Nov. 9, 1937. H. H. EVERHARD 2,098,489

HOT WATER HEATER

Filed Sept. 5, 1936 2 Sheets-Sheet 1

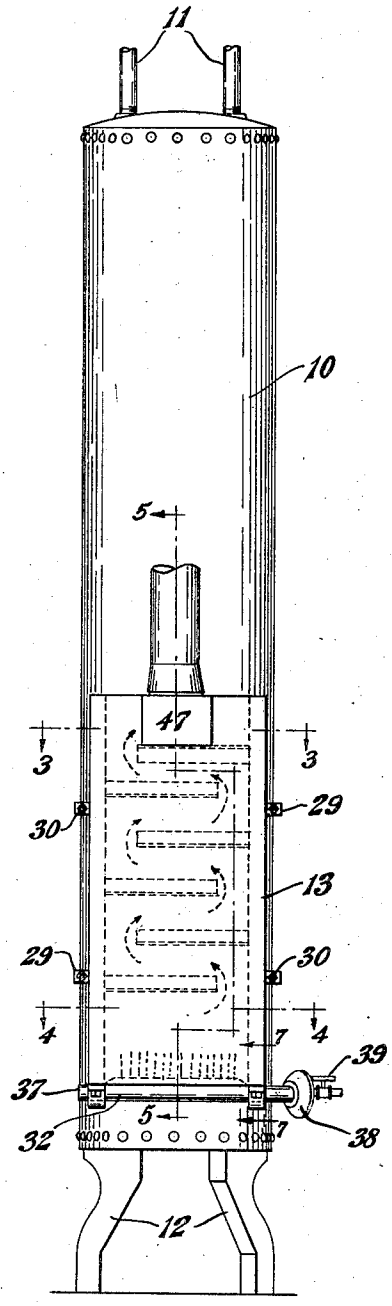


Fig. 1

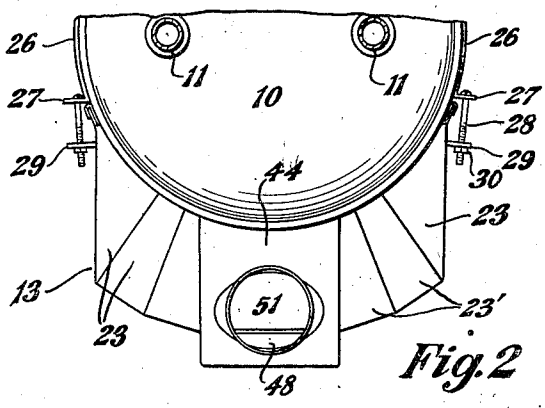


Fig. 2

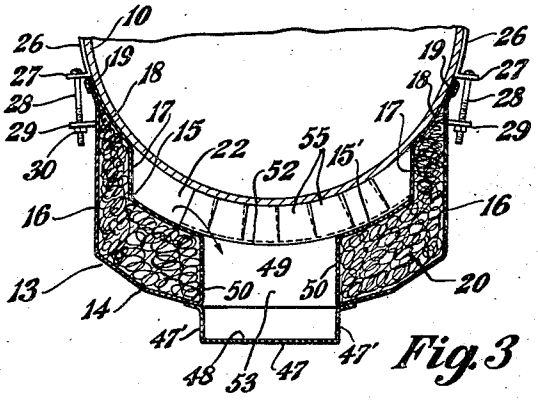


Fig. 3

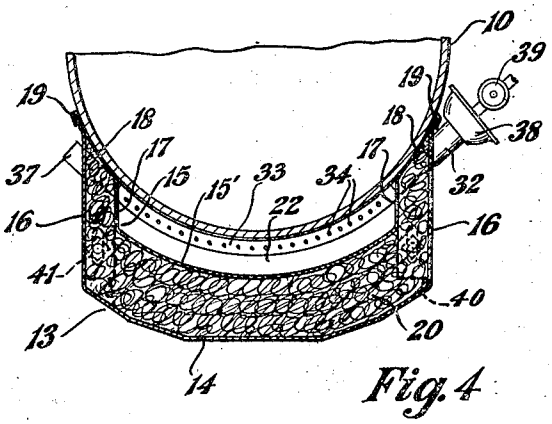


Fig. 4

Inventor

Harry H. Everhard

By Frease and Bishop

Attorneys

Nov. 9, 1937. H. H. EVERHARD 2,098,489

HOT WATER HEATER

Filed Sept. 5, 1936 2 Sheets-Sheet 2

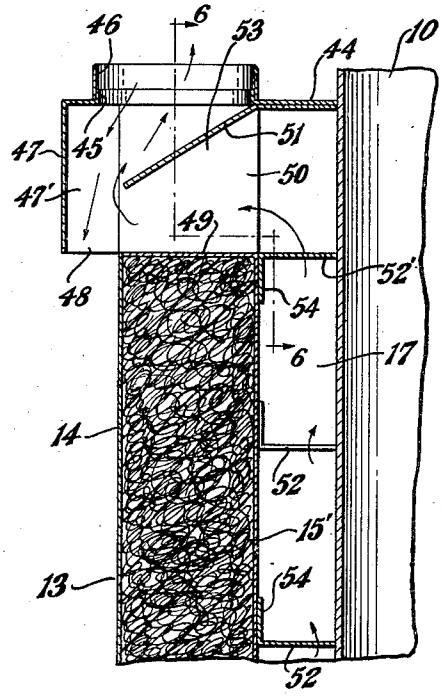


Fig. 5

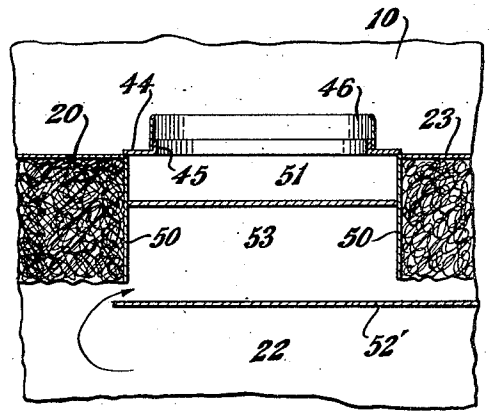
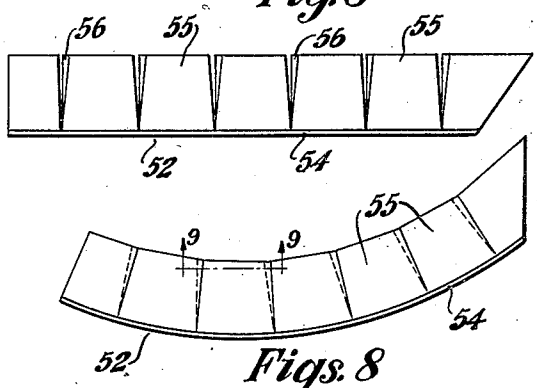


Fig. 6



Figs. 8

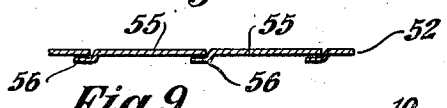


Fig. 9

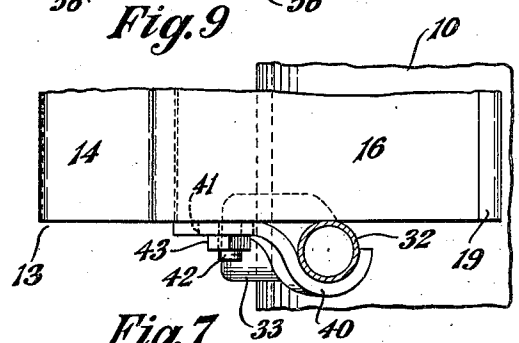


Fig. 7

Inventor

Harry H. Everhard

By Frease and Bishop

Attorneys

Patented Nov. 9, 1937

2,098,489

UNITED STATES PATENT OFFICE

2,098,489

HOT WATER HEATER

Harry H. Everhard, Canton, Ohio

Application September 5, 1936, Serial No. 99,590

7 Claims. (Cl. 122—14)

The invention relates generally to hot water heaters and in particular to a heating attachment to be applied around the side of an ordinary hot water tank or boiler.

Hot water boilers of any standard size vary considerably in diameter and curvature, as for instance, a heavy duty boiler may have a larger diameter than a lighter one of the same standard size, and a boiler may be considerably out of round due to the method of manufacture thereof.

The difficulty with prior heating attachments to be applied to the side of a hot water boiler is that they are adapted for fitting a standard size boiler having exact dimensions, and can not be adjusted for variations in diameter and curvature.

Furthermore, in localities where the water is hard the deposit and accumulation of lime or scale is an ever present problem, not only where heat is applied directly to the bottom of the boiler, but also where it is applied to a pipe coil at the side of the boiler, in which latter case the coil has to be renewed at frequent intervals.

It is a principal object of the present invention to provide a heating attachment for a hot water boiler which is adapted to fit around standard size boilers regardless of variations in diameter and curvature.

Another object is to provide a heating attachment which will heat the water in the boiler efficiently and at the same time produce a minimum amount of lime or scale deposit.

Another object is to provide a heating attachment for a hot water boiler which includes baffle means for retarding the flow of hot gases and thereby increasing the efficiency of the heater.

And finally, it is an object of the present invention to provide an improved construction attaining all of the foregoing objectives, which construction is inexpensive to make, and is easily attached to a standard size hot water boiler without interfering in any way with its usual fittings.

