

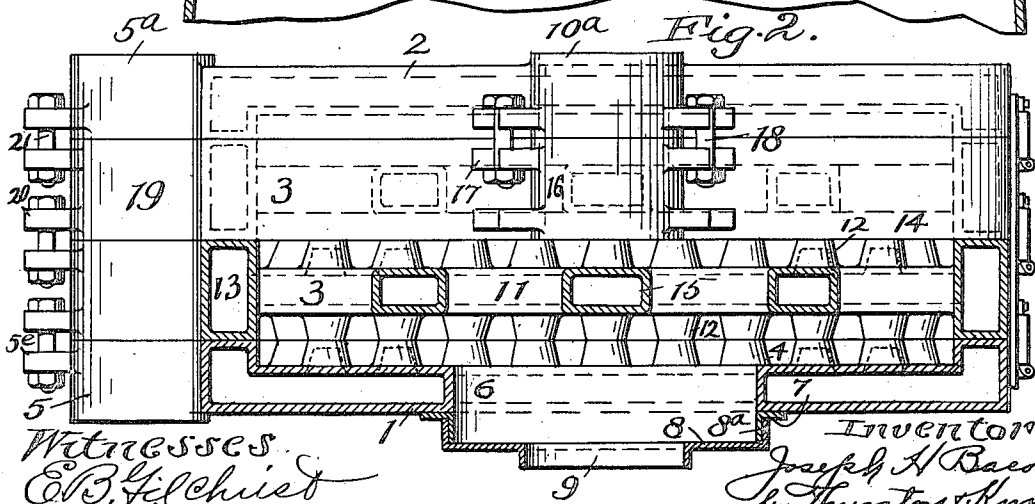
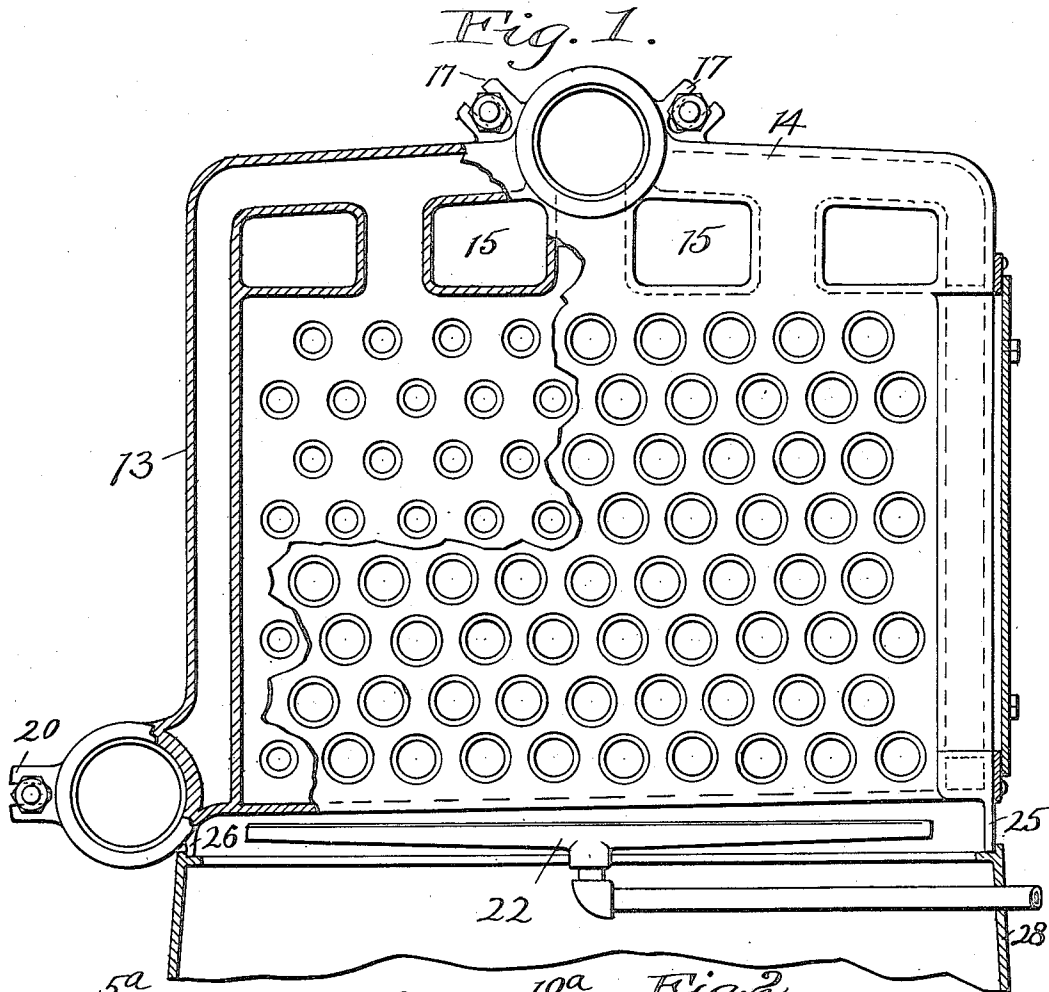
J. H. BACON.  
BOILER.

