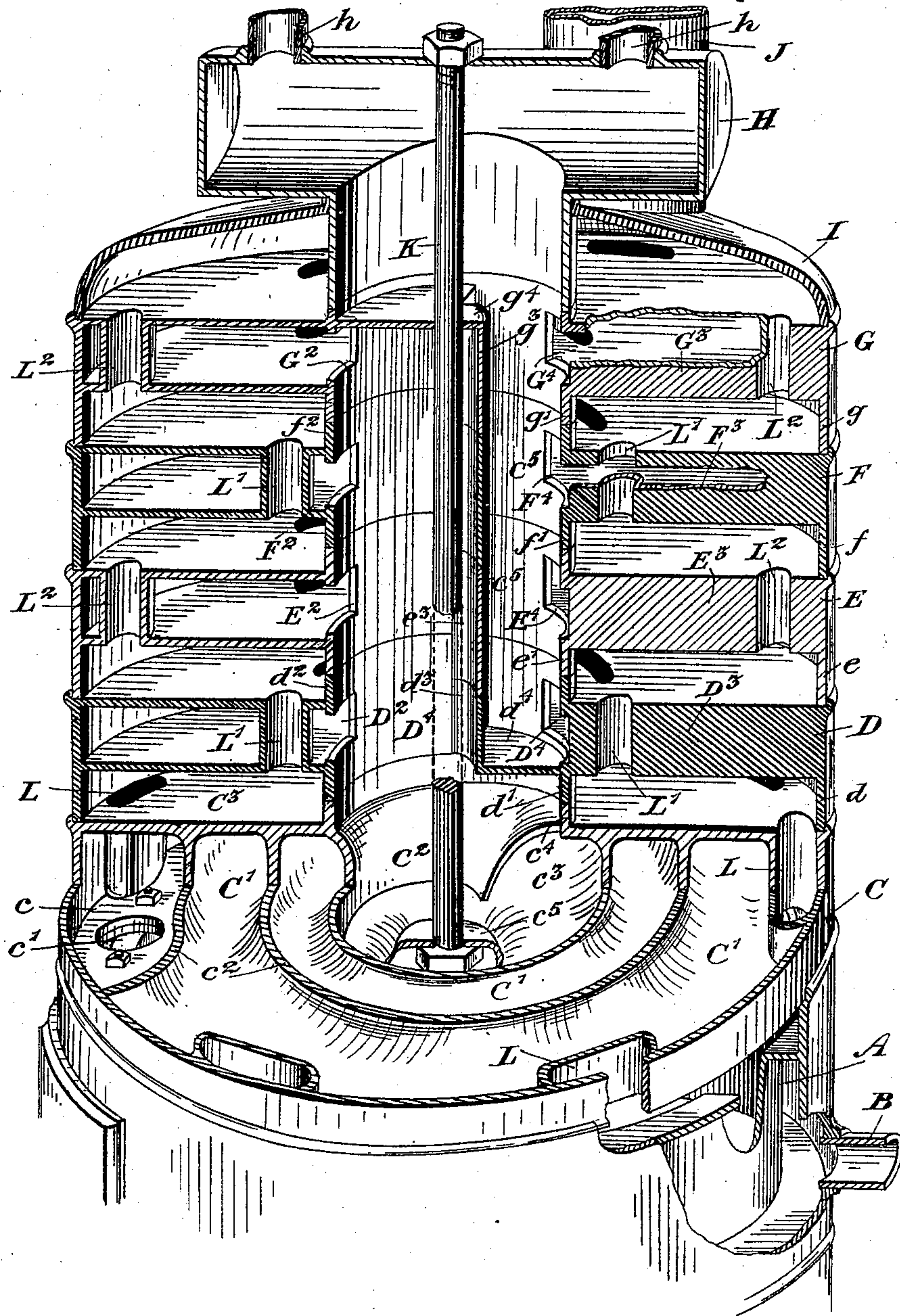


(No Model.)

