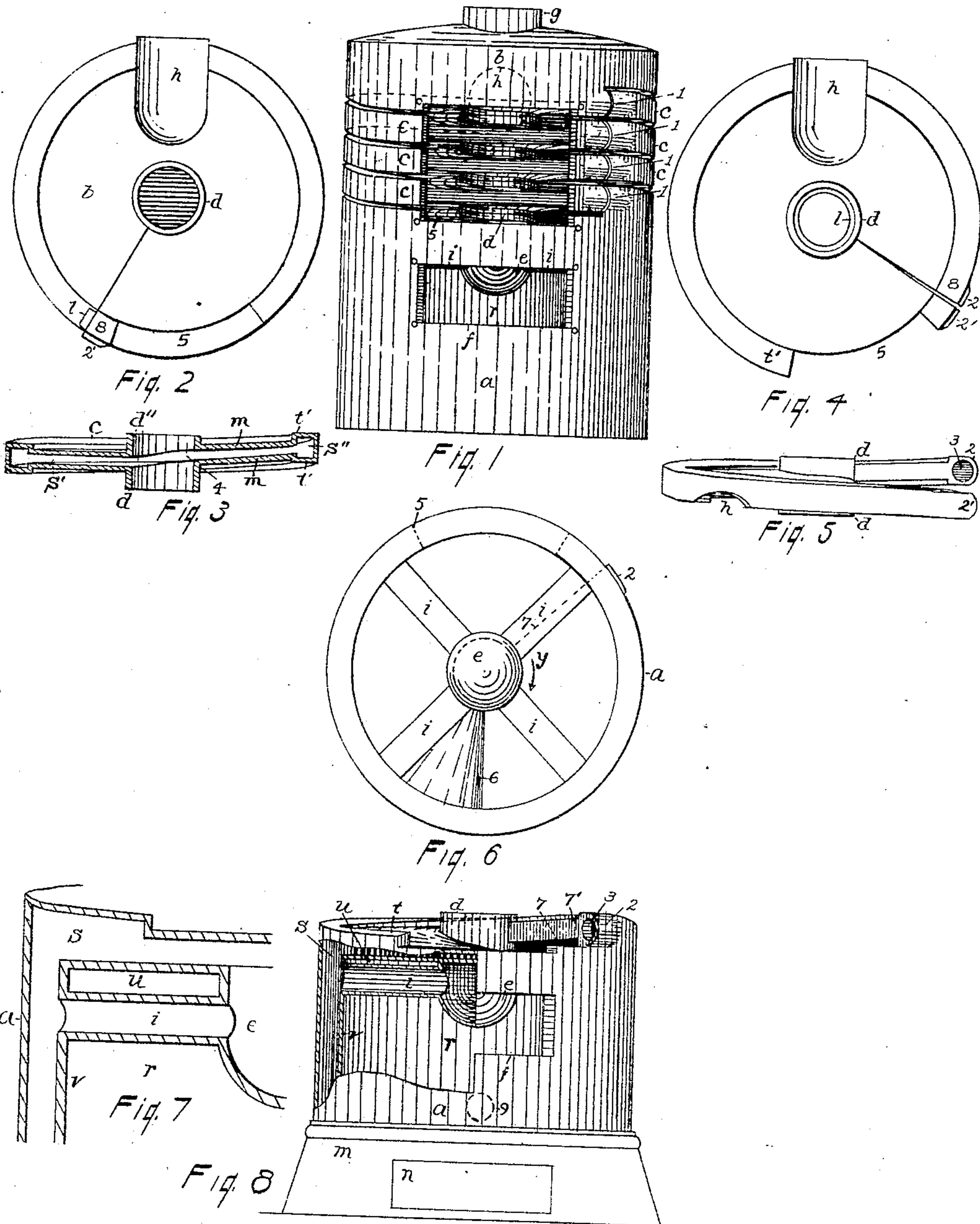


No. 804,032.

PATENTED NOV. 7, 1905.

