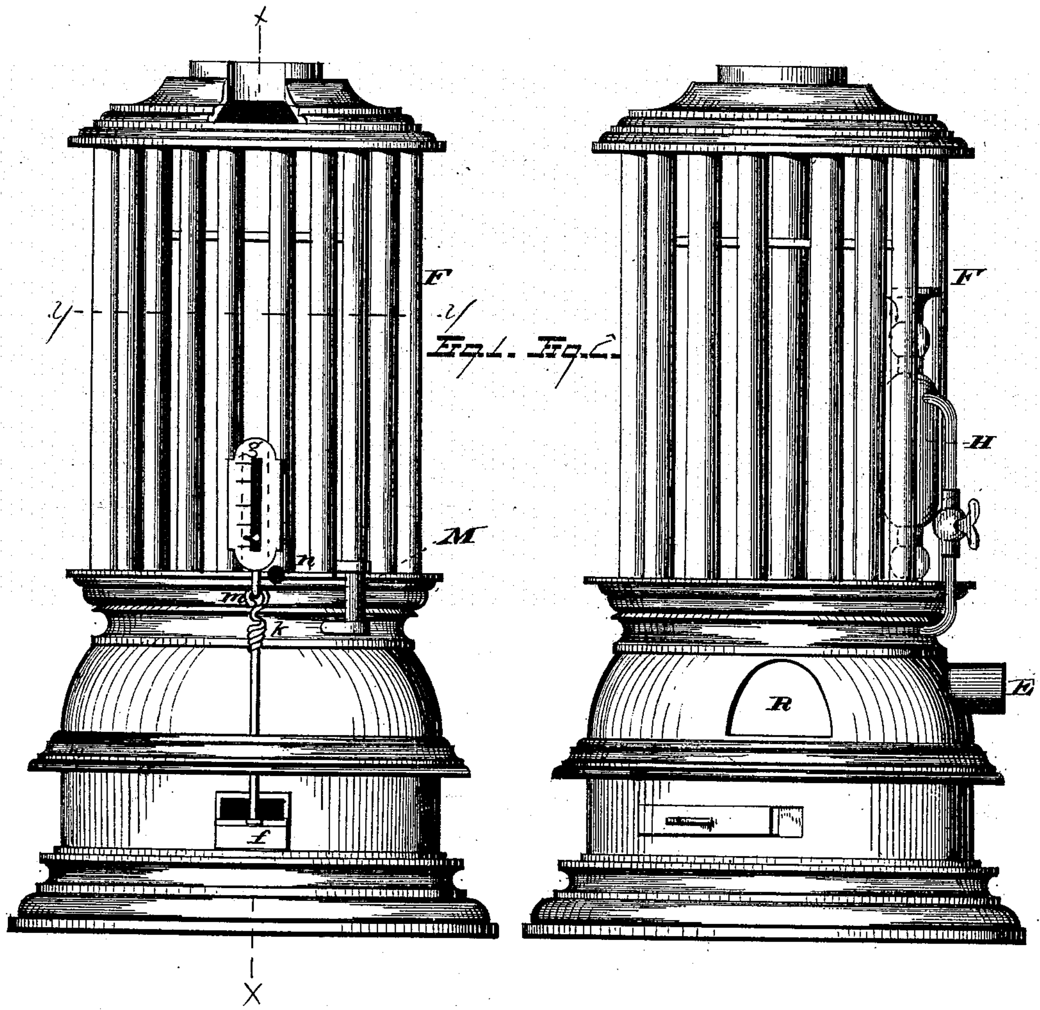
2 Sheets—Sheet 1.

W. H. BROWN.

Steam Radiators.

No. 201,091. Patented March 12, 1878.



