Oct. 21, 1924.

1,512,480

R. PALMBLADE

RANGE BOILER

Filed Sept. 22, 1922

3 Sheets-Sheet 1

Fig. 1.

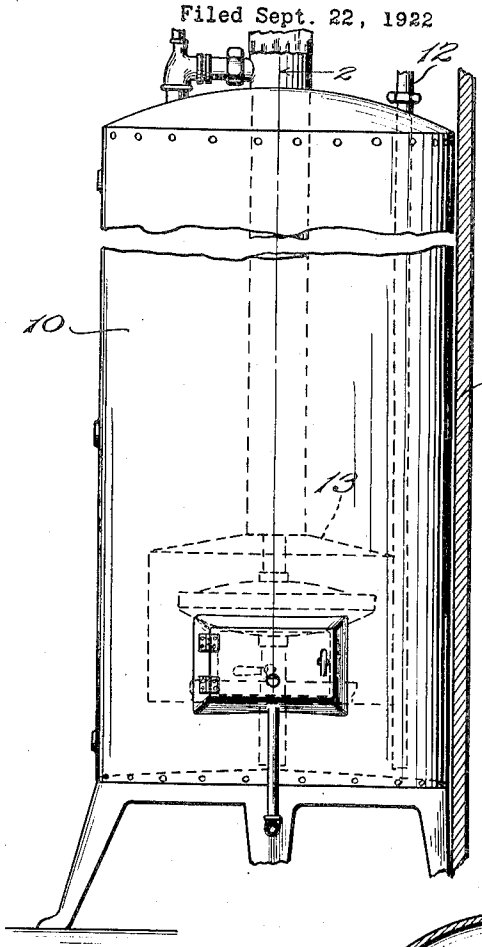


Fig. 5.

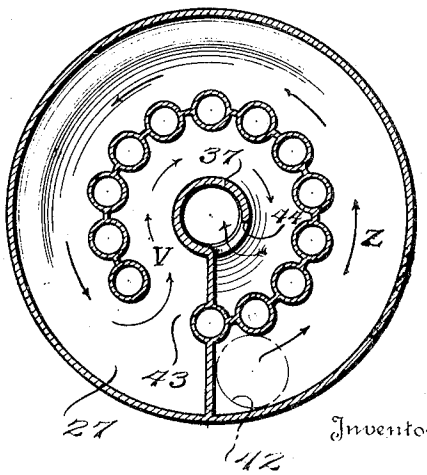
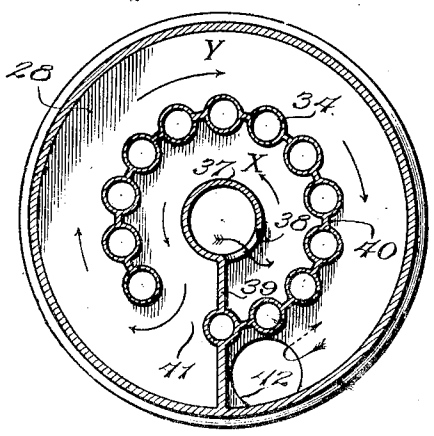


Fig. 4.



