No. 737,784. PATENTED SEPT. 1, 1903.

G. J. SEBALD & C. F. SCHMIDT.

WATER HEATER.

APPLICATION FILED FEB. 16, 1903.

NO MODEL.

Fig. 5.

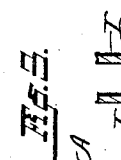


Fig. 4.

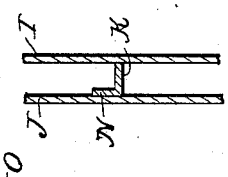


Fig. 2.

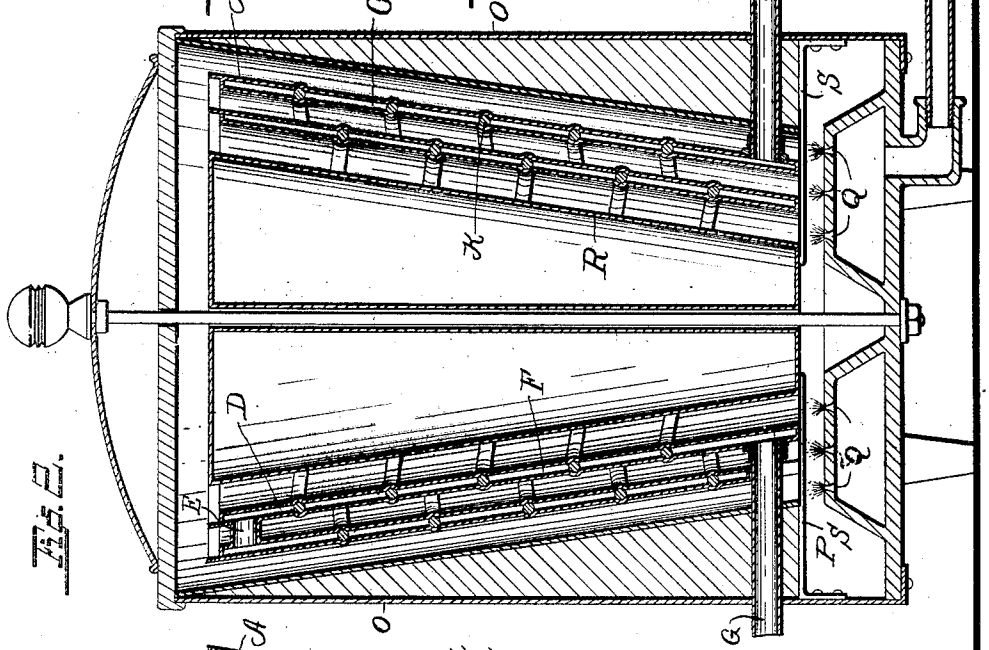
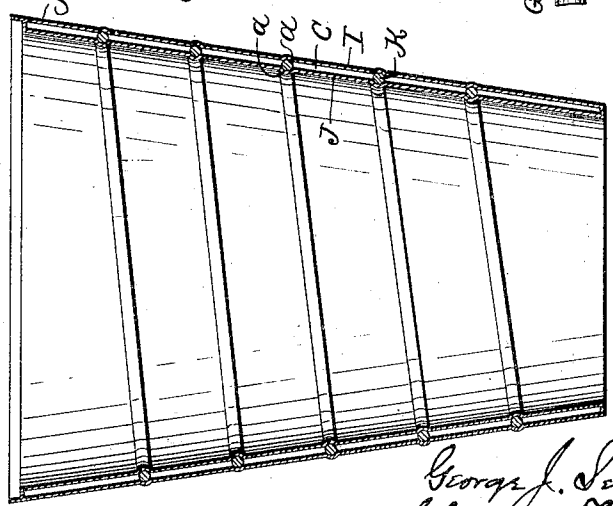


Fig. 7.



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No. 737,784. Patented September 1, 1903.

UNITED STATES PATENT OFFICE.

GEORGE J. SEBALD AND CHARLES F. SCHMIDT, OF MILWAUKEE, WISCONSIN.

WATER-HEATER.

SPECIFICATION forming part of Letters Patent No. 737,784, dated September 1, 1903.

Application filed February 16, 1903. Serial No. 143,482. (No model.)

To all whom it may concern:

Be it known that we, GEORGE J. SEBALD and CHARLES F. SCHMIDT, citizens of the United States, residing at Milwaukee, county of Milwaukee, and State of Wisconsin, have invented new and useful Improvements in Water-Heaters, of which the following is a specification.

Our invention relates to improvements in water-heaters for domestic purposes; and it pertains to that class of so-called "instantaneous" heaters by which a thin film of water is forced through a narrow spirally-formed chamber, the walls of which are heated to a high temperature, whereby the water in passing from the hydrant or other reservoir under pressure through the circulating-chamber to the discharge-faucet is heated to the desired temperature as fast as it is drawn.

The construction of our invention is explained by reference to the accompanying drawings, in which—

Figure 1 represents a vertical section of the circulating-water chamber of our device removed from its inclosure. Fig. 2 represents a vertical section of our heater, including two circulating-chambers and their inclosing walls; and Figs. 3 and 4 represent modified forms of the device for forming the spiral partitions of the circulating-chamber.

Like parts are identified by the same reference-letters throughout the several views.

