(No Model.)

H. E. CHADWICK.

STEAM OR HOT WATER HEATER.

No. 527,405. Patented Oct. 16, 1894.

Fig. 2.

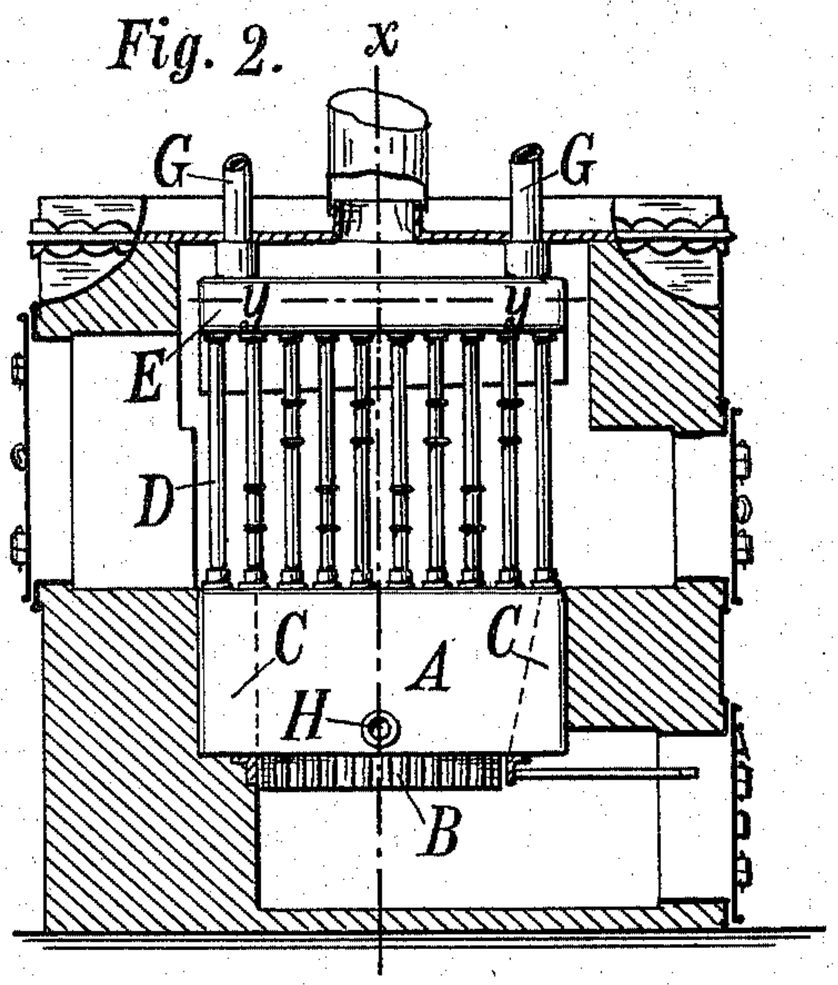


Fig. 1.