These and other objects are accomplished by the improvements comprising the present invention, which may be briefly stated as including a concavo-convex flexible sheet metal shell having a heat insulating chamber and adapted for fitting around the side of a hot water boiler and forming therewith a narrow heating chamber, said heating chamber having a series of circumferentially adjustable baffles for conforming to the wall of the boiler.

In the drawings forming part hereof

Figure 1 is an elevational view of a hot water boiler showing the improved heating attachment applied to the side thereof;

Fig. 2 is an enlarged plan view thereof;

Fig. 3 is an enlarged transverse sectional view as on line 3—3, Fig. 1;

Fig. 4 is an enlarged transverse sectional view as on line 4—4, Fig. 1;

Fig. 5 is an enlarged longitudinal section taken circumstantially on line 5—5, Fig. 1;

Fig. 6 is a sectional view taken on line 6—6, Fig. 5;

Fig. 7 is an enlarged fragmentary section taken on line 7—7, Fig. 1;

Fig. 8 is a view showing the manner of forming the baffles; and

Fig. 9 is a sectional view as on line 9—9, Fig. 8.

Similar numerals refer to similar parts throughout the drawings.

In Figure 1 of the drawings is shown an ordinary cylindrical hot water boiler 10 having the usual water connections 11, and supported on the feet 12. The improved heating attachment is indicated generally at 13 and is secured to the side wall of the boiler 10 at the lower portion thereof.

The heating attachment 13 comprises a flexible sheet metal shell substantially concavo-convex in cross section, and includes an outer shell member 14 and an inner shell member 15. The outer shell member 14 is preferably formed to be polygonal in shape and has the inwardly directed side walls 16 integral therewith.

The inner shell member 15 has a longitudinally extending arcuate wall 15' which is provided with inwardly directed side walls 17 having angular curved portions 18 substantially conforming to the curved wall of the boiler 10. The inner edges of the flange portions 18 are preferably crimped around the inner edges of the side walls 16 of the outer shell member 14, as at 19, so as to form a substantially U-shaped heat insulating chamber which is filled with asbestos wool 20 or other suitable heat insulating material.

The heat insulating material 20 thus surrounds on three sides the narrow heating chamber 22 formed between the arcuate wall 15' of the inner shell member 15 and the circular wall of the boiler 10. The top wall 23 and the bottom wall 24 of the heating attachment are formed by slitting the end portions of the outer shell member at the corners of the polygonal sides thereof and bending the resulting leaves or portions 23' in overlapping relation angularly inward towards the boiler, so that said walls are circumferentially adjustable as indicated in Fig. 2. The bottom wall

24, however, is preferably bent upwardly behind the wall 15' of the inner shell member as shown at 25, so that the heating chamber 22 is open at its lower end, as best shown in Fig. 5.

The heating attachment 13 may be attached to the boiler 10 by means of metal straps 26 which encircle the boiler and preferably have flanged ends 27 through which bolts 28 are inserted. The bolts 28 are passed through lugs 29 which are secured to the heating attachment in a suitable manner, and the straps 26 clamp the heating attachment to the boiler by means of nuts 30 bearing against lugs 29.

A burner is secured to the heating attachment in the lower open end of heating chamber 22, and the burner may comprise an arcuate pipe 32 substantially conforming to the curve of the boiler wall, and preferably flattened vertically between its end portions, as best shown at 33 in Fig. 5. The flattened portion 33 is provided with a series of burner holes 34 for discharging gas, and by flattening the pipe, ample space 36 is provided for admission of secondary air for combustion. The burner pipe 32 is closed at one end 37 and is provided at its other end with the usual mixing chamber 38 and gas valve 39.

The burner pipe 32 is adjustably connected to the bottom wall 24 of the heating attachment by means of bracket arms 40 supporting the pipe and having slots 41 through which studs 42 pass and are clamped to the bracket arms by nuts 43. Thus the burner may be adjusted to hug the wall of the boiler after the heating attachment is clamped thereto.

The central portion of the top wall 23 of the heating attachment is cut out to form a rectangular opening in which an L-shaped plate 44 is fitted. The top flange of the L-shaped plate 44 is provided with a flanged opening 45 for taking the usual flue pipe connection 46. The depending flange 47 of the L-shaped plate preferably projects or extends outwardly beyond the outer shell member 14, and has rearwardly extending walls 47' secured to shell member 14 so as to form a down draft flue opening 48.

The L-shaped plate 44 forms the top and outer walls of a flue compartment 53, the bottom wall 49 thereof being formed by bending the upper end portion of wall 15' of the inner shell downwardly as shown in Fig. 5, and the side walls 50 thereof being formed by bending the central portions of the outer shell inwardly, as shown in Fig. 3.