C. F. PAUL, JR.  
STEAM AND WATER HEATER.  
APPLICATION FILED JUNE 17, 1904.



Witnesses  
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# UNITED STATES PATENT OFFICE.

CHRISTIAN F. PAUL, JR., OF PEEKSKILL, NEW YORK.

## STEAM AND WATER HEATER.

No. 804,032.

Specification of Letters Patent.

Patented Nov. 7, 1905.

Application filed June 17, 1904. Serial No. 212,937.

*To all whom it may concern:*

Be it known that I, CHRISTIAN F. PAUL, JR., a citizen of the United States, and a resident of Peekskill, in the county of Westchester and State of New York, have invented a certain new and useful Steam and Water Heater, of which the following is a specification.

This invention relates to hot water and steam heaters, and has for its objects the securing of vertical contacts of the heat with the heating-surfaces by means of spiral flue-passages and a consequent free, easy, and general circulation of the water by means of spiral waterways.

The objects are attained by the means set forth in this specification and the accompanying drawings.

Reference will first be made to the drawings, in which like letters and digits refer to similar parts in the several views.

Figure 1 is a front elevation of the sections of the heater. Fig. 2 is the plan of the bottom of the top section. Fig. 3 is a cross-section through one of the intermediate sections. Fig. 4 is a plan of the top of the section that lies next to the top section. Fig. 5 represents the same section turned forward, showing the relative positions of the nipple-connecting hubs 2 2. Fig. 6 is a bottom view of the fire-pot section. Fig. 7 is an enlarged detail of parts shown in Fig. 8. Fig. 8 is a partially sectional view of the fire-pot section in elevation.

The body of the heater, as shown in Fig. 1, is here shown as composed of five sections, although more or less than that number may be used. *a* is the bottom or fire-pot section, *b* the top section, and *c c c* three intermediate sections. The fire-pot section consists of two concentric cylinders united at their bottoms and connected at their tops to form a water-chamber *s* with a spiral outlet and a fire-box with a spiral flue therefrom, as in Figs. 7, 8. The sections rest on a base *m*, which constitutes an ash-pit with a doorway *n*.

The roof of the fire-space or the crown-sheet is developed in the center to an inverted dome *e*, Figs. 1, 6, 7, 8, and from the upper sides of the dome tubes *i* are extended to meet the inner wall *v*, as in Figs. 7, 8. A fire-door *f* is provided through the section.

The top of the fire-pot section has a spiral inclination around its center from a point opposite the fire-door, as at 6, Fig. 6, having a gradual rise one and one-third times the circumference of the section, the rise terminating

at the right of the fire-door, as at 7', Figs. 6, 8. The crown-sheet inside the fire-pot has a like inclination, the said sheet and outer wall lying parallel with each other, with a water space between them, which is a continuation of the water-chamber *s*; but as the place of beginning of the spiral and its termination are not in the same plane and overlap each other for the distance from 6 to 7' in direction of the arrow *y*, Fig. 6, a space or passage-way is made between them, as at 7, Fig. 8, that constitutes a flue from the interior of the fire-pot. Looking within the fire-pot, as in Fig. 6, the flue begins at the point 6 and ends at the broken line 7'.

A hole 3 at the end of the spiral and outwardly-extended hub 2 is an outlet for the flow of water from the spiral to the next section. A hole in the hub *d*, similar to that in Fig. 2, likewise opens to the interior of the water-chamber *s*, and the water leaves the said chamber by way of the two outlets *d* and 3. Along the outer edge of the section a rim *t* is projected, as shown.