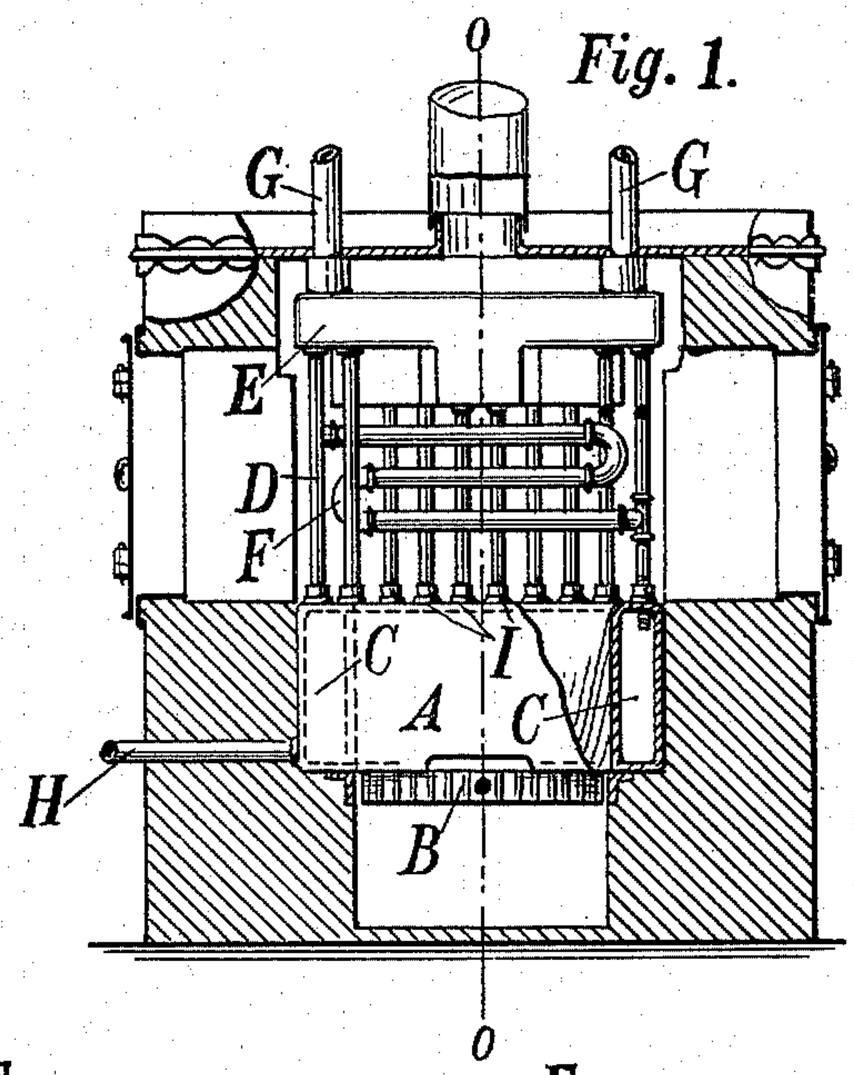
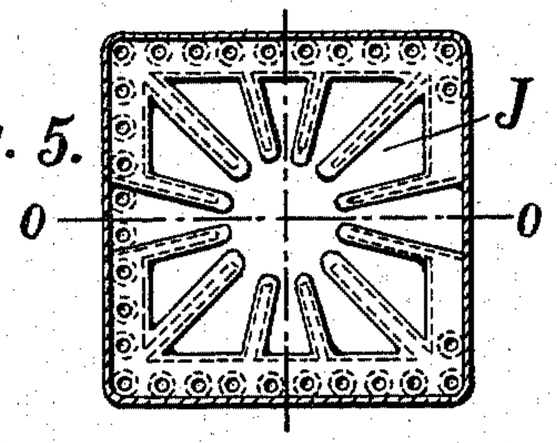


Fig. 5.



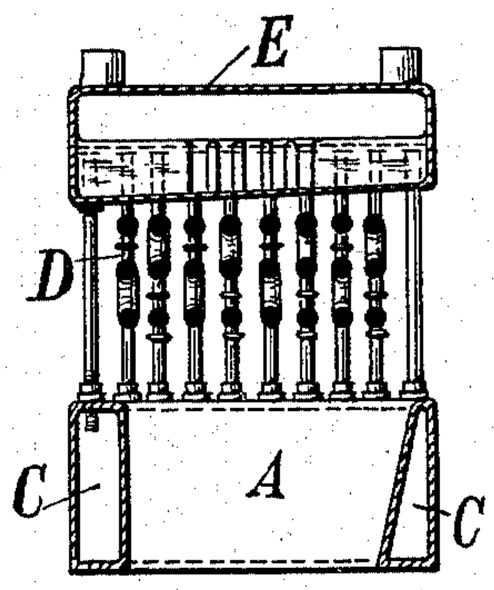


Fig. 4.

