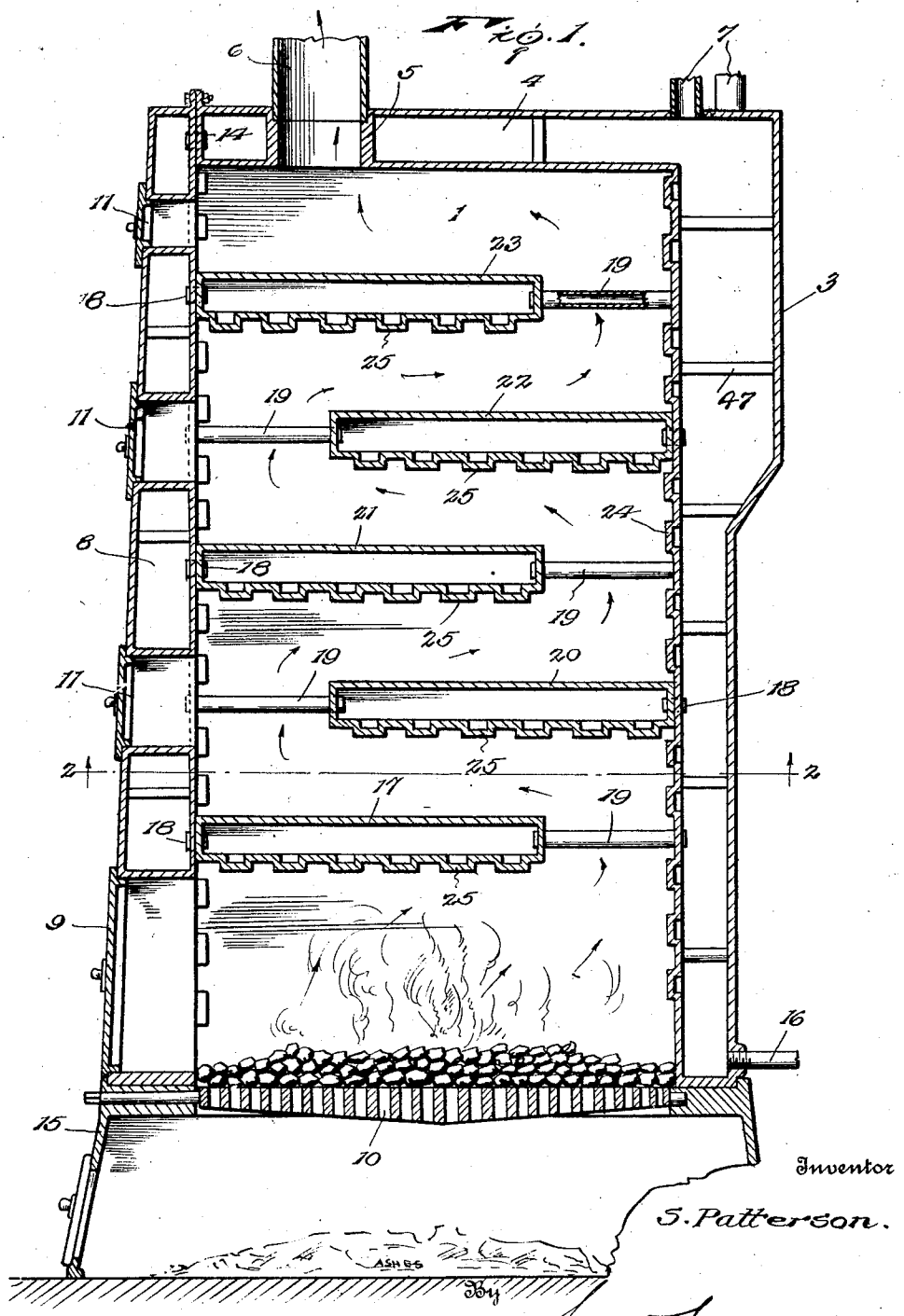
March 10, 1925. 1,528,845

S. PATTERSON

HEATING BOILER

Filed July 15, 1921 3 Sheets-Sheet 1



March 10, 1925. 1,528,845

S. PATTERSON

HEATING BOILER

Filed July 15, 1921 3 Sheets-Sheet 2

Fig. 2.