APPLICATION FILED MAY 9, 1914.

1,151,750.

Patented Aug. 31, 1915.

2 SHEETS—SHEET 1.



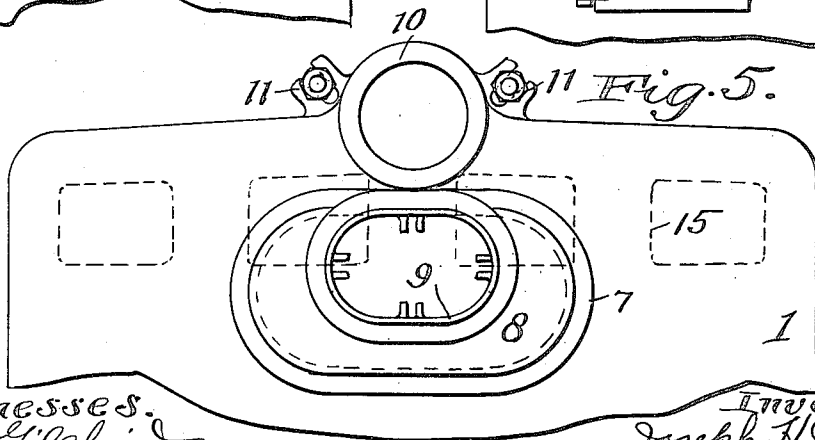
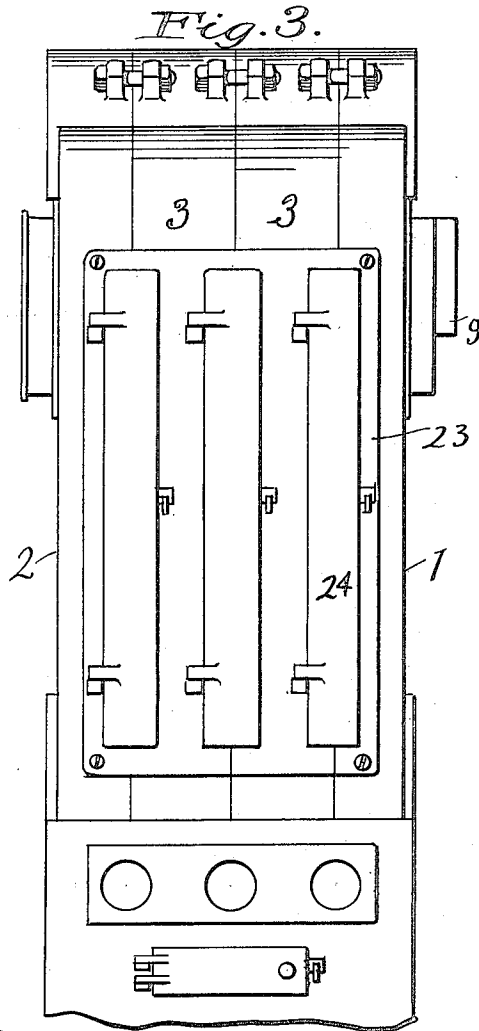
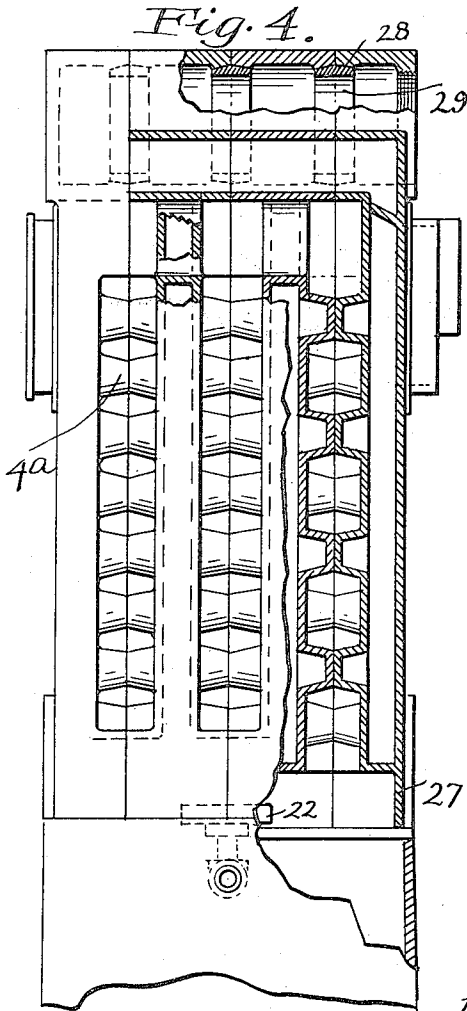
Witnesses.  
E. B. Welch  
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# UNITED STATES PATENT OFFICE.