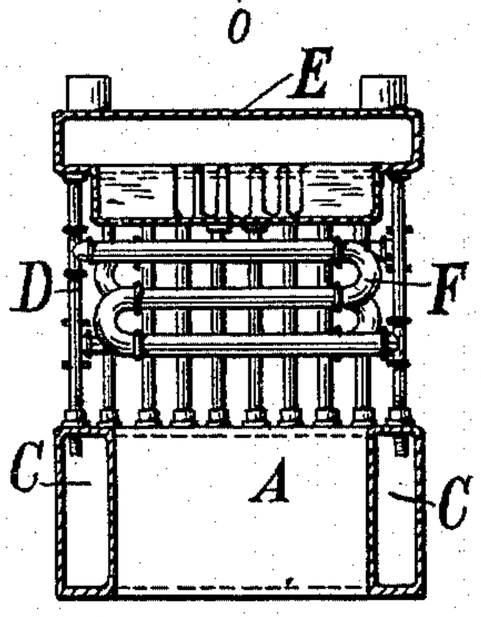


Fig. 3.

Fig. 6.

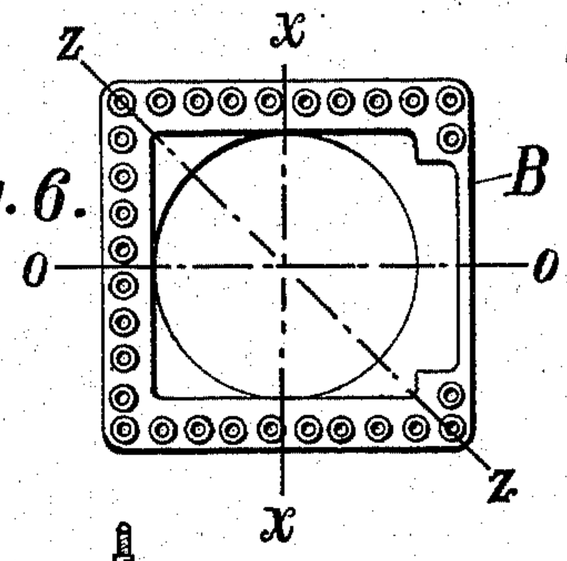
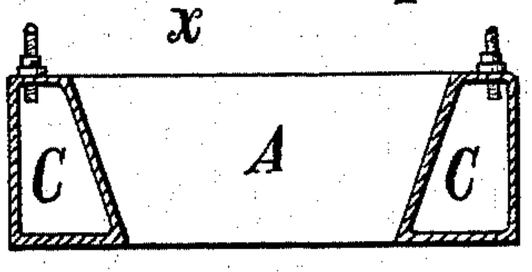


Fig. 7.



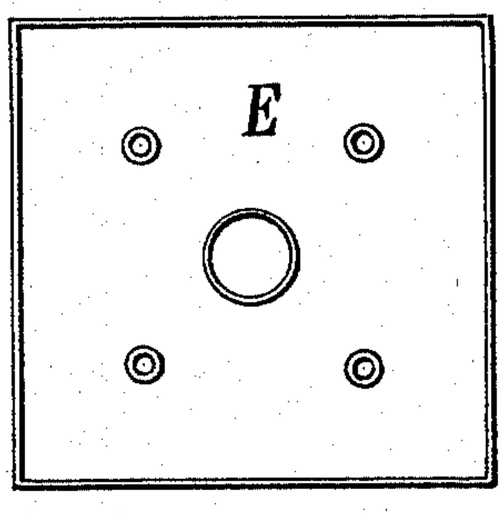


Fig. 8.

Witnesses:

A. E. Marlaine

E. F. Warner

Inventor:

Horace E. Chadwick

by Miller B. Vincent

Att'y.

UNITED STATES PATENT OFFICE.

HORACE E. CHADWICK, OF HOWARD, RHODE ISLAND.

STEAM OR HOT-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 527,405, dated October 16, 1894.

Application filed February 8, 1894. Serial No. 499,454. (No model.)

To all whom it may concern:

Be it known that I, HORACE E. CHADWICK, of Howard, in the county of Providence and State of Rhode Island, have made certain new and useful Improvements in Steam or Hot-Water Heaters; and I do hereby declare that the following specification, taken in connection with the drawings making a part of the same, is a full, clear, and exact description thereof.