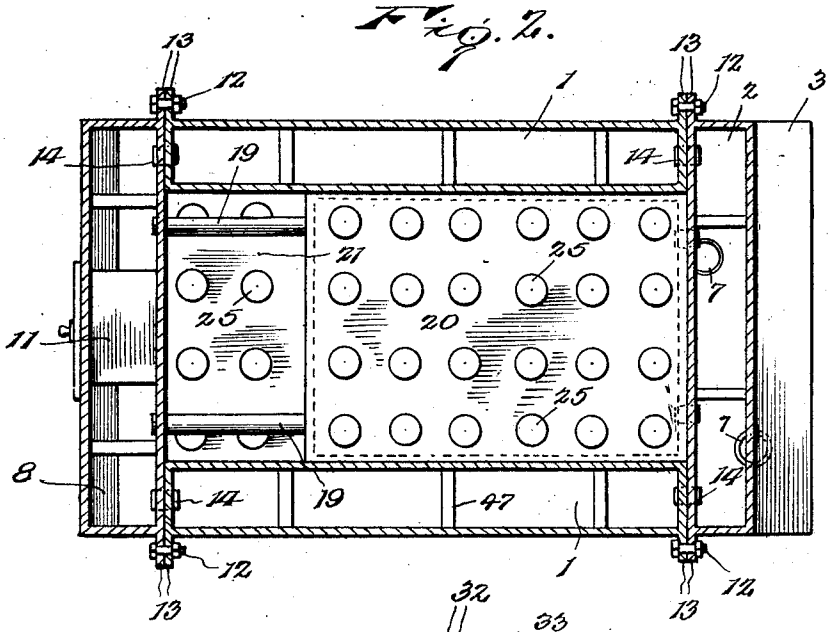
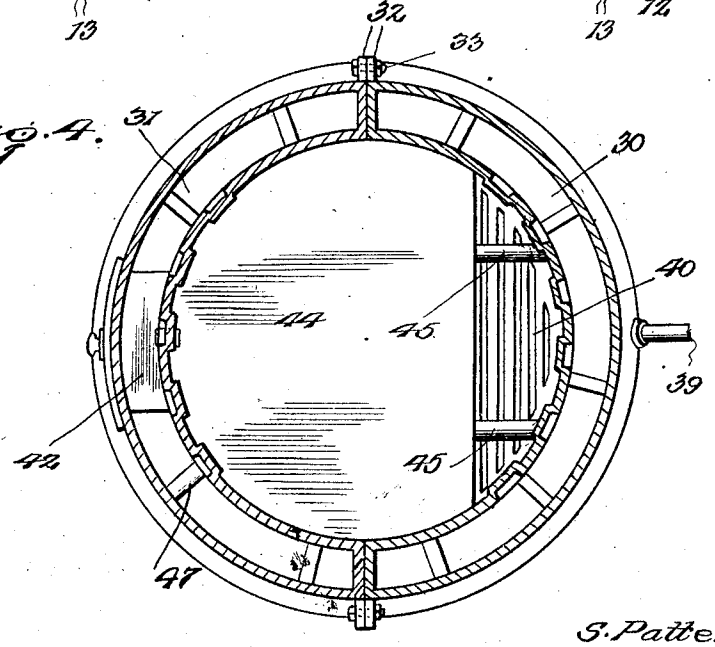


Fig. 4.