T. S. BAYLES.  
HOT WATER HEATER.

No. 581,190.

Patented Apr. 20, 1897.



Witnesses.

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# UNITED STATES PATENT OFFICE.

THOMAS STUBBS BAYLES, OF TORONTO, CANADA.

## HOT-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 581,190, dated April 20, 1897.

Application filed January 31, 1896. Serial No. 577,573. (No model.) Patented in Canada April 3, 1895, No. 48,593.

*To all whom it may concern:*

Be it known that I, THOMAS STUBBS BAYLES, of the city of Toronto, in the county of York, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Hot-Water Heaters, of which the following is a specification.

My invention relates to improvements in hot-water heaters, patented to me in Canada under No. 48,593 on the 3d day of April, 1895; and the object of the invention is to provide a simple, cheaply-constructed, compact, and economical hot-water heater; and it consists, essentially, of a plurality of hot-water sections connected together and having a central flow-chamber of peculiar construction, which flow-chamber is connected to the sections, and a spirally-formed bottom section surmounted on a water-jacket surrounding the fire-pot, suitable passage-ways being provided for connecting together the water-jacket spiral section and other sections and flow-chamber, all the sections being connected together by a central bolt and the construction of the flues being arranged as hereinafter more particularly explained.

The drawing represents a sectional perspective view of a heater constructed in accordance with my invention.

A is the water-jacket, which surrounds the fire-pot, and B is the return-pipe, which is connected to the water-jacket, as shown.

C is the bottom section, which is mounted upon the water-jacket and is formed with a spiral passage-way C', starting at the periphery at  $c$ , where it is connected by the opening  $c'$  with the water-jacket A, and separated from the rest of the spiral section by the wall  $c^2$ , and ending at the center at  $c^3$ , where a well C<sup>2</sup> is formed. The top C<sup>3</sup> of the section is made preferably perfectly flat, so that the top of the spiral passage-way is substantially rectangular. The bottom of the section C is made spirally semitubular, so as to provide a large heating-surface.

D, E, F, and G are the different sections of the heater, which are mounted in the order named above the section C. The section D has a downwardly-extending flange  $d$  at its periphery, which fits within the edge of the section C and is formed with a central opening D'.

$c^4$  is an upwardly-extending flange forming part of the section C. Upon the flange  $c^4$  fits a similar flange  $d'$ , extending downwardly from the bottom plate of the section D.

$d^2$  is a flange extending upwardly from the top plate of the section D.

$d^3$  is a partition extending across the central opening D', and  $d^4$  is a bottom plate forming a continuation of the bottom plate of the section D and forming with the partition  $d^3$  the bottom of a separate chamber. The center of the partition  $d^3$  is curved, as shown.

D<sup>2</sup> is an opening leading into the hot-water section D.

D<sup>3</sup> is a partition diametrically opposite the center of the opening D<sup>2</sup> and extending from the top to the bottom plate from the opening D' to the exterior of the section.

D<sup>4</sup> are openings situated one at each side of the partition D<sup>3</sup>.

E is the section next above the section D, which is formed with flanges  $e e' e^2$ , partition  $e^3$ , opening E<sup>2</sup>, partition E<sup>3</sup>, and openings E<sup>4</sup>, corresponding with flanges  $d d' d^2$ , partition  $d^3$ , opening D<sup>2</sup>, partition D<sup>3</sup>, and openings D<sup>4</sup>, respectively, of the section D.

F is the next section above, which is provided with the flanges  $f f' f^2$ , partition  $f^3$ , opening F<sup>2</sup>, partition F<sup>3</sup>, and openings F<sup>4</sup>, corresponding with flanges  $d d' d^2$ , partition  $d^3$ , opening D<sup>2</sup>, partition D<sup>3</sup>, and openings D<sup>4</sup>, respectively, of the section D.

