W. H. VICK.

HEATING BOILERS FOR RESIDENCES, &c.

No. 181,609. Patented Aug. 29, 1876.

Fig. 1

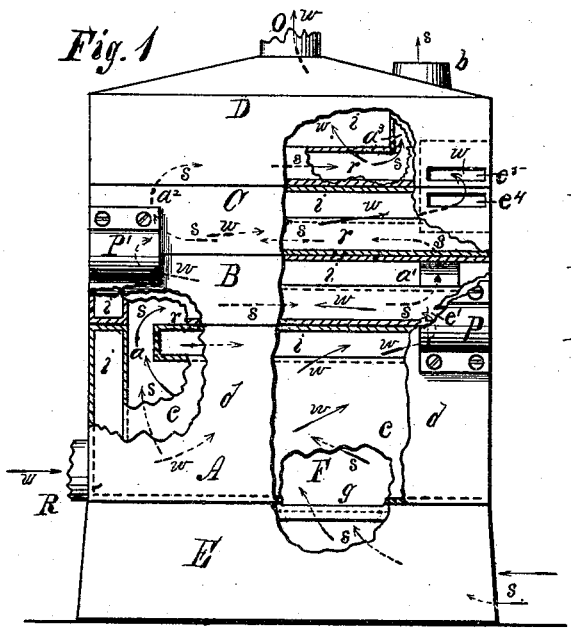


Fig. 2.

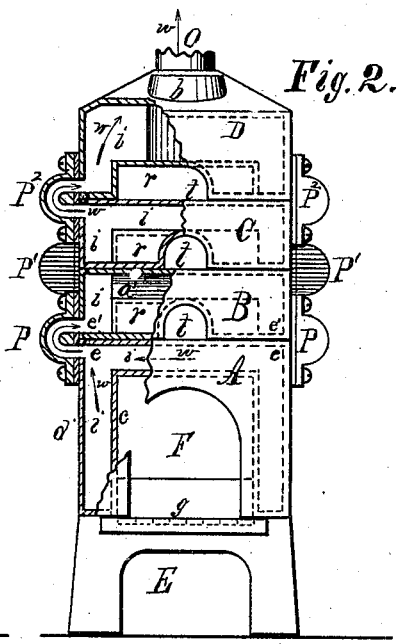


Fig. 3.

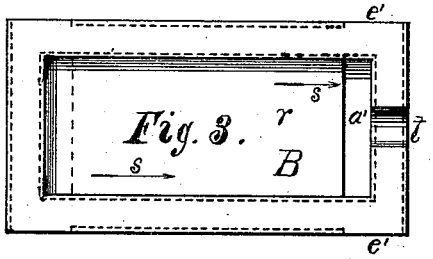


Fig. 4.

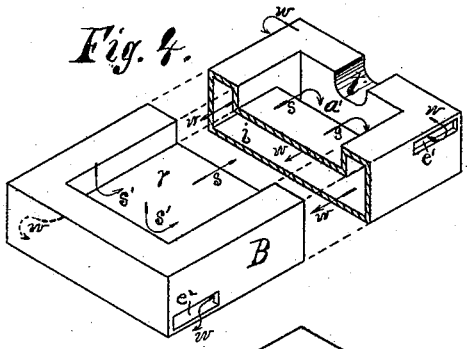


Fig. 6.

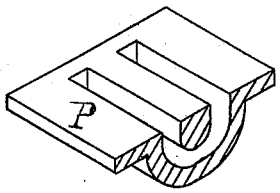
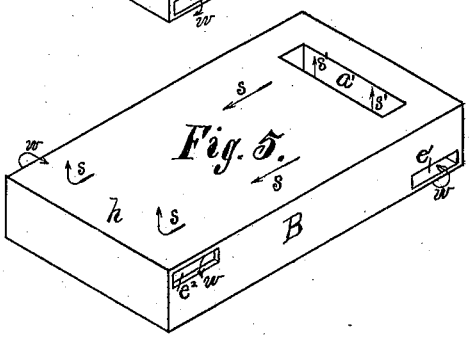


Fig. 5.



Witnesses:
G. R. Chumasero.
Henry Lahr

Inventor:
Wm. H. Vick.
by E. B. Whitmore, Atty

UNITED STATES PATENT OFFICE.

WILLIAM H. VICK, OF ROCHESTER, NEW YORK.

IMPROVEMENT IN HEATING-BOILERS FOR RESIDENCES, &c.

Specification forming part of Letters Patent No. **181,609**, dated August 29, 1876; application filed July 14, 1876.

To all whom it may concern:

Be it known that I, WILLIAM H. VICK, of Rochester, in the county of Monroe and State of New York, have invented a new and useful Improvement in Heating-Boilers for Residences, Greenhouses, &c., which improvement is fully set forth in the following specification, reference being had to the accompanying drawing.

