

(No Model.)

A. L. SNYDER.
HOT WATER AND STEAM HEATING APPARATUS.

No. 502,055.

Patented July 25, 1893.

Fig. 1.

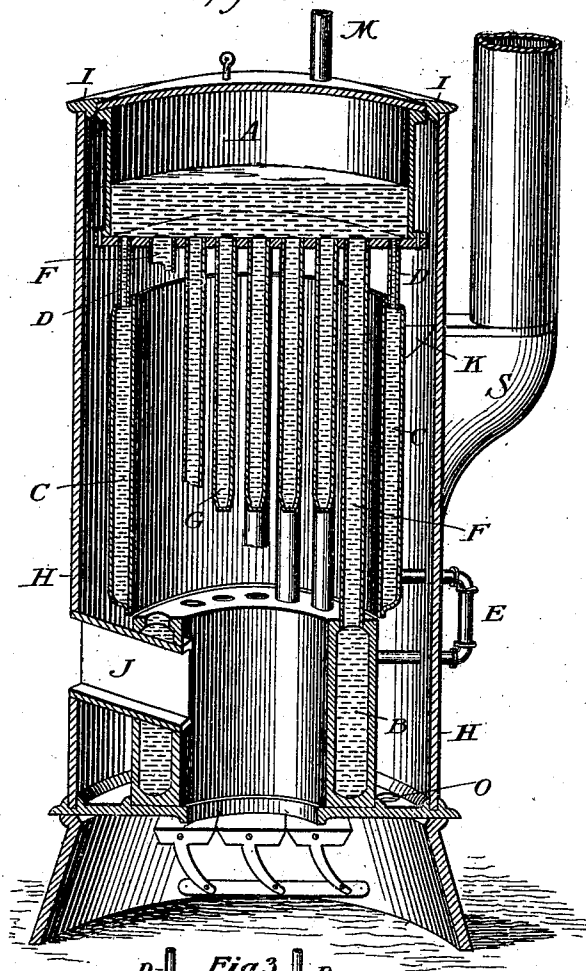


Fig. 4.

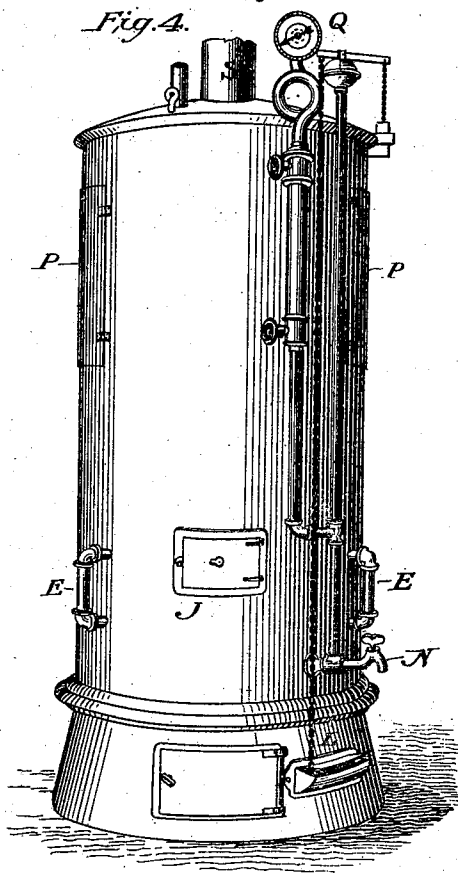


Fig. 3.

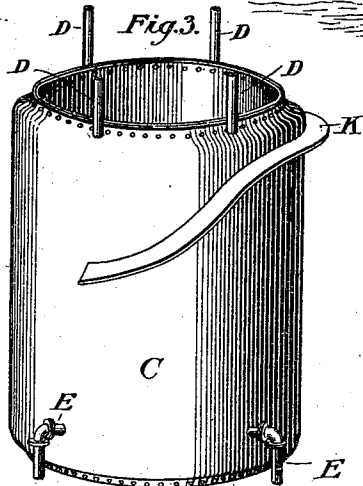
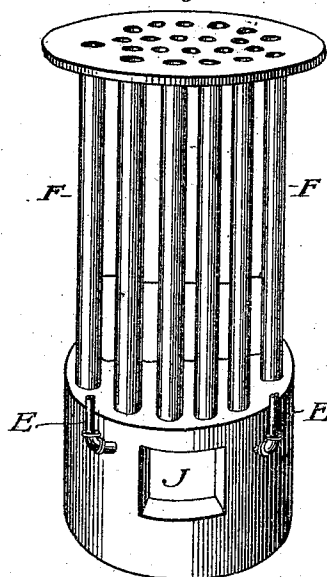


Fig. 2.



