June 10, 1930. T. W. DAHLQUIST 1,762,215

HOT WATER BOILER

Filed April 3, 1928

Fig. 1.

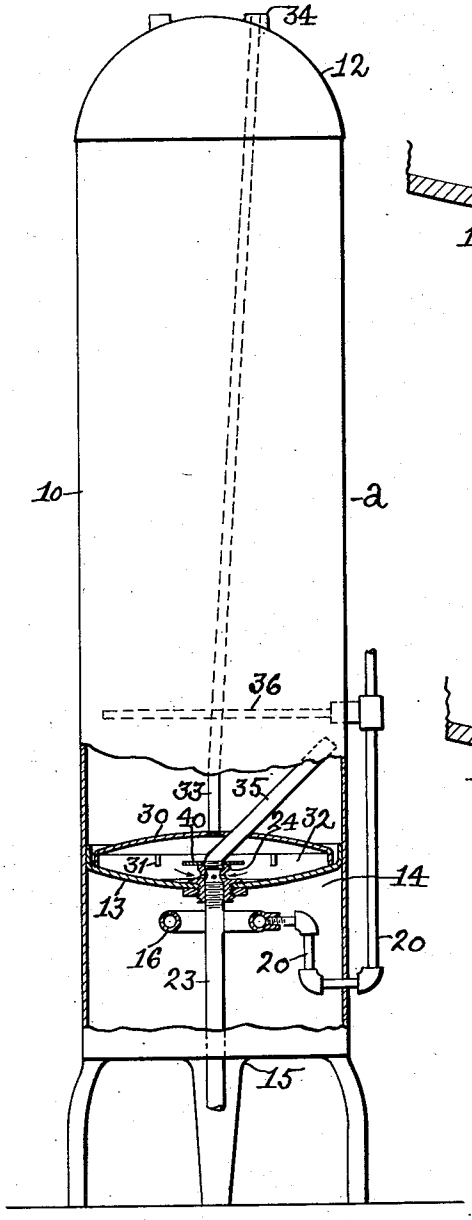


Fig. 2.

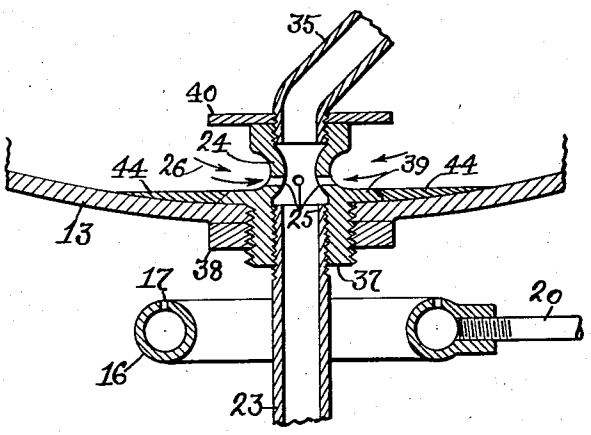
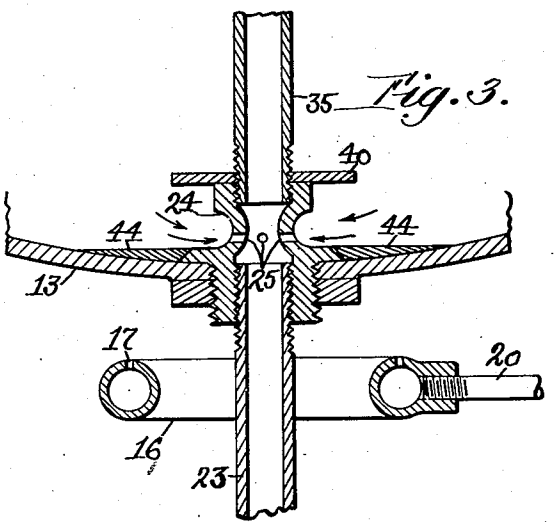


Fig. 3.



Inventor:
Theodore W. Dahlquist
By Jas. H. Churchill Atty.