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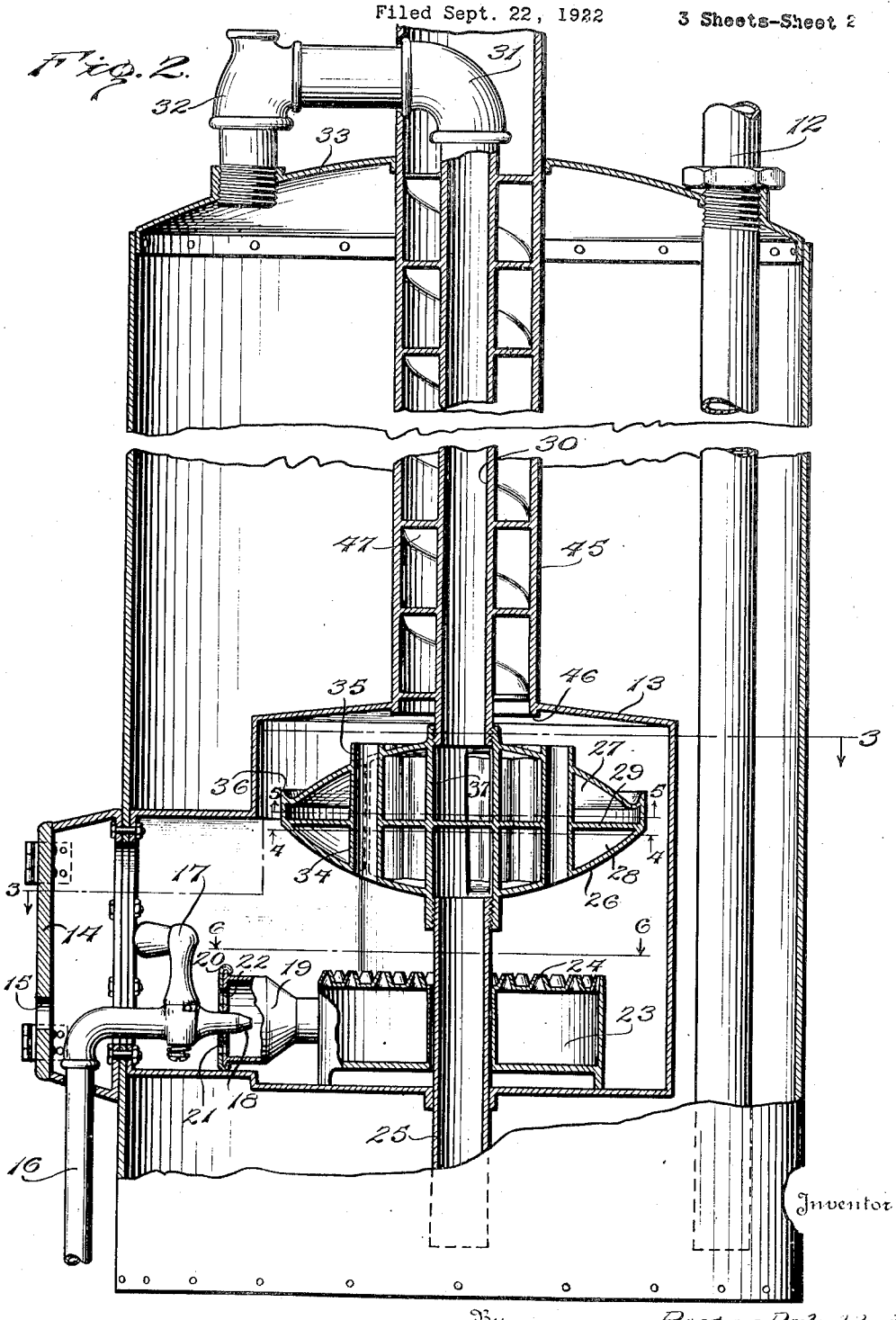
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Fig. 2.



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Fig. 3.