JOSEPH H. BACON, OF CLEVELAND, OHIO.

## BOILER.

1,151,750.

Specification of Letters Patent. Patented Aug. 31, 1915.

Application filed May 9, 1914. Serial No. 837,356.

*To all whom it may concern:*

Be it known that I, JOSEPH H. BACON, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Boilers, of which the following is a full, clear, and exact description.

This invention relates to a hot water heating apparatus, or more particularly a boiler for use in connection with a hot water heating system, vapor system, or steam heating system for heating buildings.

The object of the invention is to provide such a boiler that may be made up of sections so that by the addition of sections, a boiler of any desired capacity may be obtained. Furthermore, to arrange the sections such that the products of combustion of the heating burner or grate may pass upwardly around the sections in substantially a vertical direction, and as will appear from the specification, additional advantages in construction for a sectional boiler.

Generally speaking, the invention may be said to comprise the elements and combinations thereof set forth in the accompanying claims.

Reference should be had to the accompanying drawings, forming a part of this specification, wherein—

Figure 1 represents a side elevation, partly in section of one of the middle sections of the boiler; Fig. 2 is a top plan view of assembled boiler sections, certain parts being shown in section; Fig. 3 is a front elevation of assembled sections of the boiler; Fig. 4 is a front elevation with the front plate removed, and certain parts shown in section; Fig. 5 is a fragmentary view, showing a rear elevation of the boiler:

The boiler shown consists of two end sections 1 and 2, with intermediate sections 3. The end sections 1 and 2 are quite similar to each other, except that they must necessarily be lefts and rights. The intermediate sections 3 are exact duplicates, one of the other.

The end section 1, comprises a hollow body and from the inner face of the body, there extend projections 4. These projections are frusto-conical in shape and are hollow, so that the interior of the hollowed projection is in communication with the interior of the section itself.

At one side of and at the lower portion

there is integrally secured with the section 1, a conduit section 5. This conduit section communicates with the interior of the section 1, so that water may circulate to or from the pipe section 5, through the interior of the section. The outer end of this pipe section 5, may be closed in any desired manner, or if this section be the most convenient for connection, this pipe section may connect with a supply of water for the boiler. The pipe section 5 is provided with an outwardly extending lug 5<sup>a</sup>, which is adapted, as will be later described, to form a means of connecting this end section with its adjacent section.