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By Lacey & Lacey, Attorneys

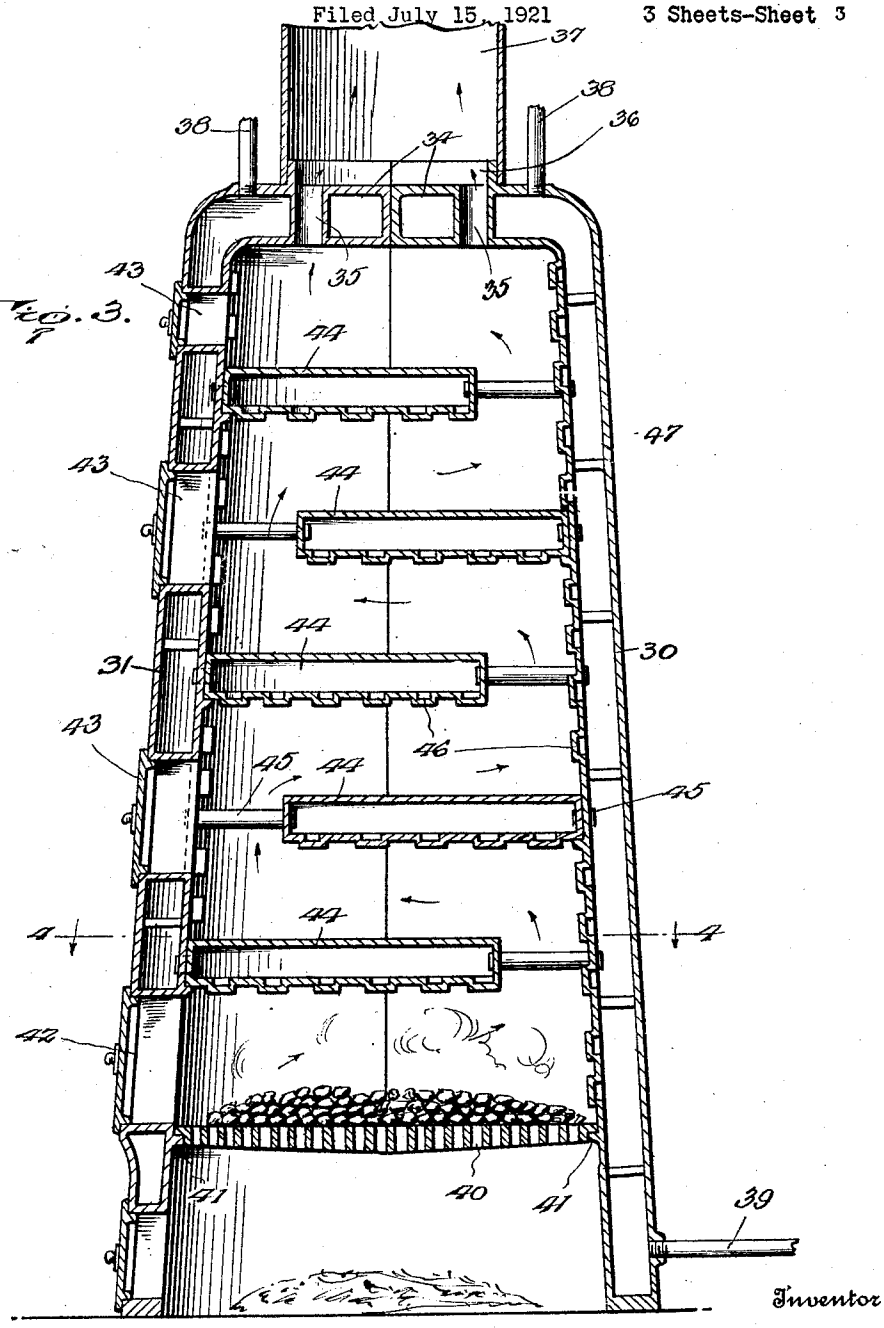
March 10, 1925. 1,528,845

S. PATTERSON

HEATING BOILER.

Filed July 15, 1921 3 Sheets-Sheet 3

Fig. 3.



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Patented Mar. 10, 1925. 1,528,845

UNITED STATES PATENT OFFICE.

SAMUEL PATTERSON, OF SPOKANE, WASHINGTON.

HEATING BOILER.

Application filed July 15, 1921. Serial No. 484,954.

To all whom it may concern:

Be it known that I, SAMUEL PATTERSON, a citizen of the United States, residing at Spokane, in the county of Spokane and State of Washington, have invented certain new and useful Improvements in Heating Boilers, of which the following is a specification.

This invention relates to boilers for heating buildings and has for its object the provision of a boiler which may be readily set up at the point of use; to provide a boiler in which a worn part may be easily removed and a new part substituted therefor; to provide a boiler having a large water capacity and presenting an extensive surface to the action of the fire and the products of combustion so that the heating of the water will be rapidly accomplished with an economical consumption of fuel; and to provide a boiler in which certain of the water containing elements will be interposed directly in the path of the heated currents and products of combustion arising from the fire-box and will serve to force said products to circulate in a tortuous path through the boiler to reach the smoke pipe. These several stated objects and other objects which will incidentally appear in the course of the following description are attained in such a construction as is illustrated in the accompanying drawings, and the invention resides in certain novel features which will be particularly pointed out in the appended claim.

In the drawings—

Figure 1 is a vertical longitudinal section of a boiler showing one form of my invention;

Fig. 2 is a horizontal section on the line 2—2 of Fig. 1;

Fig. 3 is a vertical section of a boiler showing another embodiment of the invention;

Fig. 4 is a horizontal section on the line 4—4 of Fig. 3.

In the form of the invention shown in Figs. 1 and 2, a rectangular boiler is provided consisting of four hollow sections or castings, two of which, designated by the reference numeral 1, are duplicates and constitute the sides of the boiler. The rear wall 2 of the boiler is offset rearwardly, as shown at 3, at its upper end, and the top 4 of the boiler is preferably formed integral with the said rear wall, a circular web or partition 5 being formed in the top section 4 adjacent the front end thereof to receive the lower end of the smoke flue 6, as shown in Fig. 1. The circulating pipes 7 are preferably fitted in the top section of the furnace, but they may, of course, be fitted in the back section or either side section or the front section as may be preferred. The front section 8 is preferably tapered toward its upper end and extends across the front ends of the side sections, as shown in Fig. 2. This front section is provided with a door 9 through which fuel may be fed onto the grate 10 and, above the said door 9, clean-out doors 11 are provided at intervals to permit access to the interior of the boiler when it is desired to remove accumulated soot and other matter from the heating drums. The several sections of the boiler are securely joined at their meeting points by bolts 12 inserted through projections or flanges 13 upon the respective sections and packing may be employed in the joints, if preferred, in order to avoid leakage of gases. As shown, all the sections are hollow and communication is established between the abutting sections by slip nipples 14 inserted through the walls of the sections at the several points of contact. The boiler is supported upon a base 15 which carries the grate 10 and the interior of which constitutes an ash pit, and the water is supplied to the boiler at the lower end thereof by a return pipe 16 which may also be connected with a source of supply in order to permit compensation for loss by evaporation.