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ALBERT L. SNYDER, OF TOPEKA, KANSAS.

HOT-WATER AND STEAM HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 502,055, dated July 25, 1893.

Application filed September 5, 1892. Serial No. 445,149. (No model.)

To all whom it may concern:

Be it known that I, ALBERT L. SNYDER, of Topeka, in the county of Shawnee and State of Kansas, have invented a new and useful Improvement in Hot-Water and Steam Heating Apparatus, of which the following is a specification.

The object of my invention is to provide a furnace suitable to heat water or furnish steam that will economize the heat, allow the use of soft coal, prevent accumulation of soot, present a large surface to the action of the heat and that will not take up much room.

My invention is an apparatus for heating water and furnishing steam more particularly described in the specification hereinafter set out.

In the accompanying drawings in which similar letters of reference indicate like parts, Figure 1 is a sectional view of the entire apparatus. Fig. 2 is a view of the tubes penetrating the bottom of the dome, and the fire box. Fig. 3 is a view of the shell boiler that incases the pipes showing the flange partition on the same to cause return draft. Fig. 4 is a view of the heating apparatus ready for use.

In the drawings A is the dome of the boiler having perforated bottom into which penetrate the long tubes F. F., the drop tubes G. G. and the connecting pipes D. D.

B is the fire box made in the form of a water jacket having orifices around the top into which the tubes F. F. are secured, having also pipe connections with shell boiler C by pipes E. E. and having a door J.

C. is a cylindrical boiler being a double shell boiler made just large enough to slip over the fire box and incase the tubes connecting the fire box with the dome, having four openings in the top to engage pipe connections D. and having four lateral openings near the bottom for pipe connections E. E. Over the top of this boiler the smoke passes coming from the fire-box through the spaces between the tubes. This boiler is partly encircled with a flanged partition K. to cause return draft.

D. D. are tubes between dome A. and the shell boiler C. penetrating dome A. at the bottom and shell boiler C. at the top thereof, there being four of these pipe connections.

E. E. are pipe connections from side of shell

boiler C. to fire pot B. there being four of these pipe connections E.

F. F. are water tubes connecting the dome A. with fire box water jacket B.

H. is a casing encircling the whole.

I. is an annular cover being just large enough to securely cover the space between the top of dome A. and casing H.

J. is the door to supply fire-box with fuel.

K. is partition flange rigidly fixed between shell boiler C. and casing H. to secure return draft inserted at an angle inclined from the rear toward the front on both sides and connecting in the rear so that smoke, heat, and gas passing over the top of shell boiler C. as it strikes this flange is returned downward toward the front and under the flange and back toward the rear until the flue is reached.

L. is a diaphragm automatic regulator to supply draft of air.

M. is a pipe connection to convey heated water or steam.

N. is a water bib to draw off water from the boiler.

O. is an opening through which the soot is shaken into the ash pan.

P. P. are large doors in outside casing H. to allow the soot accumulating between casing H. and shell boiler C. to be brushed down with a wire brush into the ash pan.

Q. is a steam gage.

S. is a smoke vent or pipe to carry smoke from the furnace.

The shell boiler C. is preferably made of steel presenting on the outside a smooth surface from which all soot deposited can be easily brushed down. Instead of this shell boiler C. there can be used a solid metal shell incasing the tubes in the same way and dispensing then with the pipes that connect this shell boiler with the dome and fire-box, but the best results are obtained by making it hollow and connecting it by tubes and pipes as in the drawings. The drop tubes depending from the dome can also be omitted but the best results are obtained by making it as described.