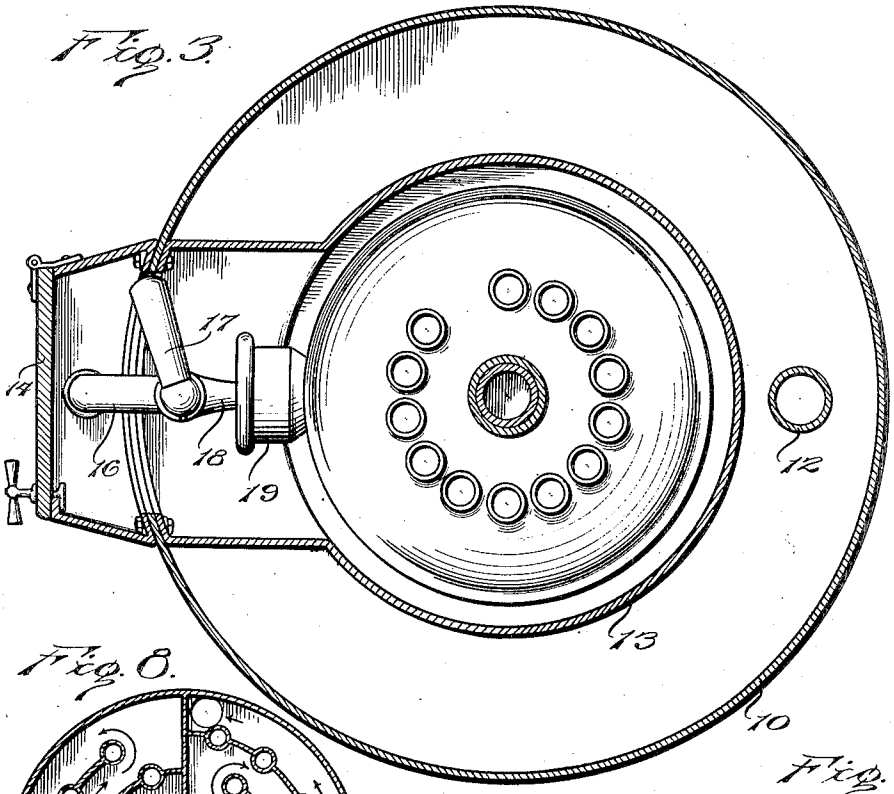


Fig. 8.

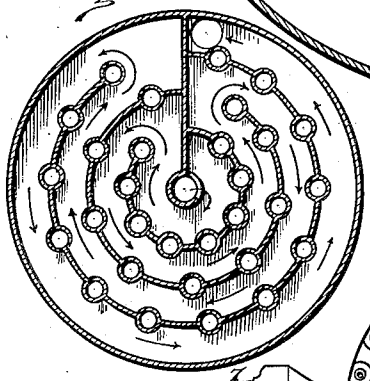
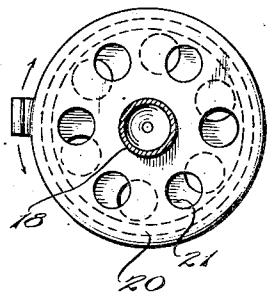


Fig. 7.



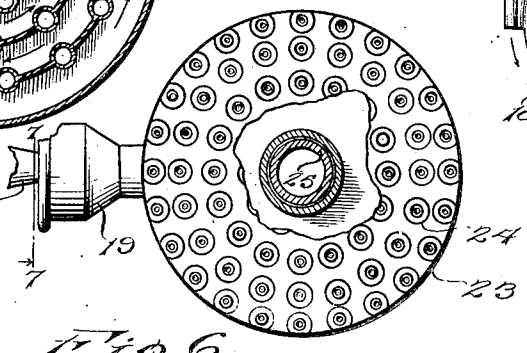


Fig. 6.

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By

Lacey & Lacey Attorneys

Patented Oct. 21, 1924. 1,512,480

UNITED STATES PATENT OFFICE.

RUGER PALMBLADE, OF PHOENIX, ARIZONA, ASSIGNOR OF ONE-HALF TO DARWIN S. HORRALL, OF PHOENIX, ARIZONA.

RANGE BOILER.

Application filed September 22, 1922. Serial No. 589,822.

To all whom it may concern:

Be it known that I, RUGER PALMBLADE, citizen of the United States, residing at Phoenix, in the county of Maricopa and State of Arizona, have invented certain new and useful Improvements in Range Boilers, of which the following is a specification.

The present invention relates to range boilers or more particularly to a device for heating water for boilers.

One object of the invention is to entirely enclose within the boiler the heating unit together with the casing forming the combustion chamber for the boiler, in this manner providing a water jacket on all sides of the heating device as well as the combustion chamber, which makes the device perfectly fire proof. One advantage of this construction is that the boiler may be placed against a wall or close to any wood work or other combustible material.

Usually boilers have to be placed some distance away from any wood work on account of the combustion chamber being open at the bottom. By providing a water jacket on all sides of the combustion chamber, the present heating plant is not only made fire proof, but, on account of the possibility of positioning the boiler close against the wall, without injuring the latter, considerable space is also gained.

The arrangement of the heating unit and combustion chamber within the boiler also allows for a very rapid heating of the water and tends to better preserve the heat.

One embodiment of the present invention is illustrated in the accompanying drawings and—

Fig. 1 represents a side elevation of the boiler with the heating unit installed;

Fig. 2 is a vertical section of the boiler in larger scale;

Fig. 3 is a horizontal section along line 3—3 of Fig. 2;

Fig. 4 is a horizontal section along line 4—4 of Fig. 2;

Fig. 5 is a similar section along line 5—5 of Fig. 2;

Fig. 6 is also a horizontal section taken along line 6—6 of Fig. 2 showing the gas burner;

Fig. 7 shows an end view of a regulating device for mixing the combustion gases and

Fig. 8 is a similar view to Fig. 4 of a slightly modified form of the heating unit intended for use in larger plants.