WITNESSES
Ed. I. Nottingham
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INVENTOR
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By Leggett and Leggett
ATTORNEYS

2 Sheets—Sheet 2.

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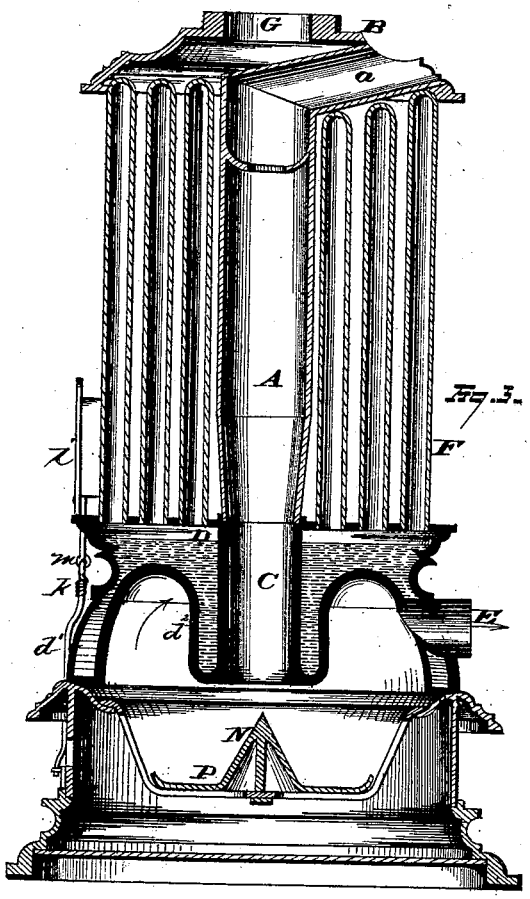

Fig. 3.

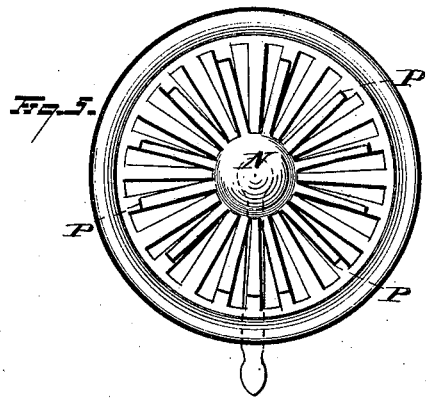

Fig. 5.

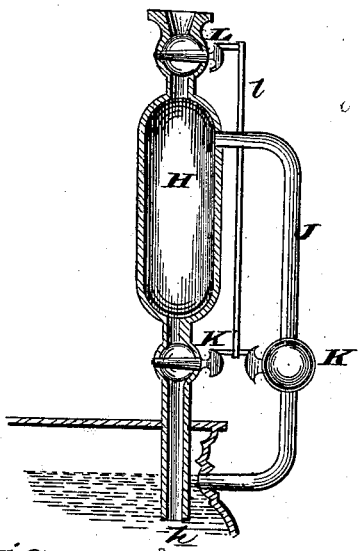

Fig. 6.

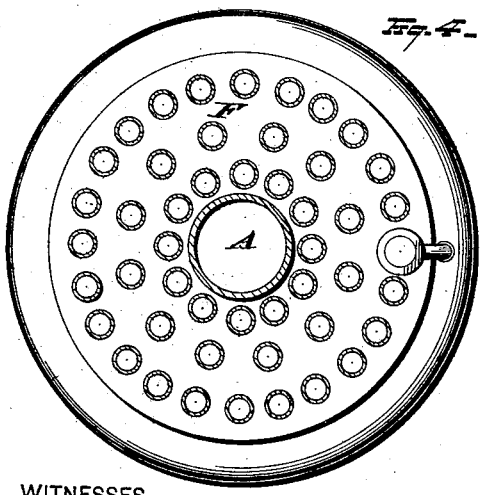

Fig. 4.