To operate my invention water is forced into the boiler until four or five inches deep in the dome. A fire is then started in the fire-box and as the smoke is carried through the spaces between the tubes it passes over the top of shell

boiler C. and striking the flanged partition a return draft is caused carrying the smoke and hot gases forward and down until the ends of flange K. are reached when the draft carries the smoke out through the escape pipe vent S. If any soot or dust accumulates it will be on the outside of the shell boiler C. and inside the casing H. The doors T. can be opened and a wire brush used to brush the soot down to the bottom and from there it is shaken into the ash pan. Soft coal can be used as well as hard coal. The difficulty heretofore in all soft and hard coal heaters has been to prevent soot and dust accumulating in places difficult of removal.

In my invention the soot and dust only accumulate on the smooth surfaces described above, and the large doors permit easily removing the same.

One of the great advantages in the construction of my heating apparatus over all others known to me is the ease with which it can be put together and the great heating surface exposed to action of the fire. When the dome and fire-box are connected by tubes the shell boiler can be drawn over the fire-box and secured in its place. The casing can then be placed around the whole and the space inside the casing covered, making a heater that is economical in price, easily handled, and that will give great heat in proportion to the amount of fuel used. The flange that partly fills the space between the shell boiler and the outside casing is also a great improvement aiding the retention of heat and preventing the soot from being drawn up the flue and at the same time throwing the heat down and around the lower part of the shell boiler.

Having thus fully described my invention, what I desire to secure by Letters Patent and claim is—

1. A hot water and steam heater having around the fire-box a water jacket connected by a series of water tubes with the bottom of the dome, in combination with a shell boiler incasing these tubes which shell boiler extends from the water jacket around the fire-box nearly to the dome leaving space enough above the shell boiler for passage of smoke and draft, tube connections from top of this shell boiler to bottom of dome, tube connections from bottom of this shell boiler to water jacket around the fire-box, a flange partition outside of and around part of the shell boiler extending from the rear toward the front on each side and to make forward and downward reverse draft, a casing encircling the whole having large doors therein which casing is connected with the outside of the shell boiler by the flange partition and connecting with the top of the dome by an annular covering, a smoke vent in the outside casing below the flange partition, a series of tubes dependent from the bottom of the dome having

their lower ends closed, all substantially as described.

2. A hot water and steam heater having around the fire-box a water jacket connected by a series of water tubes with the bottom of the dome, in combination with a metal shell incasing these tubes nearly their entire length leaving space enough above the shell and below the dome for passage of smoke, a flange partition partly encircling the outside of this shell extending from the rear forward and down on either side to cause return draft, a casing encircling the whole having large doors therein which casing is connected with the outside of the shell by the flange partition and connected with the top of the dome by an annular covering, a smoke vent in said outside casing below the flange partition, a series of tubes dependent from the bottom of the dome having their lower ends closed, all substantially as described.

3. A hot water and steam heater having around the fire-box a water jacket connected by a series of water tubes with the bottom of the dome, in combination with a shell boiler incasing these tubes which shell boiler extends from the water jacket around the fire-box nearly to the dome leaving space enough above the shell boiler for passage of smoke and draft, tube connections from top of this shell boiler to bottom of dome, tube connections from bottom of this shell boiler to water jacket around the fire-box, a flange partition outside of and around part of the shell boiler extending from the rear toward the front on each side and to make forward and downward reverse draft, a casing encircling the whole having large doors therein which casing is connected with the outside of the shell boiler by the flange partition and connected with the top of the dome by an annular covering, a smoke vent in the outside casing below the flange partition, all substantially as described.

4. A hot water and steam heater having around the fire-box a water jacket connected by a series of water tubes with the bottom of the dome, in combination with a metal shell incasing these tubes nearly their entire length leaving space enough above the shell and below the dome for passage of smoke, a flange partition partly encircling the outside of this shell extending from the rear forward and down on either side to cause return draft, a casing encircling the whole having large doors therein which casing is connected with the outside of the shell by the flange partition and connected with the top of the dome by an annular covering, a smoke vent in said outside casing below the flange partition, all substantially as described.

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