In the drawings, reference numeral 10 represents a vertical boiler which in this case is shown erected close to a wooden partition or wall 11. The boiler is provided with the cold water supply pipe 12 entering at the top of the boiler and reaching near to its bottom.

Within the boiler is erected a casing 13 constituting the combustion chamber. As best seen in Figs. 2 and 3 this casing is entirely enclosed in the boiler and surrounded by water on all sides as well as top and bottom, the only exception being at the door 14 covering the entrance to the combustion chamber. This door has an air port 15 and a gas pipe 16 enters the combustion chamber near the lower end of the door. This pipe is provided with a cock 17 and terminates with a nozzle 18 of the usual construction. Around this nozzle is placed a mixer 19 for the combustion fluid and a regulating plate 20 provided with a number of ports 21 surrounding the outer end of the mixer 19 which has corresponding apertures 22 adapted to register with the ports 21 in the plate. These apertures may be closed by revolving the plate 20 sufficiently in one direction.

The combustion fluid mixer 19 opens into a gas burner 23 provided with a number of perforations 24 for the gas jets on its upper side. The gas burner 23 surrounds a water pipe 25 placed centrally in the boiler and reaching upwardly through the gas burner. It carries in its upper end a hollow disk 26 which is divided into an upper compartment 27 and a lower compartment 28, by means of a horizontal wall 29 extending all the way across the interior of the hollow disk 26. Similarly an outlet pipe 30 for water is attached to the top of the hollow disk 26, communicating with the upper compartment 27 thereof. This outlet pipe 30 extends all the way up through the boiler and has at its upper end an elbow 31 connecting with another elbow 32 which opens through the top plate 33 of the boiler.

As best seen in Figs. 2, 4 and 5 the hollow disk 26 is furnished with a number of tubular flues 34, which stand open at the bottom of the disk and continue perpendicularly through the same terminating with the annular lip 35 above the upper face of

the disk. These tubular flues do not communicate with the compartments 27 and 28, but are provided for leading the heat or ignited combustion gas through the same and thus communicate heat to the contents of the hollow disk. The annular lip 35 extending beyond the top face of the disk is intended to prevent any condensed water, collecting on the top of the disk to drip down through the tubular flues 34, which otherwise might cause the extinguishing of the flames in the gas burner. Similarly an annular ledge or sweat ring 36 is provided around the outer periphery of the disk for the purpose of catching any condensed water collecting on the top thereof. It will be noted that the diameter of the hollow disk is greater than the diameter of the gas burner 23, so that any dripping from the outer periphery of the hollow disk can not injure the gas burner.

In continuation of the inlet pipe 25 is furnished a short cylinder 37 extending from the bottom of the hollow disk past the central wall 29 and reaching up to the outlet pipe 30. In this cylinder is formed an aperture 38 opening to one side in the lower chamber and along this aperture is shown a radial wall 39 extending from the cylinder 37 to the edge of the hollow disk. Between each of the tubular flues 34 are shown short metallic webs 40 providing a continuous partition with the tubular flues extending from the radial wall 39 around the cylinder 37 leaving, however, an opening between the first and last tubular vents as at 41. By means of this construction the water entering from the inlet pipe 25 is made to pass out through the aperture 38 in the direction indicated by arrows X in Fig. 4 around the cylinder 37 turning outwardly through the opening 41 and running in opposite direction following arrows Y outside of the tubular flues, finally reaching the passage 42 provided in the horizontal wall 29 entering the upper compartment 27. This compartment is similarly constructed but instead of the water following the inner side of the tubular flues, as was the case in the lower compartment 28 the water now circulates in the direction indicated by arrows Z in Fig. 5 on the outer-side of the tubular vents and returning through the opening 43, then passing in reverse direction following arrows V around the cylinder 37 and out through an aperture 44 therein into the outlet pipe 30 finally reaching the upper part of the boiler 10.

Referring particularly to Fig. 2 the outlet pipe 30 is entirely surrounded between the top of the casing 13 and the top 33 of the boiler, by a large flue pipe 45 which opens at its lower end into the casing and terminates with the narrow ledge 46 within the casing. At its upper end, the flue pipe 45 opens into the atmosphere. Between the water pipe 30 and the flue pipe 45 is provided one or more helical baffles 47 running from the lower end of the flue pipe 45 to the top 33 of the boiler.