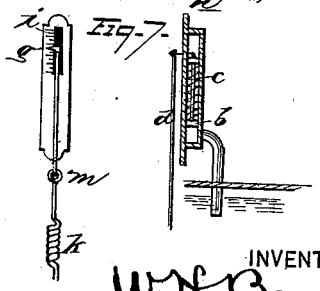

Fig. 7.

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UNITED STATES PATENT OFFICE.

WILLIAM H. BROWN, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO ISABELLA S. BROWN, OF SAME PLACE.

IMPROVEMENT IN STEAM-RADIATORS.

Specification forming part of Letters Patent No. **201,091**, dated March 12, 1878; application filed June 12, 1877.

To all whom it may concern:

Be it known that I, WILLIAM H. BROWN, of Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Steam-Radiator Stoves; 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 it, reference being had to the accompanying drawings, which form part of this specification.

My invention is designed to furnish a steam-heat-radiating stove, adapted to be used in any apartment, in substitution for the ordinary stoves radiating heat from a close-bodied surface; my object being to provide a steam-radiator constructed in form of a magazine or base-burning stove, and which shall be adapted for use in any apartment, similar to the use of stoves well known, and which, in addition to such function, will be constructed to convey heat therefrom into apartments other than those in which the radiator is immediately used. This will allow apartments to be warmed by steam-heat radiation at an expense approximately not greater than that attendant upon furnishing the usual close-bodied stoves, thus affording all the advantages incident to this mode of heating, without the heavy expense incurred under the steam-heating apparatus now necessary. The construction resembles that of magazine-stoves, and permits the location of the radiator in any place and under surrounding conditions the same as those adapted for said magazine-stoves; while, in further improvement, other suites of rooms can be supplied with heated air, conducted thereto after passage through the space intervals formed by the steam-pipes of this stove-radiator.

I provide a reservoir attachment which maintains the line of water-level constant in the boiler, and preserves a regular feed of water to supply that exhausted under the generation of steam.

An automatic heat-regulator, consisting of a piston-gage actuated by the steam-pressure of the boiler, operates a sliding damper, by means of an intermediate connecting-rod, the said gage being adjustably regulated, so that upon the steam reaching any predetermined degree of pressure, the same may close the damper, thus shutting off the draft and keeping the fire under limited action. Upon lessening the generation of steam, the same mechanism, under reverse operation, serves to supply the combustion with greater draft.

A further improvement consists in providing the flat horizontal body of the grated fire-pot with a shaker having a close conical formation in its center and horizontal radial arms. These arms move over the grate of the fire-pot as the shaker is operated, and act as anti-clinker mechanism, since their action breaks up any union of the waste-material products, and prevents that cementing of them which otherwise would block the grate. This also causes the process of combustion to be carried on most strongly about the outer part of the fire-chamber, and leaves that portion of the same immediately under the fuel-cylinder cool, and freed from the intense heat otherwise centered at this point.

I have thus constructed a steam-radiator stove which is self-feeding in fuel, self-acting in maintaining a constant water-level in the steam-generating boiler, and self-regulating in controlling the heat to be radiated from its steam-surface.

Referring to the drawings, Figure 1 represents my stove as seen from one side. Fig. 2 shows the same in a different side view. Fig. 3 is a vertical central section through line $x\,x$ of Fig. 1. Fig. 4 is a transverse section through line $y\,y$ of Fig. 1. Fig. 5 shows the fire-pot and shaker detached from the stove. Fig. 6 is a detail sectional view of the reservoir attachment, and Fig. 7 a similar view of the heat-regulating device.

The fuel-magazine A is located in the central vertical body of the stove, with its feed-opening a diagonally inclined in its passage through the top plate B, while its base connects with the central opening C in the steam-boiler D. This latter is formed so as to have its outer side d^1 extend down about the fire-chamber, and its inner central body d^2 ex-

tend down within the fire-chamber, thus exposing a large area of heating-surface to the action of the fire.

