Aug. 26, 1941. C. H. MORROW 2,253,799

WATER HEATER

Filed April 11, 1938 2 Sheets-Sheet 1

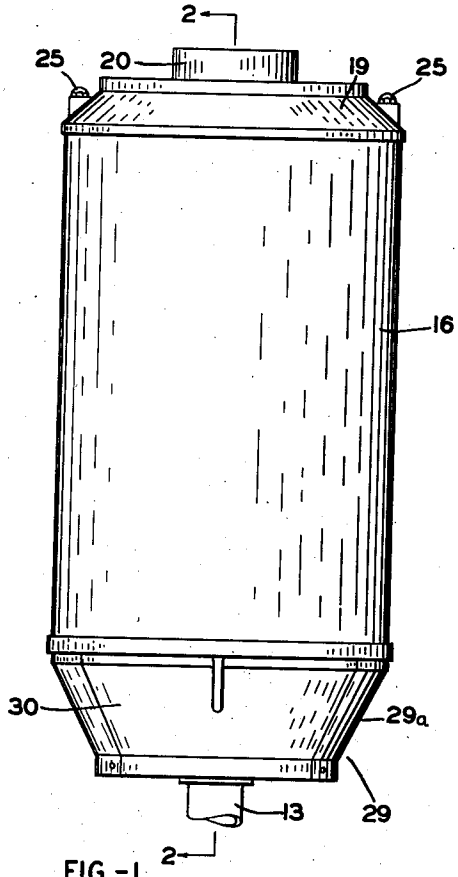


FIG.-1

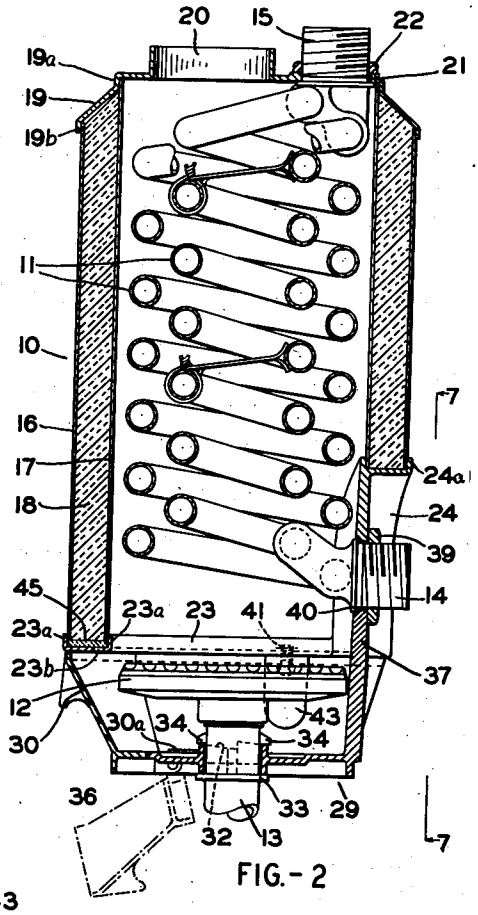


FIG.-2

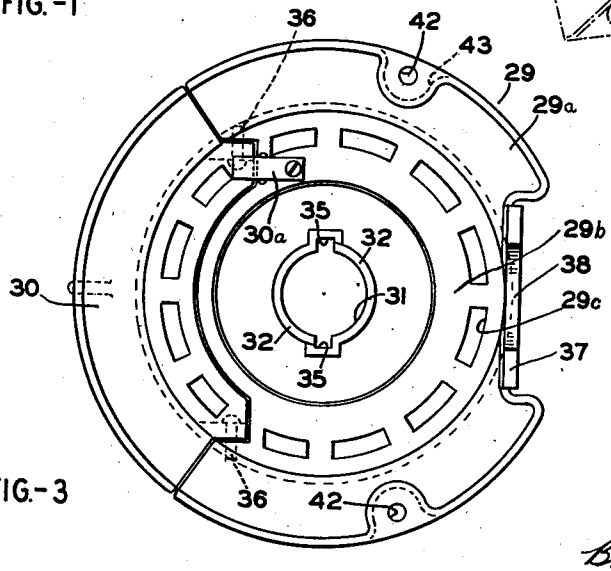


FIG.-3

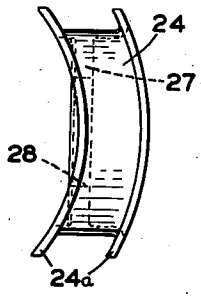


FIG.-4

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WATER HEATER

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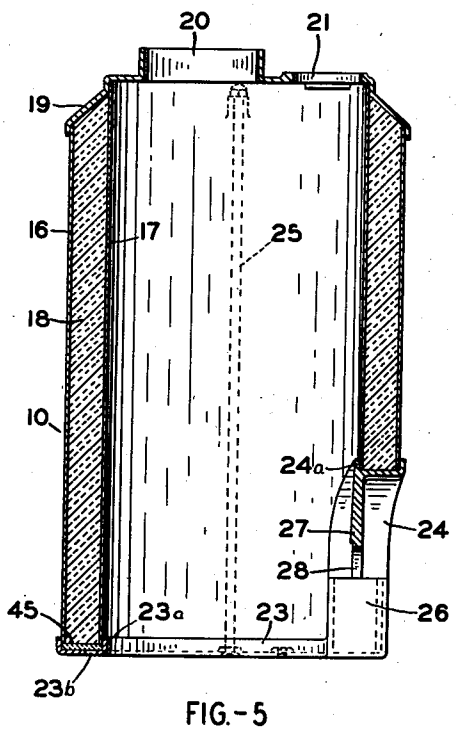


FIG.-5

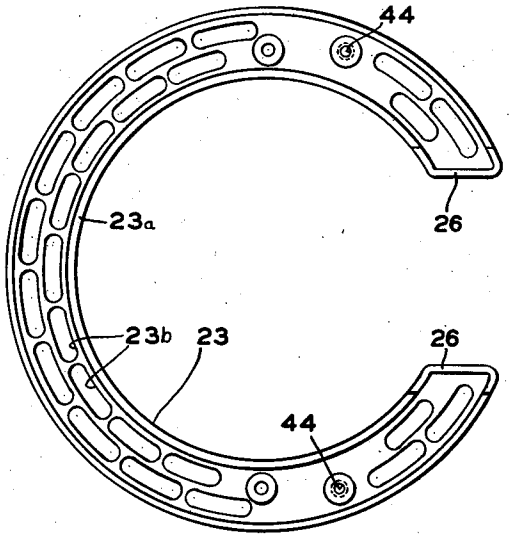


FIG.-6

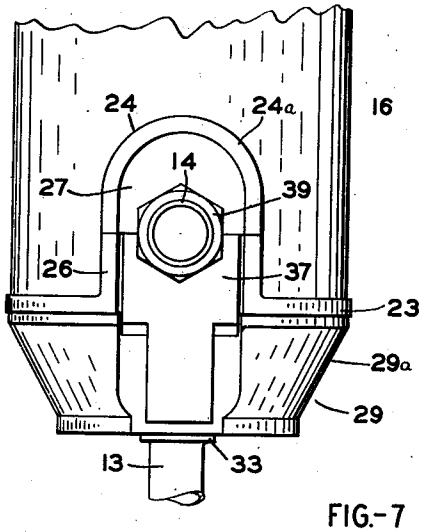


FIG.-7

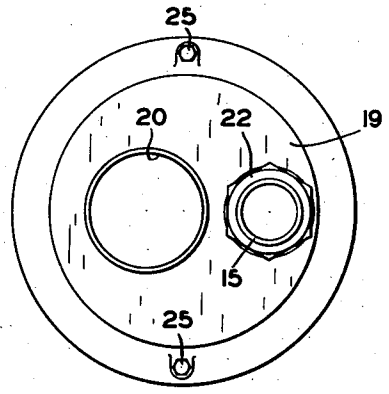


FIG.-8

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WATER HEATER

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Application April 11, 1938, Serial No. 201,215

1 Claim. (Cl. 122—494)

This invention relates to improvements in water heaters and the like to simplify the structure generally and to provide an improved water heater which is adapted to efficient assembling operations and also adapted to quick disassembling in case of repairs.

An object of the present invention is to provide an improved water heater comprising a water heating element surrounded by a casing and having a burner beneath it. In such a structure I provide improvements in the casing and burner structures so that but a small number of parts are necessary which are cheap to manufacture and easy to assemble and disassemble.