G is the next section above, which is provided with the flanges  $g g' g^2$ , partition  $g^3$ , opening G<sup>2</sup>, partition G<sup>3</sup>, and openings G<sup>4</sup>, corresponding with flanges  $d d' d^2$ , partition  $d^3$ , opening D<sup>2</sup>, partition D<sup>3</sup>, and openings D<sup>4</sup>, respectively, of the section D. The section G is also provided with a top plate  $g^4$ , extending from the partition  $g^3$  over the opposite half of the central chamber C<sup>5</sup>. The top of the chamber C<sup>5</sup> has connected to it a distributing head or chamber H, to which the flow-pipes  $h$  are connected.

I is the dome for the top of the hot-water heater, and J is the smoke-pipe. The bottom of the well C<sup>2</sup> in the center of the section C is formed with a recess  $c^5$ . From the center of this recess extends a bolt K, which passes up through the center of the flow-chamber C<sup>5</sup> through the top of the distributing-chamber H, where a nut is provided on



the top of the bolt, whereby the several sections are secured firmly together.

It will be seen that the partition  $c^5$ , formed of the several sections hereinbefore described, is curved so as to permit of the passage of the bolt.

All the flanges hereinbefore mentioned are necessarily made water-tight.

L are flues arranged around the circumferential edge of the section C, preferably to the inside thereof, and leading from the fire-pot to the space between the section C and section D.

L' are flues which extend through the sections D and E around the flow-chamber  $C^5$ . The flues L' are located, preferably, in proximity to such flow-chamber.

L<sup>2</sup> are flues which extend through the sections E and G near the periphery thereof.

The flame and heat pass upwardly through the flues L, L', and L<sup>2</sup> alternately in a zigzag direction, so that they are utilized to the best advantage in heating water in the sections. The bottom section C, being directly above the fire-pot, receives the intense heat, and the circulation of the water around the spiral ends in the central well  $C^2$ , where the heated water rises and passes through the openings throughout the several sections and passes off around the sections in two directions to the partitions diametrically opposite, whence it passes through the openings at each side of the partitions into the flow-chamber  $C^5$ , through which it rises to the head H, whence it passes through the flow-pipe  $h$  throughout the building and returns by the pipe B.

My heater having more heating-surface than any boiler for the size of grate-surface, it will be seen that in practice it will be more economical. The majority of other boilers have the flow-pipe at the back at the outside, where there is no heat having to travel therefrom to the front and back again. In my boiler the water circulates in the bottom spiral section to the center from the water-jacket around the fire-pot and in the other sections from one side of the flow-chamber to the other, never leaving the hottest part until passing out at the top. Each section is itself an independent heater, and the water does not require to traverse the successive sections above, and consequently there is the least possible friction, and the circulation issues from each section as fast as it becomes heated. All the sections are held together by one bolt, which in itself is of very economical construction.

What I claim as my invention is—

1. In a hot-water heater a hollow horizontal section having a central vertically-divided opening, openings into the section from such opening and flues through the section as and for the purpose specified.

2. In a hot-water heater, the hollow sections with a central opening therethrough, said sections having inner abutting flanges forming the inner wall of said sections and

the wall of said opening, an outer flange forming the outer wall of said section, said inner walls having slots therein forming communication between said central opening and the interior of said sections, substantially as described.

3. In a hot-water heater a section comprising a spirally-formed passage-way having the outer end connected to the return-pipe and a well at the inner end connected to the flow-pipe said well being located at the center of said section as and for the purpose specified.

4. In a hot-water heater the combination with the fire-pot, of a section mounted thereon comprising a spirally-formed passage-way connected at the outer end to the flow-pipe, a well formed at the inner end said well being located centrally of said section and a passage-way between such well and the flow-pipes as and for the purpose specified.

5. In a hot-water heater the combination with the water-jacket surrounding the fire-pot, of a section mounted upon the water-jacket, a spirally-formed passage-way formed in such section, an opening connecting the outer end to the water-jacket, a well at the inner end of the spirally-formed passage-way said well being located centrally of said sections and the flow-pipes leading from such well through an interposed central opening in said section as and for the purpose specified.