The products of combustion circulate about the boiler and find direct exit out through the flue E, which latter leads into the fire-chamber through the outer side body d^1 of the boiler. The central opening C of this boiler serves as a continuation of the fuel-magazine, and its connection with the fire-chamber enables the stove to act as a base-burner, while the boiler thus obtains both an inner and an outer heating-surface.

Extending upward from the boiler in annular series about the fuel-magazine, and capped by the top plate B, are the steam-chambers F, which may be in one or more annular series; but preferably I construct them in a series of three. These chambers admit steam from the boiler up in them, and, by their heated surfaces, radiate warmth into the atmosphere about them. They may be single chambers, terminating just below the under surface of the top plate B, or their ends may be welded to the latter; or, instead of either of the above two ways, the extremities of one or more pairs of the said chambers may be bent and connected together.

An opening, G, is made in the top of this plate, adapted to receive a suitable hot-air pipe connection with other rooms in the building. As the caloric currents pass from the spaces between the upright steam-chambers up into this opening, they can convey a large amount of heated air into the upper rooms.

If desired, a marble slab may be fitted upon this top plate, similar to those used in ordinary steam-radiators; but such a provision is entirely optional.

In order to preserve a constant level of water in the boiler, I provide the reservoir attachment H, (shown in detail in Fig. 6 of the drawings,) and which is secured to the outer horizontal body of the boiler. Its lower extremity extends down into the same below the water-line. It is preferably screwed into a correspondingly-tapped hole of the boiler-plate, and is approximately included in the circular plane of the stove. It is funnel-shaped at its upper extremity to allow of the ready introduction of water, and is provided with an auxiliary steam-pipe, J, connecting its upper portion with the side of the boiler, just at the water-line of the latter.

The lower portions of both the reservoir and its steam-pipe are equipped with valves or stop-cocks K K′, respectively controlling their connection with the boiler, while the cock L controls the connection of the upper portion of the reservoir with its funnel-shaped feed-opening. The connecting-rod *l* is preferably used, allowing the two lower cocks to be jointly operated in opening and closing their boiler-connection simultaneously with the opposite action of the upper cock, the object being to close both the lower cocks or valves when the upper cock or valve is open, and the reverse. But this connection of the several valves is entirely arbitrary with the construction of any single stove, and does not enter into my invention.

The glass gage M, connecting with the boiler, accurately indicates the height of water therein, and after filling the boiler with the proper volume of water, as shown by said gage, the lower valves are closed and the upper valve opened. Water is then fed into the reservoir until the latter is filled, when the upper valve is closed. This allows the water in the reservoir to pass into the boiler until the line of water in the latter and in the extremity *h* of the reservoir is the same. As steam is generated, its downward pressure upon the surface of water in the boiler will cause the latter to pass up through the extremity *h*, since this, as well as the steam-pipe J, is now below the line of water in the boiler; but upon this line of water falling level with the opening into pipe J steam will escape through the latter, and exert pressure upon the upper surface of water in the reservoir, thus counterbalancing the tendency of the water to rise in the reservoir, and maintaining a constant line level in both the reservoir and the boiler.

As the water in the reservoir becomes exhausted the operation of filling the latter is repeated, and thus the water in the boiler is caused to maintain the same level constantly. In Fig. 7 is shown my heat-regulating mechanism, consisting of a piston, *b*, working in a suitable casing secured to the boiler-casting, and, through a connecting-pipe, is operated by the steam-pressure therein. The piston is provided with a spiral spring, *c*, which exerts a constant yielding pressure upon it, and tends to move it downward as allowed by the steam beneath, thus insuring the descent of the damper-rod *d* and opening of the sliding damper *f*.

As the steam varies in generation, the damper operates automatically to counterbalance such variation, and index-finger *g*, moving over the graduated plate or scale *i*, indicates accurately the amount of steam-pressure on head; and to allow such indication after the damper has reached its extreme upper movement, the spiral formation *k* is made in the body of the damper-rod. This gives the upper portion of the rod opportunity to rise, even when the lower portion is prevented from such movement by the close shutting of the damper, while, in order to allow the draft to be held closed as pressure decreases, the damper-rod is made in two vertical sections, detachably connected, as shown at *m*.

