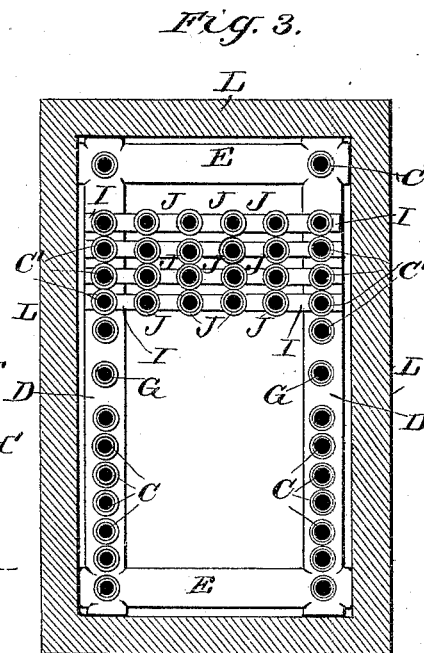
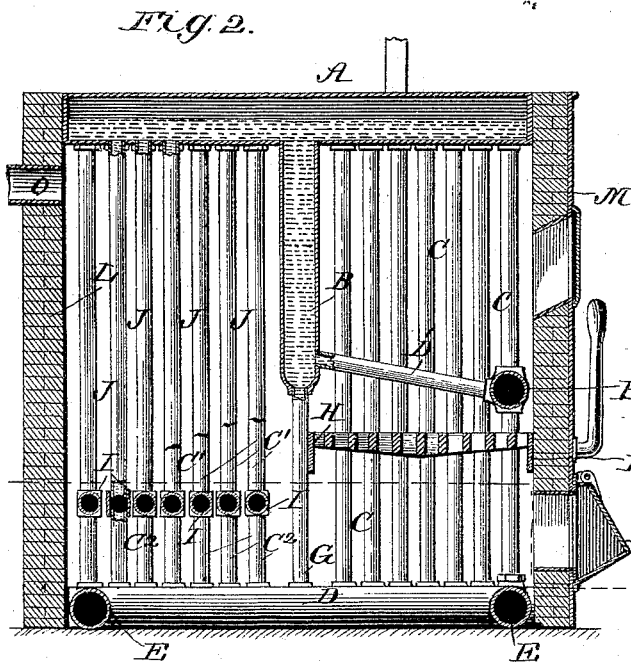
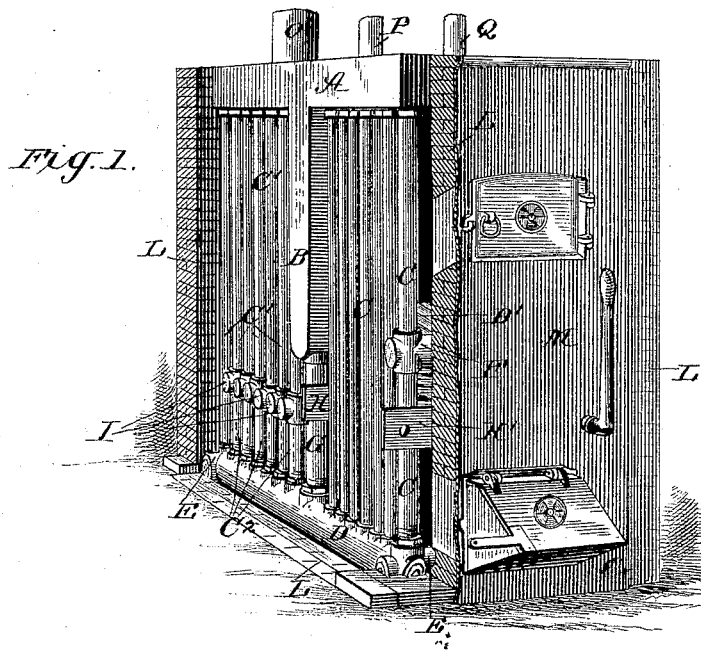


(No Model.)

M. E. HERBERT.  
HOT WATER BOILER.

No. 489,807.

Patented Jan. 10, 1893.



WITNESSES:  
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# UNITED STATES PATENT OFFICE.

MICHEAL E. HERBERT, OF ST. JOSEPH, MISSOURI.

## HOT-WATER BOILER.

SPECIFICATION forming part of Letters Patent No. 489,807, dated January 10, 1893.

Application filed May 28, 1892. Serial No. 434,831. (No model.)

*To all whom it may concern:*

Be it known that I, MICHEAL E. HERBERT, residing at St. Joseph, in the county of Buchanan and State of Missouri, have invented certain new and useful Improvements in Hot-Water Boilers, of which the following is a specification.

My invention relates to hot water heaters and it has for its object to provide a heater of this class, simple in construction which can be cheaply built, so as to come within the reach of the average house owner and is a very positive, rapid and economical heater for any grade of fuel.