6. The bottom section for a hot-water heater comprising a spirally-formed passage-way connected at the outer end to the return-pipe and at the inner end to the flow-pipe, the top of the section being flat and the bottom of each convolution of the spiral being substantially semicircular and immediately above the fire-pot as and for the purpose specified.

7. The bottom section for a hot-water heater comprising a spirally-formed passage-way connected at the outer end to the return-pipe and at the inner end to the flow-pipe, the top of the section being flat and the bottom of each convolution of the spiral being substantially semicircular and immediately above the fire-pot and a series of slots forming flues extending through the outer convolution of the spiral as and for the purpose specified.

8. A hot-water heater comprising a fire-pot, a water-jacket surrounding the same, a series of superimposed chambers having a central opening leading through the same independent of the interior of said chambers, a central partition in said opening, slots in the inner walls of said chambers arranged on opposite sides of said partition, a communicating passage between the said water-jacket and the bottom of said opening and the return-pipes leading from the upper part thereof, substantially as described.

9. In a hot-water heater the combination with a spirally-formed hollow section and flues thereof, of a horizontal hollow section having downwardly-depending flanges resting on the outer edge of the bottom section, a central opening immediately above and con-



connected to the well of the bottom section and flues through the sections, and openings leading from the central opening of flow-chamber into the hollow section, a partition-wall dividing the section, and openings leading from the hollow section into such divided portion as and for the purpose specified.

10. In a hot-water heater the combination with the spirally-formed hollow section and flues thereof, of a plurality of horizontal hollow sections having downwardly-depending flanges forming spaces between the hollow portions of the sections to the outside of the central opening, flues extending through the sections, a central partition dividing the flow-chamber as specified extending from the bottom of the bottom section to the top of the top section, openings leading from the central opening or flow-chamber connected to the end of the spirally-formed bottom section into the hollow section and openings leading into the separated portion of the flow-chamber opposite as and for the purpose specified.

11. In a hot-water heater the combination with the spirally-formed hollow section and flues thereof, of a plurality of horizontal hollow sections having downwardly-depending flanges forming spaces between the hollow portions of the section to the outside of the central opening, flues extending through the sections, a central partition dividing the flow-chamber as specified extending from the bottom of the bottom section to the top of the top section, openings leading from the central opening or flow-chamber connected to the end of the spirally-formed bottom section into the hollow section and two openings in each section opposite and partitions separating such openings extending from the central opening or flow-chamber to the outer periphery of the sections as and for the purpose specified.

12. In a hot-water heater the combination with the spirally-formed hollow section and

flues thereof, of a plurality of horizontal hollow sections having downwardly-depending flanges forming spaces between the hollow portions of the section to the outside of the central opening, flues extending through the sections, a central partition dividing the flow-chamber as specified extending from the bottom of the bottom section to the top of the top section, openings leading from the central opening or flow-chamber connected to the end of the spirally-formed bottom section into the hollow section, and two openings in each section opposite and partitions separating such openings extending from the central opening or flow-chamber to the outer periphery of the sections, and a cross-head at the top of the central flow-chamber having the flow-pipes leading therefrom as and for the purpose specified.

13. In a hot-water heater the combination with the spirally-formed hollow section and flues thereof, of a plurality of horizontal hollow sections having downwardly-depending flanges forming spaces between the hollow portions of the section to the outside of the central opening, flues extending through the sections, openings leading from the sections into the flow-chamber and a cross-head for the flow-chamber having the flow-pipes connected thereto as and for the purpose specified.

14. The combination with a plurality of hot-water sections having a central opening or flow-chamber extending from the top to the bottom of the section and connected by openings to each section, of a central bolt which passes through the center of the central opening to the top and bottom of the sections as and for the purpose specified.

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Witnesses:

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