The operation of the device is as follows:

After the regulating plate 20 has been turned to adjust the flow of air through the ports 21, the gas burner 23 is lit and the water commences to circulate in the heating unit. The cold water enters through pipe 25 into the lower compartment 28 and takes its circuitous path first in one direction and then in the opposite direction and when partly heated rises to the upper compartment 27 through the passage 42 and then circulates in opposite direction to what was the case in the lower compartment. It will be evident that the water is heated not only from the gas jets striking directly on the bottom of the hollow disk 26, but also by the heated and ignited combustion gases passing through the tubular flues 34 and also from the combustion gases passing around and above the hollow disk 26. After having completed its course through the upper compartment 27 the water proceeds upwardly through the outlet pipe 30, where it becomes still more heated from the combustion gases passing upwardly through the flue pipe 45 on its helical course along the baffles 47. It will thus be seen that the water is made to absorb heat during its entire course through the heating unit from the bottom to the top of the boiler. The water surrounding the casing 13 is also heated through contact with the walls thereof. At no time is there any danger of the heated parts of the casing coming in direct contact with the exterior structure as it is entirely enclosed by water.

It should be noted that the combustion chamber 13 does not necessarily have to be situated as low down in the boiler as is indicated in Fig. 2 of the drawings, but may be placed centrally or even higher up therein and the right is reserved for placing the combustion chamber in different positions.

Having thus described the invention, what is claimed as new is:

1. A heating unit for boilers comprising a hollow disk having a transverse partition furnishing an upper and a lower compartment therein, a passage in said partition, an inlet port for said lower compartment, an outlet port for said upper compartment, elements in said disk including a radially directed abutment member, and tubes arranged with their axes parallel to the axis of the disk to form an annular wall and providing together with said abutment wall, for the fluid to be heated, a circuitous path through each of said compartments.

2. A heating unit for boilers comprising a hollow disk having a transverse partition

furnishing an upper and a lower compartment therein, a passage in said partition, an inlet port for said lower compartment, an outlet port for said upper compartment, elements in said hollow disk providing annular circuitous paths through each of said compartments for the fluid to be heated, and a casing providing a combustion chamber in which said hollow disk is inserted, said elements including radially directed abutment members and tubes arranged with their axes parallel to the axis of said hollow disk to form an annular wall, said tubes communicating above and below the disk with said combustion chamber.

3. A heating unit for boilers comprising a hollow disk having a transverse partition furnishing an upper and a lower compartment therein, a passage in said partition, an inlet port for said lower compartment, an outlet port for said upper compartment, tubes extending through both of said compartments and arranged as an annular wall and radially directed abutment members together with the tubes providing circuitous paths for the fluid to be heated through each of said compartments, a casing providing a combustion chamber in which said hollow disk is inserted, a supply pipe leading into said inlet port, and an outlet pipe leading from said outlet port.

4. A heating unit for boilers comprising a hollow disk having a transverse partition furnishing an upper and a lower compartment therein, a passage in said partition, an inlet port for said lower compartment, an outlet port for said upper compartment, tubes extending through both of said compartments and arranged as an annular wall, and radially directed abutment members together with the tube providing circuitous paths for the fluid to be heated through each of said compartments, a casing providing a combustion chamber in which said hollow disk is inserted, a supply pipe leading into said inlet port, and an outlet pipe leading from said outlet port, said outlet pipe opening into the upper end of said boiler.

5. A heating unit for boilers comprising a hollow disk having a transverse partition furnishing an upper and a lower compartment therein, a passage in said partition, an inlet port for said lower compartment, an outlet port for said upper compartment, tubes extending through both of said compartments and arranged as an annular wall, and radially directed abutment members together with the tubes providing circuitous paths for the fluid to be heated through each of said compartments, a casing providing a combustion chamber in which said hollow disk is inserted, a supply pipe leading into said inlet port, an outlet pipe leading from said outlet port, said outlet pipe opening into the upper end of said boiler, and a flue pipe surrounding said outlet pipe and having communication with said combustion chamber at one end and the atmosphere at the other end.

In testimony whereof I affix my signature.

RUGER PALMBLADE. [L. S.]