May 20, 1941. G. A. CLOSE 2,242,744

BOILER

Filed Aug. 19, 1938 2 Sheets-Sheet 1

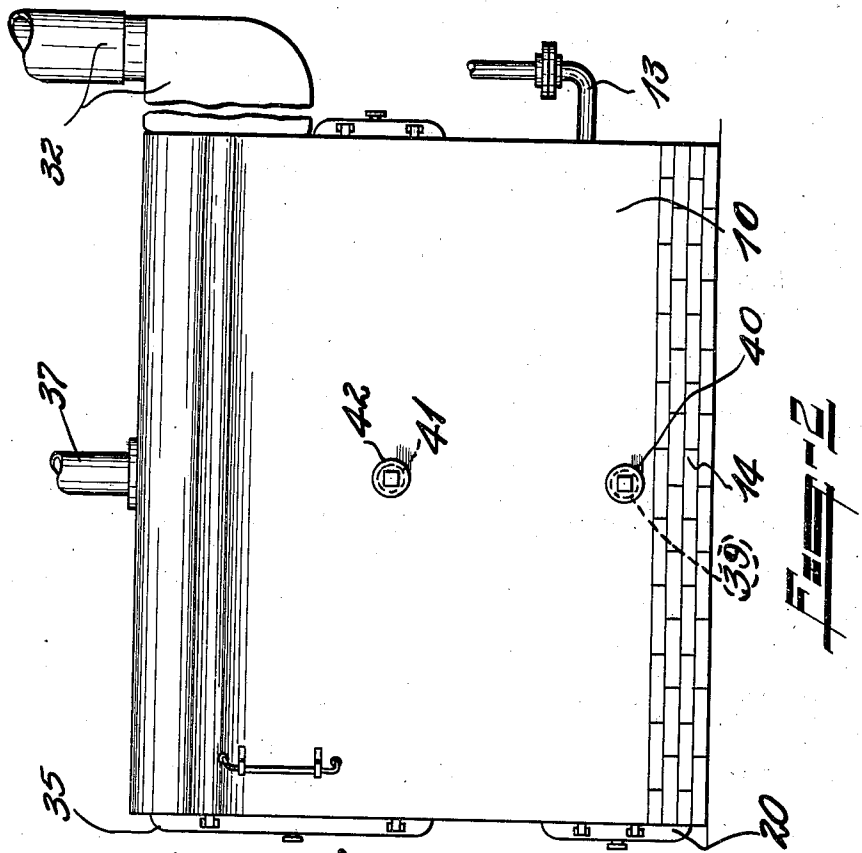


Fig. 2

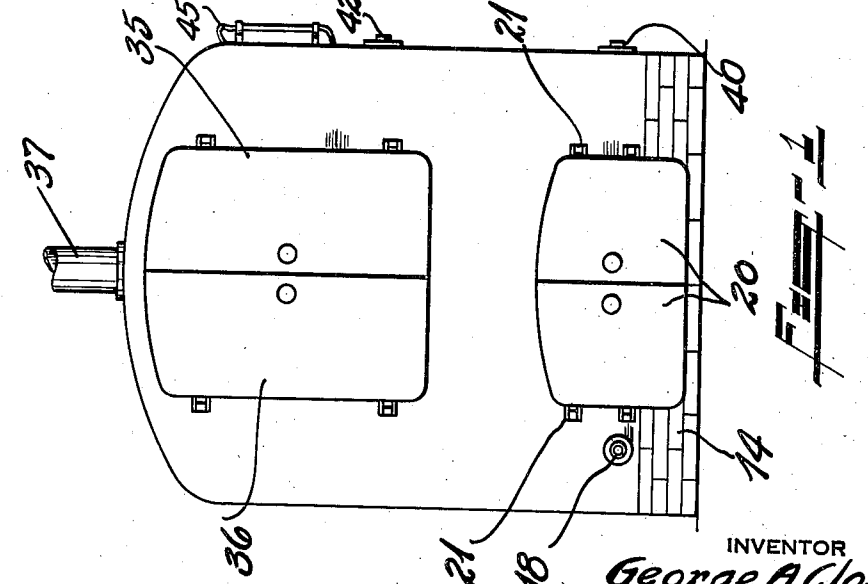


Fig. 1

INVENTOR