An angular plate 51 is secured to the top flange of plate 44 behind the flue opening 45 to form a baffle plate for directing down or back drafts from the flue out of the opening 48 to the atmosphere.

The heating chamber 22 is provided with a series of vertically spaced baffles 52 which extend radially between the inner shell member 15 and the boiler. The baffles 52 are staggered by spacing alternate ends from side walls 17 of the heating chamber so as to retard the flow of gases in the heating chamber and cause them to follow a zigzag path as indicated in Fig. 1. The top baffle 52' is located at the bottom wall of the flue compartment 53, and its one end being spaced from adjacent wall 17 provides communication between chamber 22 and compartment 53 at the inner side of said compartment.

The baffles 52 and 52' preferably have angular flanges 54 which may be welded to the inner shell member 15, and the horizontal flange of each baffle is slit into leaves or segments 55, as shown in Fig. 8. By thus slitting the horizontal flanges of the baffles and forming one slit edge of each leaf with an angular overlapping flange 56, the baffles may be bent to circumferentially conform to the curvature of the boiler wall regardless of variations of diameter or curvature.

Since the outer and inner shell members are constructed of flexible sheet metal and the top and bottom walls of the outer shell are formed by overlapping portions, when the bolts 28 are drawn up to clamp the heating attachment to the boiler wall, the shell members will also conform to the variations in diameter and curvature of the boiler wall.

The improved heating attachment is inexpensive to make and is easily attached to a standard size boiler without interfering in any way with its usual fittings.

With the present construction heat is applied to the relatively large body of water in the tank directly through the thin side wall of the boiler, instead of a small body of water as in a coil heater, with the result that the temperature of the water can be maintained below 180° F., at which temperature very little lime or scale is deposited.

Any sludge or lime deposit in the water will settle to the bottom of the boiler where it does not act to insulate the heat from the water and decrease heating efficiency as well as increase lime deposit, because the transfer of heat to the water occurs at the side of the boiler above the deposit in the bottom, and the side wall of the boiler is kept free and clean of sludge and lime deposit.

I claim:

1. A heater for a cylindrical hot water boiler, including a flexible shell adapted for fitting around the side of the boiler and forming therewith a narrow heating chamber, said shell having a heat insulating chamber outside of said heating chamber, and a series of circumferentially adjustable arcuate baffles in the heating chamber for conforming to the curved wall of said boiler.

2. A heater for a hot water boiler, including a shell for fitting around the side of the boiler, said shell having walls forming an inner heating chamber and an outer heat insulating chamber, walls forming a flue passage extending across both of said chambers at one end of said shell and projecting beyond said insulating chamber and communicating with said heating chamber, a flue communicating with said flue passage, and means in said flue passage for directing back drafts from said flue out of said flue passage to the atmosphere.

3. In combination with a cylindrical hot water boiler, a concavo-convex flexible shell for fitting around the side of the boiler and forming a narrow heating chamber therewith, means securing said shell to said boiler, a burner at one end of said heating chamber, a flue passage communicating with other end of said heating chamber, and a series of staggered circumferentially collapsible adjustable baffles in the heating chamber for conforming to the circular wall of said boiler.

4. A heater for a hot water boiler, including a shell for fitting around the side of the boiler and having an inner heating chamber and an outer heat insulating chamber, walls forming a flue compartment extending across both chambers at one end of said shell, a flue connection at the upper side of said compartment, the rear end of said compartment communicating with said heating chamber and the front end projecting over said heat insulating chamber to form a downwardly directed opening to the atmosphere, and a

baffle wall in said compartment for directing back drafts from the flue connection directly out through said downwardly directed opening.

5. A heater for a cylindrical hot water boiler, including an elongated flexible shell having an open side for forming an elongated heating chamber alongside the boiler, the outer walls of the shell forming a heat insulating chamber at the rear and sides of the heating chamber, a closure at one end of said heating chamber and an arcuate burner secured to the shell at the other end of said chamber, said burner being adapted to direct flames upwardly alongside of said boiler, and radially extending circumferentially collapsible baffle plates in the heating chamber for retarding the gases passing therethrough.

6. A heater for a cylindrical hot water boiler, including a flexible elongated shell for fitting around the side of the boiler and forming therewith a narrow heating chamber, said shell having circumferentially adjustable top and bottom walls and a heat insulating chamber outside of said heating chamber, and a series of circumferentially adjustable baffles in the heating chamber for conforming to the curved wall of the boiler.

7. A heater for a hot water boiler, including a shell for fitting around the side of the boiler, said shell having walls forming an inner heating chamber and an outer heat insulating chamber, walls forming a flue passage communicating with said heating chamber and extending across and beyond said insulating chamber for communicating with the atmosphere, and a flue communicating with said flue passage.

HARRY H. EVERHARD.