Near the top of the outer section, there is an opening or flue 6, which extends entirely through the section, and is walled, so that the water within the section, may flow entirely around this wall opening.

If the section 1 be connected with a flue, this section may be provided with a cap for reducing the diameter of the opening to a convenient size, for a flue pipe. This may be accomplished in any desired manner, and for the purpose I have shown a reducing collar 7, secured to the section 1, which cooperates with a cap 8, having an inturned flange 8<sup>a</sup>, that engages with the collar 7. The cap is provided with an opening 9, which is adapted to receive a flue pipe.

At the upper part of the section 1, there is intimately united with the section, a pipe section 10. This is shown in Fig. 5, and this pipe section communicates with the interior of the section, so that water circulating in the section 1, may find exit or entrance through the pipe section 10. Adjacent the pipe section 10, there are lugs 11 formed upon the section, these lugs forming a means for uniting the adjacent section, as will be later described.

The end section 2 is formed in a manner exactly the counterpart of the section 1, except that the section 2 is a right hand section, if we consider the section 1 a left hand section. For purposes of identification, I have indicated the pipe section at the top of the section 2 as 10<sup>a</sup>, the pipe section at the lower part of this section 2, as 5<sup>a</sup>, and the inwardly extending projections 4<sup>a</sup>. The section 2 is also provided with an opening similar to the opening 6 in the section 1. The opening is included in both sections, so that a flue connection may be handily made from either end section of the boiler.

Each intermediate section of the boiler comprises a central body portion 11, which is hollow, and from which extend on both sides, hollow conical projections 12, and these projections abut against the similar projections upon adjacent sections, which will be clearly seen by reference to Figs. 2 and 4. The central portion 11 communicates with back and top portions, represented at 13 and 14 respectively. These back and top portions are slightly wider than the body 11, and are the same in width as the outside distance between the opposite projections 12, which extend from the body 11. The back section and top section abut against similar portions on adjacent sections.

The projections 12, as well as the projections 4 and 4<sup>a</sup> upon the end sections 1 and 2, are arranged in rows as indicated in Fig. 1, and the projections in adjacent rows are staggered in a vertical direction, thereby to provide a tortuous passage for the products of combustion on their way to the flue. The horizontal rows of projections are not staggered. Therefore the spaces between them are unobstructed which permits a cleaning tool to freely pass between the horizontal rows and dislodge soot which may have accumulated upon the projections and the walls of the sections.

The intermediate sections 3 are provided with walled openings 15, which extend entirely through the sections, thus permitting the heated products of combustion arising between the sections to pass unobstructed toward the flue opening in the end section.

At the top of each section there is a hollow pipe section, as indicated at 16. This section is preferably formed as an integral part of its section, and communicates with the interior of the section. Each pipe section is provided with lugs 17, upon opposite sides thereof, and adjacent each end of the section. Adjacent lugs on each section may be united by the means of bolts, such as represented at 18. In this manner, the sections at their upper parts are securely joined to each other. Each intermediate section 3 also has a pipe section 19, which is preferably integrally united with its section, at the lower part thereof. This pipe section communicates with the interior of the section itself. Each pipe section is provided with lugs 20 adjacent the ends thereof, and by means of the lugs upon adjacent sections, the sections may be joined together. The fastening means, as shown, are bolts, as indicated at 21.

To insure a tight joint between the adjacent pipe sections 5<sup>a</sup> and 19, and adjacent pipe 10 and 10<sup>a</sup>, I may slightly bevel the inner faces of the pipe sections, as indicated at 28, so that the adjacent beveled faces form a rather broad inverted V. Cooper-

ating with each beveled face is a ring 29, the outer surface of which is beveled complementarily to the beveled faces before mentioned. As the sections are pulled together by the bolt-engaging-lugs 11; the rings 29 exert a wedging action, and so make a tight joint. Preferably, the lugs 17, as well as the lugs 20, are slotted or U-shaped, so that a bolt may easily be slipped into the slots, and the nuts engage upon the outside portions of the lugs.