George A. Close
BY
Frank C. Fearman
ATTORNEY

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BOILER

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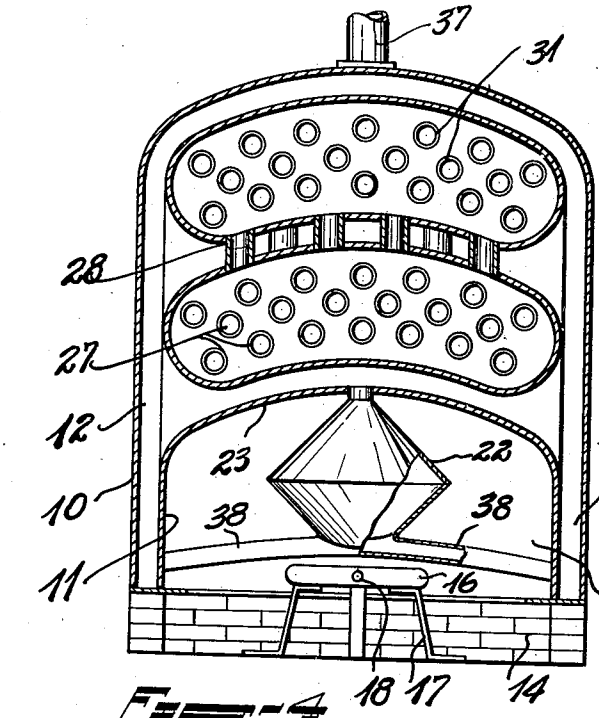