Another feature of the present invention is the arrangement of the casing and burner chamber parts so that when the heater is in position with the burner and water coil connected, the casing may be disconnected from the other parts and removed vertically upward to give access to the parts without disturbing certain of the water and fuel connections.

Other novel features and advantages of my improved construction will be apparent from the accompanying drawings and specification and the essential features will be set forth in the claim.

In the drawings, Fig. 1 is an elevation of an embodiment of my improved water heater; Fig. 2 is a central vertical section taken along the line 2—2 of Fig. 1; Fig. 3 is a top plan view of the castings forming the burner chamber; Fig. 4 is a top plan view of the wall supporting member engaging the upper side of the water inlet pipe; Fig. 5 is a sectional view of the casing of Fig. 2 removed from association with the other parts; Fig. 6 is a top plan view of the wall supporting and finishing ring at the lower end of the casing; Fig. 7 is a rear elevation taken substantially from the position 7—7 of Fig. 2; while Fig. 8 is a top plan view of the heater.

When water heaters of the type here described are provided with insulated casings, little difficulty is encountered so long as the insulation is of the sheet variety. A number of problems are encountered, however, when it is desired to use some of the very efficient insulating materials of a granular form, such as expanded mica particles. This type of insulation will escape through any openings in the casing wall and therefore I have constructed a water heater having imperforate walls, that is to say there are no openings through which water pipes pass, or door openings or the like. I thus avoid the problem of leakage of insulating material at such points. Another problem encountered with this type of insulation is the finishing of the casing wall in a manner to permanently enclose the insulation in the casing wall so that during assembling or disassembling operations the insulation will not be disturbed and the casing wall will always be in the form of its original construction. I am aware that prior water heaters have been constructed with an insulated casing wall surrounding a burner chamber but either these constructions were not adapted to the use of granular insulation or difficulties were encountered when it was necessary to disassemble the parts after the heater had been in use for the purpose for instance of cleaning the water heating element. In such instances if the casing wall were of the imperforate variety it was necessary to disconnect the casing wall and the burner compartment to get at the water heating element. Such a disassembling of the parts would allow insulation of the granular type to escape from the casing wall. My present invention provides an imperforate casing wall which may be filled with insulation of the granular type and means is provided to seal the insulating material within the casing wall in a structure which after its first assembling need never be disassembled throughout the life of the heater. At the same time I have devised a structure which requires the minimum disconnection of water and fuel pipes when it is desired to clean the water heating elements or otherwise for access to the parts.

In the embodiment of my invention shown in the drawings, a casing wall indicated generally at 10 surrounds a water heating element 11 beneath which is a burner 12 which is supplied with fuel at 13. The heating element 11 here shown is of the double coil type but it will be understood that my invention is applicable to heaters using other types of water heating elements. The element here shown has a water inlet pipe at 14 at the lower portion of one side and a water outlet pipe 15 at the top.

The casing wall 10 comprises sheet metal shells 16 and 17 set so as to provide a space between them which preferably is filled with a suitable form of heat insulating material 18. The casing is finished at the top by the member 19 which provides a shoulder 19a engaging the shell 17 and a flange 19b engaging the shell 16. The top is provided with an opening 20 for a waste heat flue and an opening 21 through which the water outlet pipe extends. A threaded collar 22 positions the outlet pipe in the opening. The shells here shown are cylindrical but my invention includes other shapes also.

A bottom finishing member 23 coacting with a bottom finishing member 24 supports the lower ends of the wall members 16, 17, holds the insulation in place, and finishes off the casing. The ring 23 has the upstanding flanges 23a embracing the sheet metal cylinders of the casing and the member 24 has flanges 24a for a similar purpose. Two long stove bolts 25 have countersunk heads engaging the lower face of the member 23 and have nuts at the top engaging the upper face of the member 19. These bolts hold the casing wall assembled so that the shells 16 and 17 encompassing the insulation 18 are held securely assembled between member 19 at the top and members 23 and 24 at the bottom. This casing is thus a separate self-sustaining unit as shown in Fig. 5.