As previously described, the back portions 13 of each section, as well as the top portions 14 of each section are wider than the intermediate body portion 11 of each section. The top portion 14 extends at the front of each section downwardly, to substantially the height at which the conical projections begin. The front portion of each section, as well as the bottom portion of each section, is only the width of the body portion 11. It will therefore be clear that heated products of combustion from a burner 22, or any other sort of heat may pass upwardly between the sections, heating the sections as it arises, and also heating such water as may be within the hollow conical projections. Furthermore, inasmuch as in the front, the sections are spaced apart, cleaning brushes may be inserted to remove any soot which may accumulate upon the conical projections, or upon the body portions of the sections.

The front portion of the sections may be closed by mounting a plate 23 upon the same, which plate may be provided with openings covered by doors indicated at 24. These doors may be hung and retained in any desired manner.

Each of the sections at the front and rear portions thereof, is provided with downwardly extending flanges 25 and 26 respectively,—while each end section is provided with downwardly extending flanges along the side thereof, as indicated at 27. These flanges are adapted to rest upon a support 28, which support may be stood upon the floor, or any convenient mounting may be provided therefor. This stand 28 will form a convenient support for a burner 22, or if desired a grate may be substituted.

From the construction of the heater, it will be seen that the products of combustion from the source of heat pass in a continuous substantially vertical direction, until they reach the upper part of the sections, and there pass through the openings 15 to the flue. This is quite different from the usual type of water heaters wherein the products of combustion pass in successive horizontal zones.

Having thus described my invention, what I claim is:—

1. A water heating boiler comprising a pair of hollow end sections and one or more

intermediate sections, said sections communicating with each other at certain points, adjacent portions of each section being provided with outwardly and transversely extending hollow projections, the successive transversely extending projections being spaced apart to provide unobstructed transverse spaces, one of said end sections being provided with a flue outlet, each intermediate section being provided with spaced walled openings, the walled portions between the spaced openings communicating with the water space above and below the spaced openings, the said walled openings in each section communicating with the space between adjacent sections, the products of combustion passing through the spaced openings and transversely of the boiler sections to the flue, and a source of heat beneath the sections.

2. A water heating boiler, comprising a pair of hollow end sections and one or more intermediate sections, said sections communicating with each other at certain points, adjacent portions of each section being provided with hollow outwardly extending lugs, the lugs upon adjacent sections engaging thereby to space the sections, one of the end sections being provided with a flue outlet, each intermediate section being provided with spaced walled openings, the walled portions between the spaced openings communicating with the water space above and below the spaced openings, the products of combustion passing through the spaced openings, the said walled openings in each section communicating with the space between adjacent sections and transversely of the boiler sections to the flue, and a source of heat beneath the sections.

3. A water heating boiler comprising a pair of hollow end sections and one or more

intermediate hollow sections, adjacent portions of each section being provided with outwardly and transversely extending hollow projections, the successive transversely extending hollow projections being spaced apart to provide unobstructed transverse spaces, and a source of heat beneath the section.

4. A water heating boiler comprising a pair of hollow end sections and one or more intermediate hollow sections, adjacent portions of each section being provided with outwardly and transversely extending hollow projections, the successive transversely extending projections being spaced apart to provide unobstructed transverse spaces, a front plate carried by the said sections, doors carried by said front plate, the said doors opening adjacent the unobstructed transverse spaces, and a source of heat beneath the sections.

5. A water heating boiler, comprising a pair of hollow end sections and one or more intermediate hollow sections, said sections communicating with each other at certain points, adjacent portions of each section being provided with outwardly extending frusto-conical lugs, the lugs upon adjacent faces engaging thereby to space the sections, said lugs being staggered vertically, but arranged in straight horizontal rows, the said horizontal rows being spaced to provide a horizontal clearance between the rows of lugs, and a source of heat beneath the sections.

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

JOSEPH H. BACON.

Witnesses:

A. J. HUDSON,  
L. I. PORTER.