Patented June 10, 1930 1,762,215

UNITED STATES PATENT OFFICE

THEODORE W. DAHLQUIST, OF DEDHAM, MASSACHUSETTS

HOT-WATER BOILER

Application filed April 3, 1928. Serial No. 267,000.

This invention relates to a hot water boiler of that character employing a heating unit located below and in proximity to the bottom of the boiler.

The heating unit usually employed is a burner for gas, oil and the like,

Hot water boilers of the character described are of relatively short life and of decreasing efficiency, due to the formation of a layer of scale, sediment and the like on the upper surface of the bottom of the boiler, which layer serves to insulate the body of water within the boiler from the bottom plate thereof, and thereby causes the bottom plate to be burnt out in a relatively short time.

The present invention has for one of its objects to avoid these objectionable features and provide a more efficient and durable boiler of the character described.

Another object of the invention is to accomplish these results in a boiler having a partition near its bottom which forms a hot water chamber within the boiler which is connected directly with the hot water outlet of the boiler.

To these ends provision is made for preventing the formation of a layer of scale, sediment and the like on the upper surface of the bottom plate of the boiler, as will be described.

These and other features of this invention will be pointed out in the claims at the end of this specification.

Fig. 1 represents in elevation and section one form of boiler embodying the present invention.

Fig. 2, an enlarged section of the bottom plate of this boiler, the gas heater, and the water inlet pipe for the boiler.

Fig. 3, an enlarged section of a modified construction to be referred to.

Referring to the drawing, *a* represents a hot water boiler, similar to that commonly used in households, and provided with a body portion 10, a head 12, and a bottom 13, all of metal such as steel or copper. The body portion 10 is herein shown as extended below the bottom plate 13, to form a chamber 14 above a supporting stand 15, and in which is located a burner 16, for gas, oil or like fuel.

The burner 16 will be hereinafter referred to as a gas burner, and it may be of any suitable or desired construction. It is shown as an annular hollow ring provided with gas outlet ports 17. The gas burner 16 is fed with gas from a suitable source by a pipe 20, and is located in proximity to the bottom plate 13 of the boiler, so that the flame from the burner contacts with the bottom plate.

To prevent the flame from the burner from burning out the bottom plate of the boiler, and also to get the full benefit of burner for heating the water in the boiler, provision is made for setting in motion the water in the boiler adjacent the bottom plate 13 thereof, so as to prevent said bottom plate from being covered on its upper surface with a layer of scale, sediment or the like, which if permitted to form, would more or less insulate the body of water from the bottom plate and thereby decrease the efficiency of the boiler, and also would in time cause the burner to burn out the bottom plate and render the boiler useless until the burnt out bottom plate had been replaced.

In the present instance, I have illustrated one construction for setting the water which contacts with the bottom plate of the boiler in motion.

The construction herein shown is preferred by me and consists of a water inlet pipe 23, preferably the cold water inlet pipe for the boiler, which is extended up through the bottom plate 13 and is provided immediately above the bottom plate with a contracted section 24, provided with one or more ports or openings 25, which connect the inlet pipe 23 with the boiler adjacent the bottom plate thereof, so that when cold water is supplied

to the boiler through the pipe 23, its velocity is increased by the contracted section 24, and the water at the bottom of the boiler is drawn into the inlet pipe 23 through the ports 25, as indicated by the arrows 26, and is discharged into the boiler at a higher level. It will thus be seen that any scale forming material in the water and any mud or sediment in the water is prevented from permanently accumulating on the bottom plate.