A pin or stud, *n*, is fixed to the stove at proper distance, so that by detaching the lower section of the rod and engaging it loosely with the above, the draft may be maintained closed.

The grated fire-pot is provided with a shaker made with a central close-bodied cone, N, and radial arms P. It is reciprocated in rotary movement over the fire-pot by a suitable han-

dle or lever-arm, and accomplishes a twofold result. The radial arms act as an anti-clinker device, preventing the cementing of the waste products of the fire-chamber, and under their operation the formation or gathering of clinkers is obviated, while the conical construction given to the central portion of the fire-chamber by the cone of its shaker causes the mass of fuel to be consumed about the outer margin of the base, and away from the vertical center of the fuel-cylinder. The column of fuel in the latter is thus protected from the intense heat of the fire action, and is correspondingly reduced in temperature from that which otherwise would be the case; and the formation of gases, so obnoxious in magazine-stoves, is obviated, and the fuel-cylinder both rendered cool and free from such gases.

Openings R in any number (one or more) may be made in the side of the boiler, and provided with dark or illuminated doors, by which the fire-chamber may be readily reached; or the same may be dispensed with, and the side of the boiler made close-bodied.

Safety-valves may be attached to the stoves, if desired, in prevention of the steam gathering too great a pressure. So, too, it is optional whether a supporting-plate giving upper lateral bearing to the steam-chambers F be used; but I prefer such construction.

Air-escape valves may be connected with the individual steam-chambers, to vent the same under the steam-pressure. Such valves may be automatic in their operation, or controlled by hand.

I have not shown any form of ash-pan or means of outer communication with the ash-pit, as they may be of any desired nature, and are foreign to the principle of my invention.

The round form of the stove, as shown in the drawing, is simply arbitrary, and does not affect my invention. Instead of such a style, the horizontal section of the stove may be of any desired character.

It is evident that both the heat-regulating mechanism and the central conical formation of the shaker in the grated fire-pot may be well used in respective connections other than with this stove. Hence I do not formally claim them in this patent, but reserve them as subject-matter for other Letters Patent.

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

1. A magazine steam-radiator stove wherein the top and base portions are connected by the fuel-magazine, and the latter is surrounded by a series of steam-chambers, which serve as the radiating-surface of the body portion of the stove, substantially as described.

2. A steam-radiator stove consisting of one or more series of upright steam-chambers supported upon and connecting with a boiler formed it its base-section, said boiler being made with a downwardly-projecting central body, having a central feed-opening and a side extension, the two together forming an annular arch in its bottom, substantially as described.

3. In a steam-radiator stove, a boiler located above the fire-chamber in its entire area, and having both a downwardly-projecting central and side ring formations, the two latter forming, as described, a continuous annular fire-arch between their opposite sides, substantially as described.

4. In a steam-radiator stove, the reservoir attachment H, provided with steam-pipe J, the two having valves, and adapted, in the manner described, to maintain a constant water-level in the boiler, substantially as set forth.

5. The reservoir attachment H, provided with the water-foot *h* and side steam-pipe J, the same having valves or stop-cocks, and adapted, substantially as described, to be readily applied to the outer or marginal body of the boiler of a steam-radiator stove, substantially as set forth.

6. In a steam-radiator stove, the independent concavo-convex top plate secured upon the upright steam-chambers, and having a side feed-opening, which connects with the upper diagonal passage of the fuel-cylinder, substantially as described.

7. In a steam-radiator stove, the concavo-convex top plate, suitably secured upon the upright steam-chambers, and provided with the feed-opening and the hot-air-flue opening, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand this 4th day of June, 1877.

WILLIAM H. BROWN.

Witnesses:
CAS. BYFIELD,
LIVINGSTON HOWLAND.