Figure 1. is a front elevation of my improved heater in settings, the latter being shown in section. Fig. 2. is a side elevation of same with settings also in section. Fig. 3. is an elevation of heater detached from settings in section on line *x. x.* Fig. 2. Fig. 4. is an elevation of same in section on line *o. o.* Fig. 5. shows the under side of the top. Fig. 6. shows the top of the fire pot. Fig. 7. is a cross section of fire pot. Fig. 8. is a view of the top.

The object of my invention in steam and hot water heaters is to increase the heating surface, improve the circulation and consequently obtain the greatest amount of steam or heated water from a given amount of fuel, and consists in the construction, arrangement and operation of the devices hereinafter described.

The heater is set or bricked up in the ordinary manner, which does not require particular description.

In the drawings A is a square, or nearly square fire pot, below which is a grate B, arranged to be shaken in the usual way.

The fire pot A, is constructed with a hollow water space C, upon its sides, the inner wall of the front side being inclined, whereby the top at the furnace door is so narrow that the coal that falls upon it will not stay there but will pass down upon the inclined inner wall onto the grate below. Connected with the hollow water space C, of the fire pot A, is a series of vertical tubes D, terminating at the upper end, and also connected with the interior water space of a top E; the latter being located directly over the fire pot. The under portion or bottom of the top E, has a series of depressions J, arranged radially to the center, and extending downward toward the fire pot, as shown on Fig. 5; which depressions serve to increase the heating surface to the amount of the area of their vertical sides, which become exposed to the action of the heat. The depressions are not necessarily arranged radially to the center, but such arrangement I deem preferable, for the reason that the surfaces are thus better presented to the fire. Two of these depressions extend from the extreme front to the extreme rear wall of the top with a slight inclination as they go backward, as seen in Fig. 4, so that the water of condensation can be drawn from the top into the fire pot. As there can be no tubes D from the top to the fire box in front or at the furnace door, the extension of the depression of the top out even with the extreme wall of the top utilizes a space that would be otherwise vacant, and thus increases the heating capacity of the heater. The vertical tubes of the series E. attached to the two corresponding sides of the fire pot A. are connected by a series of **S**-shaped tubes F. which pass across and above the fire pot, the alternate **S**-shaped tubes being reversed so as to secure a proper circulation up and down through the vertical pipes.

G. G. are pipes connecting the heater with the radiators and H. is the supply or feed pipe.

Two of the vertical tubes I. I. of the series D. are connected with the depressed portion of the bottom of the top E. to insure the complete drainage when required.

In the operation of my device the water enters through the feed pipe H. first filling the hollow sides of the fire pot A. and then passing from the fire pot into the series of vertical tubes D. and the connecting **S**-shaped tubes F. and finally filling the interior of the top E, the device being equally available for the distribution of steam or hot water. In case the former is required, the water will only be allowed to rise to the level of the line Y. Y. as shown in Fig. 2.

The great area of heating surface furnished by the sides of the fire pot A., the vertical tubes D. with their connecting **S**-shaped

tubes F. and the top E. with its radially arranged depressions, insures the quick operation of the device and the maintenance of the desired degree of heat, with the smallest expenditure of fuel.

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

1. The combination in a steam heater, of a fire pot A having a water space C and a series of tube openings in its upper surface on three sides, of a top E having a series of radial depressions upon its under surface, only one of which extends to the periphery or outer edge of the top and is provided with tube openings, said extended depression being inclined downward as it goes to the rear, whereby the water of all of the depressions can be drawn from the top, and a series of vertical flues for connecting the top and bottom, substantially as set forth.

2. The combination of a fire pot A, having a water space C, and a series of tube openings in its upper surface on three sides, a top E having a series of depressions upon its under surface, two of which extend from the extreme front to the extreme rear and are inclined downward as they go to the rear, and a series of vertical tubes for connecting the bottom and the top along two sides, and the rear end of the extension of the depression to the back of the fire box, substantially as set forth.

HORACE E. CHADWICK.

Witnesses:

WALTER B. VINCENT,

A. E. MACLAINE.