Fig-4

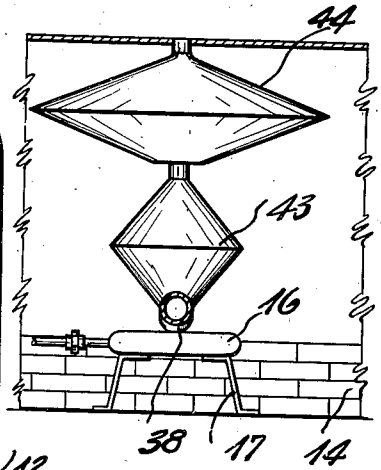


Fig-5

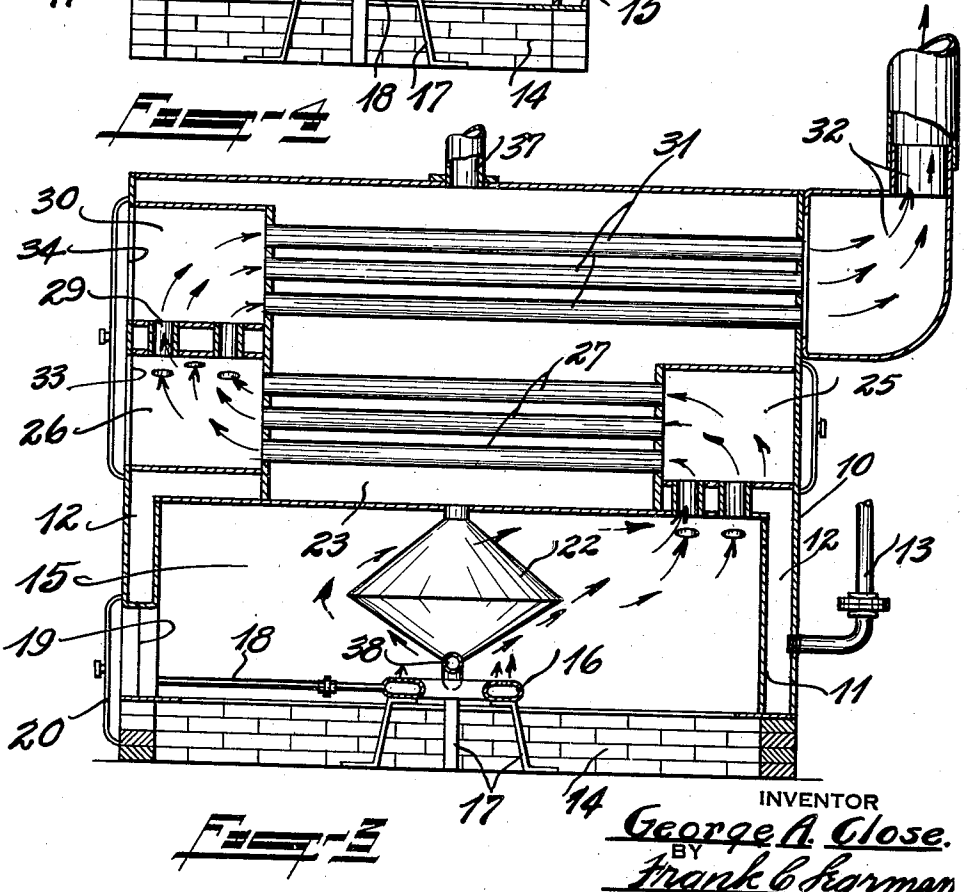


Fig-3

INVENTOR
George A. Close.
BY
Frank C. Harman
ATTORNEY

Patented May 20, 1941 2,242,744

UNITED STATES PATENT OFFICE

2,242,744

BOILER

George A. Close, Bay City, Mich.

Application August 19, 1938, Serial No. 225,668

1 Claim. (Cl. 122—503)

This invention relates to boilers and more specifically to boilers for use in homes, manufacturing plants, buildings, and other places where a heat unit is required.

One of the prime objects of the invention is to design a boiler formed of suitable plate welded together at the joints to form an all-welded structure, and to so locate the various parts that they are readily and easily accessible for assembly, removal or repair.

Another object of the invention is to design a gas fired boiler having a conical shaped water vessel disposed in the combustion chamber directly above the flame from the burner, thus spreading the hot gases and utilizing the full effect of the burner.

A further object of the invention is to provide a boiler provided with a plurality of arches and flue units, and provide suitable communicating openings from one arch or unit to the next, so that the gases travel a tortuous path and all of the heat units are utilized.

A still further object is to provide a double walled boiler including a centrally disposed water vessel, thus providing ample water space, and provide means for readily cleaning and flushing the water chamber.

A further object still is to provide a boiler structure, all of parts which are readily accessible, which will be comparatively light in weight, efficient in operation, and economical to manufacture and assemble.

With the above and other objects in view, the present invention consists in the combination and arrangement of parts, hereinafter more fully described, illustrated in the accompanying drawing, and more particularly pointed out in the appended claim, it being understood that changes may be made in the form, size, proportions, and minor details of construction, without departing from the spirit, or sacrificing any of the advantages of the invention.

In the drawings:

Fig. 1 is a front elevational view of my improved boiler.

Fig. 2 is a side elevational view thereof.

Fig. 3 is a longitudinal sectional view through the boiler.

Fig. 4 is a transverse sectional view thereof.

Fig. 5 is a fragmentary side elevational view showing a modified design of water vessel.

Referring now more particularly to the drawings in which I have shown the preferred embodiment of my invention, the numerals 9, 10 and 11 indicate the spaced apart walls of a sheet metal boiler formed as clearly shown in Figs. 3 and 4 of the drawings, these walls forming a chamber 12 therebetween to receive water supplied from a central source by means of a pipe 13 in the usual manner.