My invention consists in the peculiar combination and novel arrangement of parts, such as will hereinafter be fully described in the annexed specification and particularly pointed out in the claims, reference being had to the accompanying drawings in which

Figure 1 is a perspective view of my improved hot water boiler parts of the masonry being broken away to illustrate the interior construction. Fig. 2 is a vertical longitudinal section thereof and Fig. 3 is a horizontal section of the same taken on line 3—3 Fig. 2.

The body of my improved boiler consists of an upper hollow chamber A, which forms the top thereof, and which has a depending water leg B, which serves to divide the body into front and rear sections, such hollow chamber being supported on vertical circulating tubes the lower ends of which are joined into the longitudinal bottom circulating pipes D which are connected at their front and rear ends by the transverse circulating pipes E, as shown most clearly in Fig. 3 of the drawings.

D' indicates a series of grate tubes, disposed in the front or fire section, which communicate at their rear ends with the water leg B near the bottom thereof, while their front ends communicate with a transverse header tube F which communicates with the front vertical water tubes C. The bottom of the water leg B, which extends a short distance below the grate tubes, is connected to the bottom circulating pipes D by the short end tubes G.

H indicates a transverse bracket or supporting brace secured to the short tubes G, and H' is a similar bracket piece secured to the front wall of the boiler, and on such brack-

ets is journaled a grate of any suitable construction, the object of which is to catch the fine coal that drops through the water tube grate, whereby to more thoroughly consume the smoke.

It will be noticed by reference to Fig. 1 that the vertical water tubes at the sides of the front section as well as the extreme rear end tubes extend from the top or water chamber down to bottom of circulating pipes, while the tubes C' at the sides of the rear section are connected with transverse headers I the ends of which are connected with the bottom pipes D by the short tubes C<sup>2</sup> which form practically extensions of the tubes C'.

J J indicate a series of drop tubes communicating at their upper ends with the water top A while their lower ends are connected with the transverse headers I.

L indicates the masonry which forms the sides and rear ends of the boiler, M the metal front, O the smoke exit, located at the upper rear end, P the flow tubes and Q the return pipes.

From the foregoing description taken in connection with the drawings it will be seen that by constructing a water boiler in the manner stated, I am enabled to obtain the desired results in a rapid, effective and economical manner. By arranging the several circulating pipes the drop tubes and the bottom circulating pipes as shown, provides for a positive circulation to all the tubes from the front header E.

The grate effects a great saving of fuel in that it catches the smaller particles of coal which are drawn through the water tube grate bars, by the down or indirect draft, which draws the fire under the water leg and disseminates it among the drop tubes, as it passes up to escape through the smoke flue at the upper rear end of the rear or drop tube section of the heater.

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

1. A hot water boiler, comprising a hollow top forming a water chamber, a water leg depending from such top, longitudinal circulating pipes at the bottom water tubes connecting such pipes and the top, tubular grate bars communicating with the water leg, the verti-

cal circulating pipes, and an inclosing casing formed with inlet and outlet openings substantially as and for the purpose described.

2. In a hot water boiler in combination, a  
5 hollow top section having a depending water leg, longitudinal circulating bottom pipes, vertical tubes connecting the top and the said bottom pipes, a tubular grate section communicating with the water leg and a grate mounted  
10 under such tubular grate section, and the casing all as and for the purpose described.

3. In a hot water boiler in combination, a hollow top having a depending water leg, vertical tubes depending therefrom at the longitudinal  
15 edges circulating pipes connecting the lower ends of such vertical tubes, transverse circulating pipes connecting the ends of the said longitudinal pipes, tubes connecting the water leg with the said longitudinal pipes,  
20 tubular grate bars connected with the water leg and one of the transverse circulating pipes, and the casing all substantially as and for the purpose described.

4. In a hot water heater the combination  
25 with the hollow top A having a depending water leg, the tubular grate bars, connected to such water leg at a point above the lower

edge thereof, the circulating pipes D, the vertical tubes C, and the transverse circulating pipes, of the vertical pipes C', the transverse  
30 headers I communicating therewith, and the casing all arranged substantially as shown and described.

5. An improved hot water boiler, comprising a hollow top, longitudinal and transverse circulating  
35 base pipes, vertical tubes connecting such top and circulating pipes, a water leg depending from the hollow top, tubes connecting the bottom of such leg with the base pipes, tubular grate flues communicating with the  
40 water leg and circulating pipes, a grate mounted under such tubular grate, a series of drop tubes depending from the rear portion of the top, transverse header tubes connected with the bottom of such tubes, said header communicating with the circulating pipes, and the  
45 casing, formed with the usual feed opening and smoke outlet all arranged substantially as and for the purpose described.

MICHEAL E. HERBERT.

Witnesses:

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