Figure 1 is a side elevation of my improved boiler, having portions of the outer and inner shells broken away to uncover the interior. Fig. 2 is a front elevation of the same. Fig. 3 is an inverted plan view of one of the sections composing the boiler. Fig. 4 is a perspective view of the same piece transversely sectioned. Fig. 5 shows the same right side up. Fig. 6 is an enlarged view of one of the side connections sectioned along one side.

The object of my invention is to produce a heating-boiler for heating residences, greenhouses, &c., made up of independent hollow water-sections, each of which contains a longitudinal heat-flue, the sections being so connected that the water and heat are both caused to travel in opposite directions the length of each; and it consists, mainly, in piling several independent metal water-sections one upon the other, and connecting the adjacent ones alternately at the ends by side pipes, through which the water may flow from end to end of each.

In the drawing, Figs. 1 and 2 show a boiler made up of four sections, A B C D, resting upon a suitable ash-pit, E. The form of these sections, and the action of the water and heat currents, will be better understood by inspecting Figs. 4 and 5. The former shows section B inverted, and cut across to uncover the water-current (indicated by the arrows) *w*, the heat-current being represented by the arrows *s*. Fig. 5 is the same section reinverted, showing a plain top surface. These sections, as shown, are in the form of a shallow box, having thick sides and bottoms, the latter, at the distant end, being pierced through to the opposite surface by a vertical rectangular flue, *a'*, up through which heat and smoke pass.

If the section shown in Fig. 4 is supposed to be a different one from that shown in Fig. 5, and turned bottom upward upon the plain surface of the latter in such a manner that the flue *a'* of the former shall fall over the surface at *h* of the latter, the manner of building up these sections to form a boiler will be illustrated.

The heat-arrows *s'* in Fig. 5 become those marked *s'* in Fig. 4, and pass horizontally along in the box-like inclosure of the latter, and up through the flue *a'*, entering the next overlying section, backward along the hollow of which they travel. This circuitous course of the heat as it passes through the boiler will be understood by tracing the arrows *s* in Fig. 1, as they pass through the grate-bars *g*, and, finally, out at the chimney *b*. The lower section A is made sufficiently high to allow of a suitable furnace-room, F. These sections each form a separate and independent compartment for holding water, and are water-tight, save that they are provided with rectangular outlet and inlet ports *e e'*, &c., which are covered and connected by the side pipes or connections P, P^1, and P^2.

When the boiler is designed to be used for heating water for greenhouse purposes a return or inflow pipe is caused to enter the lower section, as shown at R, Fig. 1. This brings the cooled water in contact with the furnace-sheets, and, as it heats, rises, and flows forward and backward through the lengths of the sections, passing from each to the next one above through the side pipes P, &c., till it reaches the outflow-pipe O at the top. When the sections are placed in position in the boiler an outlet-port of one section comes immediately under an inlet-port of the next overlying section, as shown uncovered at e^4 and e^5, Fig. 1. A side pipe, P^2, covers and connects these ports, which, with a similar pair on the opposite side, (see Fig. 2,) form the only water-connection between the said sections.

By observing the arrows *w* in Fig. 1, which indicate the course of the water-current, it will be understood that the water, in its course upward, flows the whole length of each section, and in each its course is opposite to that of the heat.

The upper section D I design to make higher than the intermediate ones, to form a suffi-

cient steam-space when the boiler is used as a low-pressure steam-boiler for heating residences, &c.

The combined capacity of the two outlet-ports and the two inlet-ports of each section is made equal to, or greater, than that of the outflow or return pipe, so that a free and rapid circulation of the water is insured. By this manner of connecting the water-space of adjacent sections every part of the water must move onward. No idle pools can form, and, traveling such a distance within the boiler, subjected to a broad heating-surface, the water goes out at the top at a high temperature compared with the small consumption of coal in the furnace.

The ashes and soot that collect on the top of each section may be cleaned off by inserting a scraper in the doorways *t*, which, at other times, are closed. The boiler may be built up at any desired height by employing more or fewer intermediate sections. It can be conveniently set up anywhere, like an ordinary cooking-stove, may be jacketed or not, and requires no brick-work or other masonry to inclose it. Every part is accessible, and it can most readily be taken apart for cleaning and repairs, and, should an intermediate section become cracked, it may be replaced by a new one without disturbing the steam or water pipes.

I claim as my invention—

1. In a sectional water or low-pressure steam-heating boiler, an independent water-section, having a longitudinal smoke and heat flue, substantially as shown in Fig. 4, and described.

2. A heating-boiler built up of independent water-sections, each of which sections contains a single smoke-flue, *s*, surrounded, excepting upon one side, by a single continuous water-space, *w*, substantially as shown and described.

3. The arrangement, in a heating-boiler, of a series of sections, A B C, &c., one over the other, the contiguous sections being joined by exterior water-connections P, &c., in such a manner that the top portion of the water-space of one is joined to the bottom of that of the next alternately at or near the ends, substantially as described.

WILLIAM H. VICK.

Witnesses:
E. B. WHITMORE,
P. M. CRANDALL.