A is a circulating-chamber into the lower end of which water is admitted from the hydrant through the pipe B, when it passes upwardly in a spiral course through the spiral channel C until it reaches the upper end of said chamber A, when it passes from thence into the interior circulating-chamber D, through the duct E, and from said duct E it passes downwardly in a spiral course through the spiral channels C and F until it reaches the lower end of said circulating-chamber D, when it passes outwardly through the discharge-pipe G to the place of discharge.

The chamber A comprises the two conical-shaped vertical walls I and J, while the space between said walls is subdivided into a spiral channel C by the spiral partition K, whereby the water in passing from the inlet B to the outlet G of the heater is passed to traverse a spiral course upwardly through the circulating-chamber A and downwardly through the circulating-chamber D. The partition K is preferably formed of wire, as indicated in Figs. 1 and 2, which wire is, when constructing the heater, first wound in a spiral course from one end to the other of the inner wall J of the circulating-chamber, when it is thus secured in place, preferably with solder, when the exterior wall I is forced over the coils of said wire from the smaller toward the larger end of the inner conical-shaped wall, when owing to the conical shape of the respective walls I and J they are drawn firmly against and around the partition-wire K as they are being thus forced together, whereby a tight joint is formed between said partition-wire and the respective walls I and J which causes the water to circulate through the channels C and F, as stated, in passing from one end to the other of the respective circulating-chambers. To more securely retain said spiral partition K in place, the walls I and J are preferably provided with spiral corrugations *a a*, as indicated upon the respective sides of said partition-wire, whereby said wire is retained between the opposing concave surfaces of said walls and whereby a closer joint is formed between such parts.

To economize material, the partitions K may, if desired, be formed, as indicated in Figs. 3 and 4, of sheet metal, which is first cut into narrow strips and then bent into the desired shape to serve as a partition. In Fig. 3 the partition is formed by bending the strip into a T shape, comprising the central bend and the two right-angular bends M, while the form of partition shown in Fig. 4 is made from a narrow strip of sheet metal, which is bent in a rectangular shape, (indicated at N.) It will be obvious, however, that the form of the partition may be varied indefinitely without departing from the spirit of our invention.

It will be understood that the walls of the circulating-chambers are connected together at their respective ends and that said chambers A and D are supported from the inclosing walls O of the heater above the combustion-chamber P by brackets S or other equivalent means. The combustion-chamber P is provided with a plurality of annular series of burners Q, one series located between the

exterior circulating-chamber A and the inclosing walls O, another series of burners located between the circulating-chambers A and D, and still another series between the inner circulating-chamber D and the conical-shaped deflecting-wall R, whereby the heat as it ascends from the combustion-chamber to the top of the inclosure is caused to traverse the entire surface of both the interior and exterior walls of such circulating-chambers. It will be understood that the conical-shaped deflector K serves to deflect the heat as it rises from the inner series of burners outwardly and against the inner wall of the inner circulating-chamber D, whereby the fuel is used with the greatest economy.

While we have shown two circulating-chambers, we do not wish to limit our invention to the number of circulating-chambers used nor to the specific arrangement of said chambers with each other and the inclosure, as it is obvious that the number of circulating-chambers may be increased or diminished to meet the requirements of the user. It will also be obvious that the heating capacity of our device will be increased by increasing the number of circulating-chambers employed and the area of the heating-surfaces of the circulating-chambers. It will be understood that by connecting the inlet water-duct in the manner shown with the exterior circulating-chamber all water passing through the heater will be compelled to pass in a spiral course from the lower end of said first circulating-chamber to its upper end and from thence downwardly through the interior circulating-chamber through each spiral channel successively until it reaches the lower end of said inner chamber before it can escape.

While we have shown the inlet-pipe connected with the exterior circulating-chamber and the outlet-pipe connected with the interior circulating-chamber, it will be understood that the same result may be obtained by connecting the inlet water-duct with the interior chamber and the outlet water-duct with the exterior chamber, as in either case all the water will be compelled to pass through all the channels of the respective circulating-chambers before it escapes therefrom.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a water-heater, a circulating-chamber comprising two spirally-grooved conical-shaped walls, one located within the other and connected together at their respective ends; a spiral partition located in said spiral grooves between the opposing walls of said chamber, substantially as set forth.

2. In a water-heater of the class described, the combination of a plurality of conical-shaped water-circulating chambers; arranged one within the other, concentric to each other diverging outwardly and upwardly from their lower to their upper ends; a conical-shaped deflector located within the innermost of said circulating-chambers; an exterior inclosing wall arranged concentric to said circulating-chambers; a combustion-chamber; a plurality of series of burners, located beneath the lower ends of said circulating-chambers, said series being adapted respectively to register with the space between the said circulating-chambers, and between said chambers and their inclosing walls; an inlet-duct communicating from the water-supply under pressure with one of said circulating-chambers at its lower end; a water-duct communicating from said first-named circulating-chamber to the next in the series, at their upper ends; and a water-duct communicating from the lower end of the second circulating-chamber with the exterior; all substantially as and for the purpose specified.

In testimony whereof we affix our signatures in the presence of two witnesses.

GEORGE J. SEBALD.
CHARLES F. SCHMIDT.

Witnesses:
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