The intermediate sections have the same spiral shape as the top of the fire-pot and are shown in Figs. 3, 4, 5. Fig. 3 shows them in cross-section. Central hubs *d d* are united to rims *t' t'*, corresponding with the rim *t* on the fire-pot, by upper and lower parallel plates *m m*, forming a water-chamber *s'* between them, the rims *t' t'* enlarging the water-space, as at *s''*. The water-space is continuous with the open hubs *d' d''*. Fig. 5 represents an edge view of one of these intermediate sections. The ends 2 2 lie apart, as shown, and are provided with openings, as at 3, for the reception of push-nipples, preferably; but right and left threaded screw-nipples may be employed. A hub of one section unites with a hub of another, as in Fig. 1. If a nipple be placed in hub *d*, Fig. 8, as at *l*, Fig. 4, then the hub of an intermediate section be placed on the nipple, as the sections are drawn close the intermediate section may be twisted on its center to cause the nipple in hole 3 of one section to enter the like hole in the other section, firmly uniting them, as at 1 1 1 1, Fig. 6.

Each section is added in like manner until the heater is built up, as in Fig. 1. The top section is deep enough to constitute a steam-dome, if it is intended for a steam-heater. A push-nipple is shown in a section-hub 2 at *l*, Fig. 2. In uniting the sections the hub 8 in Fig. 2 would be joined to the hub 8 of Fig. 4.

When a heater is all together, there will be



a spiral waterway through the intermediate sections from the fire-pot section to the top section, and by the formation of the rims  $t\ t'$  there will be a spiral flue from the fire-pot section to the top section. To make an outlet from this flue between the top and first section below it, a semicircular space  $h\ h$ , Figs 2, 4, 5, is made in each, so that when the two come together there is an outlet at the back of the heater, as shown by broken lines  $h$ , Fig. 1.

The spaces 5 cut away from the rims of the sections  $t'$ , Fig. 4, form clean-out openings when the heater is built up, as shown in Fig. 1. A door-frame with doors would be placed over these openings and the fire-door space to complete the construction. These are omitted from the drawings.

An outlet  $g$  at the top of the heater may be adapted for screw, flange, or push-nipple connections for an outflow-pipe. The inflow is indicated at 9 at the back of the fire-pot section, Fig. 8.

In constructing this heater certain details might be varied from those shown herein; but

What I claim, and desire to secure by Letters Patent, is—

1. A heater comprising a bottom section having an annular water-space, the closed tops of the walls forming the annular water-space drawn into spirals, one end of the spiral overlapping the other end to form a flue from the interior of the fire-pot, a hub in the center opening to the water-chamber in the section, a nipple connection at the upper outer end of the spiral, an intermediate section united by central and side nipple connections to the bottom section, other intermediate sections as required superposed on the first section, a top section having its bottom spirally formed to conform to the other sections and united by central and side nipples to the top intermediate section, a semicircular depression in the under side of the top intermediate section and a like depression in the upper side of the top section

to form a flue-outlet, each section having rims forming enlarged annular water-spaces and when the sections are united forming a flue-space between the sections, and each section having the said rims cut away in its front whereby the openings so caused constitute a clean-out space.

2. A fire-pot section for a heater comprising an annular water-chamber with a top formed into a spiral the ends of the spiral overlapping to form a flue from the interior of the fire-pot, a hub in the center of the spiral opening into the water-chamber and adapted for nipple connections, the outer end of the spiral rounded to form a hub, and a hole in the hub for a nipple.

3. A fire-pot for a heater comprising an annular water-chamber with a top formed into a spiral the ends of the spiral overlapping each other to form a flue-space, a hub in the center of the spiral opening into the water-chamber and adapted for nipple connection, the outer end of the spiral adapted for a side nipple connection, an inverted dome in the center of the crown-sheet within the fire-chamber forming a part of the water-chamber, and tubes connecting the dome with the inner walls of the fire-pot section.

4. A heater-section for a spiral heater comprising hubs open to the water-chamber and connected by parallel spiral plates with a spiral chamber rectangular in cross-section and extending higher and lower than the central water-space, the ends of the spirals being closed, the outer ends expanded to form hubs having side holes for nipple connections and sections of the outer rim cut away to form a clean-out space.

Signed at Peekskill, in the county of Westchester and State of New York, this 13th day of June, A. D. 1904.

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Witnesses:

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