In the present instance, the boiler is provided with a partition 30, having legs 31 which rest upon the bottom plate 13 of the boiler, and said partition forms a hot water chamber 32 from which hot water is led through an outlet pipe 33 to the hot water outlet 34 in the head of the boiler, with which the hot water faucet is connected in the usual manner by a pipe not shown. To enable the present invention to be embodied in a boiler of this type, the water inlet pipe 23 is provided above the contracted portion with a bent or inclined section or portion 35, which passes through a suitable opening in the partition 30, and has its upper end terminated below a thermostatic valve-operating device represented by the dotted lines 36 in Fig. 1. Preferably the contracted portion 24 of the cold water inlet pipe is made as a casting, which is provided at its lower end with a nipple 37 of sufficient length to extend through the bottom plate 13. The nipple 37 is externally threaded to be engaged by a nut 38, which cooperates with a flange 39 to clamp the pipe section 24 to the bottom plate 13. The nipple 37 is internally threaded to be engaged by the threaded end of the section of the cold water inlet pipe located outside of the boiler. The casting 24 is internally threaded at its upper end to be engaged by the section 35 of the cold water inlet pipe. Preferably the section 35 will have screwed thereon a disk 40, which acts as a dam or obstruction to prevent the muddy water passing into the hot water outlet pipe 33. The outlet section 35 of the cold water inlet pipe is carried above the partition 30 and has its upper end in proximity to the thermostatic device 36, so that when hot water is being drawn from the chamber 32 through the outlet pipe 33, the cold water enters the boiler and is discharged therein above the partition 30 and the sediment which may be present in the boiler at the bottom thereof is drawn through the ports 25 and discharged into the boiler above the partition 30, and as long as the cold water is being supplied to the boiler, this sediment is circulated from the bottom of the boiler through the cold water inlet pipe 23 and discharged into the boiler at a material distance above the bottom of the same.

It will thus be seen that this circulation of the water has a scouring action on the bottom plate of the boiler, and serves to keep the latter clean and to prevent the accumulation of a layer of scale, sediment and the like on the upper surface of the bottom plate, and thereby increases the efficiency of the boiler, as the water contacting with the bottom plate is subjected to the maximum heat from the burner. It will also be seen that the bottom plate of the boiler is prevented from being burnt out by the heat from the burner, which avoids loss of service of the boiler and cost of replacing the burnt out bottom plate.

The sediment and the like is circulated from the boiler through the cold water inlet pipe and back to the boiler as long as cold water is entering the boiler, and when the cold water stops flowing into the boiler, the sediment in the water discharged into the boiler descends slowly to the bottom of the boiler and the sediment in the portion of the water in the cold water inlet pipe can descend into the portion of said pipe outside of the boiler. Inasmuch as the cold water is admitted into the boiler at frequent intervals, the sediment, mud, and the like does not have an opportunity to rest upon the bottom of the boiler for a period of time sufficiently long to form a permanent layer thereon.

While the invention is particularly advantageous for use with a boiler having the partition 30 and the hot water outlet pipe 33, it is also capable of being used to advantage with a boiler of ordinary construction in which said partition and outlet are not present, and when used with an ordinary boiler, the outlet section 35 of the cold water inlet pipe may be made straight as represented in Fig. 3. The nipple 37 is preferably soldered to the upper surface of the bottom plate of the boiler, which surface is thereby rendered smooth. The solder is represented by the numeral 44. The thermostatically controlled valve which controls the supply of gas to the burner is not herein shown in detail, as it is of known construction and in common use, and constitutes no part of the present invention. The thermostat represented by the dotted lines 36 functions to open the valve when the temperature of the water in the boiler falls to a given point, and to close the valve when the temperature of the water rises to a given point.

A preferred construction embodying the invention is herein shown, but it is not desired to limit the invention to the particular construction shown.

What is claimed is:

1. The combination with a hot water boiler provided with a head having a hot water outlet, and with a partition near the bottom of the boiler forming a hot water chamber, and with a hot water outlet pipe connecting said hot water chamber with said hot water outlet, of a cold water inlet pipe for said boiler extended through the bottom thereof and through said partition and provided with a port communicating with said hot water

chamber for the passage of water from said chamber into said inlet pipe.

2. The combination with a hot water boiler provided with a partition near the bottom of the boiler forming a hot water chamber, of a cold water inlet pipe for said boiler extended through said hot water chamber and discharging into the boiler above the said partition, and provided within the hot water chamber with a port communicating with said chamber for the passage of water from said chamber into said pipe.

In testimony whereof, I have signed my name to this specification.

THEODORE W. DAHLQUIST.