The boiler preferably is mounted on a brick foundation 14, and the lower section of the structure forms a combustion chamber 15 in which a gas burner 16 is located, said burner being mounted on legs 17 as usual, and a pipe line 18 leads to a suitable source of gas supply, an opening 19 being provided in the front walls of the boiler, and doors 20 are hinged to the wall 21 and form a closure for said opening.

A conical shaped vessel 22 is mounted in the combustion chamber 15, said vessel communicating with and being directly connected to the arch 23 which is also formed of spaced apart walls, said vessel being located directly above the burner, the walls of said vessel acting as a baffle to spread the hot gases in said combustion chamber, the end of said vessel opening into the hollow arch 23, so that free circulation of the water is provided.

A plurality of flues 24 is provided in the arch 23 as shown and open into a smoke chamber 25 provided at the one end of the boiler, a similar chamber 26 being provided at the opposite end, and a plurality of horizontally disposed flues 27 afford communication from one chamber to the other. Another arch 28 is provided above and spaced from the main arch 23, and a plurality of vertical flues 29 open from the chamber 26 into a chamber 30 which is located directly thereabove, and horizontally disposed flues 31 communicate with said chamber and open into a smoke stack 32 which can be bolted or otherwise secured to the end wall of the boiler, so that the spent gases may be exhausted to the atmosphere. Identically similar openings 33 and 34, respectively, open into the chambers 26 and 30 and hinged doors 35 and 36 form closures for said openings and provide easy access for assembly, repairs, etc.

A live steam line 37 connects to the upper end of the boiler as usual and leads to radiators or other heating apparatus (not shown). The water intake 13 is connected to any suitable source of supply, and inclined pipe lines 38 lead from the boiler side walls to the vessel 22, the pipe forming the lower end of the vessel, openings 39 being provided in the boiler side walls directly adjacent the lower ends of the inclined pipe, and a plug 40 forms a closure therefor, similar openings 41 being provided directly adjacent the arch 23 and are closed by means of plugs 42, these openings

providing for easy clean out of the boiler. Further, the fact that the pipes **38** are inclined compensates for any expansion or contraction of the boiler shell.

In Fig. 5 of the drawings, I have shown a slightly different modified construction of liquid vessel, the lower conical vessel **43** being smaller in diameter and is connected to a similar vessel **44** which is of larger diameter, so that the hot gases flow upwardly along the walls of the container **43**, thence striking the walls of the upper vessel **44** and being spread outwardly in the combustion chamber, thus providing for more effective utilization of the heat units.

In practise the hot gases circulate in the combustion chamber as clearly indicated by the numerous arrows, flowing upward through the flues **24** and into the chamber **25**, thence through the flues **27**, and into the chamber **26**, thence through the flues **29** into the chamber **30**, thence through the flues **31** from which the spent gases flow through the stack **32** to the atmosphere.

The water line **13** feeds the water to the boiler, the double walls, arches, vessel and spaces surrounding the flues providing ample water capacity, and in practise a safety valve, sight glass, and other standard fittings (not shown) are also provided, but it is not deemed necessary to show and describe them.

The boiler is an all-welded structure, it can be easily manufactured and assembled, which also holds true for cleaning or repairs, and it is extremely efficient in operation.

From the foregoing description, it will be obvious that I have perfected a very simple, practical and efficient, light weight, all-welded boiler which will have long life, which is easy to assemble, clean and repair, and which will be economical to manufacture.

What I claim is:

A boiler furnace comprising means forming a water firebox having a burner therein, a fluid vessel located in said chamber and comprising two superimposed communicating members each formed by a pair of cone-shaped elements with their large open ends secured together to form a leak-proof unit the upper member being of larger diameter than the lower member, said vessel being located centrally above the burner so that the burner flame impinges on the flaring side walls of the lower member, thence onto the side walls of the upper member, an upwardly arched pipe spanning the furnace and establishing communication between the side walls of the firebox and the lower end of said vessel, and means at the upper end of said vessel for establishing communication between said vessel and the top of said firebox.

GEORGE A. CLOSE.