Above the grate, a drum 17 is disposed within the combustion chamber of the boiler and this drum is closed at its top, bottom and sides, the sides abutting the side sections 1 of the boiler. The front of the drum 17 abuts the front section of the boiler and is in communication therewith through slip nipples 18 fitted through the inner wall of the front section and through the front side of the drum, while the rear side of the drum is spaced from the rear section of the boiler and is in communication therewith through longer slip nipples 19 having their ends fitted in the inner wall of the rear section and in the rear end of the drum, as clearly shown. A drum 20 is arranged above the drum 17 in spaced relation thereto and is connected with the front and rear sections of the boiler in a like manner, the rear side of the drum 20, however, abutting the rear section of the boiler and the front

side of the drum 20 being spaced from the front section of the boiler. The heat and products of combustion rising from the fuel upon the grate 10 are thus caused to flow toward the rear of the boiler and then forwardly between the two drums to escape upwardly past the front end of the upper drum, and other drums 21, 22 and 23 are provided above the drum 20 so that this tortuous circulation of the heated currents will extend from the fire-box to the top of the boiler and the heat will, consequently, play upon the bottom and top of each drum as well as upon the four side walls of the furnace boiler. The heat will thus be caused to play upon a large extent of water at one time so that the water will be quickly heated and caused to pass out through the pipes 7 and circulate through the building. To further increase the surface presented to the hot currents and the fire, I provide hollow bosses 24 upon the inner walls of the several sections of the boiler and similar hollow bosses 25 upon the bottoms of all the drums. Obviously, a small quantity of water will be received in the inner hollow portion of each boss and this small quantity of water will be very rapidly heated and, when heated, will immediately start circulating through the remaining body of water so that a circulation of heated water will be very quickly established and the radiators of the heating system soon begin to throw out heat.

In Figs. 3 and 4, I have shown the invention embodied in a circular boiler comprising a rear semi-circular hollow section 30 and a front semi-circular hollow section 31, the said sections being provided with flanges or projections 32 at their ends through which fastening bolts 33 are inserted to firmly secure the sections together. Each of said sections has a half top section 34 formed therewith and smoke escape flues 35 are formed through these half top sections, a collar 36 being formed upon the top of the furnace and engaging the end of the smoke flue 37 whereby the products of combustion are carried to the chimney. The circulating pipes 38 lead from the half top sections 34 and a water supply pipe or return pipe 39 communicates with the rear section at the lower end thereof. In this illustrated form of the invention, the grate 40 is supported upon projections 41 on the inner walls of the boiler sections and a fuel door 42 is provided in the front section. Clean-out doors 43 are provided at intervals in the front section, and drums 44 are disposed within the chamber defined by the sections and connected with the respective sections by slip nipples 45. These drums are arranged in alternate spaced relation with the front and rear sections of the boiler so as to effect the described tortuous circulation of the heated currents and upon the inner walls of the sections and upon the bottoms of the drums, I provide the hollow bosses 46 to increase the surface exposed to the action of the heat. The operation of this form of the invention is the same as that of the first described form but it has a less horizontal area and may, therefore, be preferred for smaller buildings and in those buildings where the cellar space is limited.

In both forms of the invention, the walls of the sections may be reinforced by brace bars or stay bolts, as indicated at 47, and the boiler may, of course, be covered with asbestos if desired.

Having thus described the invention, what is claimed as new is:

A vertical heating boiler comprising a plurality of hollow wall sections having abutting end surfaces, means exterior to the wall sections for securing them firmly together, a hollow top section integral with one wall section, nipples extending through the abutting portions of the wall sections to establish communication between and through the sections, the space enclosed by the assembled sections constituting a fire chamber, a grate in the bottom of the fire chamber, a smoke outlet leading from the top of the fire chamber through the hollow top section, circulating pipes leading from the said top section, a plurality of smooth-topped drums disposed horizontally within the fire chamber, the alternate drums abutting the front and rear walls of the boiler respectively at their outer ends and having their inner ends spaced from the said walls and the sides of the drums abutting the side walls of the boiler, the series of drums extending from a point just above the grate to a point just below the top section, nipples establishing communication between the drums and the interiors of the front and rear walls of the boiler, and clean-out doors in the front wall section affording access to all the drums.

In testimony whereof I affix my signature.

SAMUEL PATTERSON.