Referring now more in detail to the members 23 and 24, the member 23 is shown in detail in Fig. 6 and the member 24 in detail in Fig. 4. The member 23 is substantially C-shape in plan having upstanding portions 26 at its free ends. The flanges 23a previously referred to extend entirely about the circular portion of the member 23 and up alongside the portions 26 thereof also. The member 24 is somewhat semicircular or of inverted U shape in elevation as seen in Fig. 7 and is provided around its top and sides with the flange portions 24a adapted to coact with the casing shells 16 and 17 and at the bottom alined with the flange portions 23a of the ring member 23. The member 24 has a web 27 which is provided at the central portion of its lower edge with a semicircular notch 28 adapted to embrace the upper side of the water inlet pipe 14. Thus the members 23 and 24 acting together finish off and seal the lower end of the casing wall 10 and completely enclose the water heating element down to and including the upper half of pipe 14.

The member 23 may be imperforate but for the purpose of reducing heat transfer through the web of this member to the outside of the casing and to prevent discoloration of the finish on the outer surface of the casing, I have shown perforations 23b in the web of the member 23 so arranged as to reduce the metal content of the web and to materially reduce the heat transfer from the interior outwardly. For the purpose of preventing the escape of insulating material 18 from the casing wall I place a strip of asbestos or other suitable material 45 around the web of member 23 overlying the openings 23b, thus effectually sealing the lower end of the casing wall.

The burner-chamber-forming member 29 is shown in top plan view in Fig. 3. This member is open at one side and this opening is closed by the door 30. This door is shown in closed position in full lines in Fig. 2 and in open position in dot-dash lines. A flat spring 30a holds the door closed. The member 29 is generally bowl shape having sides 29a sloping to a bottom 29b which is provided with air inlet openings 29c. The bottom also has a centrally located opening 31 through which the fuel pipe 13 enters. Preferably this opening has oppositely disposed arcuate cam surfaces 32 for securing the pipe connection 13. On the pipe is a shoulder 33 and spaced thereabove the projections 34. The pipe is inserted from below through the opening 31 with the projections 34 passing through the recesses 35. The pipe is then turned approximately 90° whereupon the projections 34 ride upon the surfaces 32 and cam the pipe connection into a firmly seated position. The door 30 is complementary to the rest of the bowl and is connected thereto by the hinge pins 36. It will be noted that with this arrangement of the door, free access to the burner may be had because the door is the full depth of the member 29 and extends for approximately 90° around the base of the heater.

An upwardly projecting portion 37 integral with the member 29 closes the space between the portions 26 of the ring member 23 and carries at its upper edge a semicircular notch 38 which embraces the lower portion of pipe 14 so that the notches 28 and 38 completely surround the pipe 14. After assembly the parts are held in this position by the threaded collar 39. It will be noted that the pipe 14 is provided with a collar 40 which engages in suitable shoulder portions of the web 27 and the portion 37 so that the water heating element is properly positioned in the heater and held firmly in that position by the clamping action of the collar 39 against the shoulder 40.

Means is provided for releasably securing the casing wall to the burner-chamber-forming member so that the parts are easily and quickly assembled or disassembled. This means comprises a pair of bolts 41 which pass through suitable openings 42 which are arranged in the side pockets 43 of the member 29. The bolts are passed upwardly through the openings 42 and enter into threaded engagement with the openings 44 in the member 23. The pockets 43 render the bolt heads readily accessible for assembling or disassembling the parts.

The manner of assembling the casing 10 has already been described and the other steps of assembling the complete heater will now be evident. The casing 10 is slipped downwardly over the coil 11 to the position of Fig. 2. The door 30 is secured to the member 29 by its hinge pins and this assembled bowl shape burner chamber is then secured below the casing by the bolts 41. The collars 22 and 39 are then turned down on the threaded pipes 15 and 14, respectively. It will be obvious that when the heater is in use, with the pipes 13, 14 and 15 properly connected, if access is to be had to the coils 11 it is only necessary to remove collar 22 and flue or water pipe connections at the top if necessary, whereupon the casing 10 may be slid vertically upward without disturbing the water inlet connection at 14 or the fuel connection at 13.

I have thus described a water heater which comprises a small number of parts but which gives a very efficient insulated heater readily accessible during use and maintenance operations.

Nothing in this description should be interpreted as limiting the materials of which the parts 19, 23, 24, 29 and 30 may be made. Each of these may be made as a simple casting but I do not limit myself to this form.

What I claim is:

In a water heater having a water heating element enclosed in a casing and a burner beneath said element and in which said element has a water inlet pipe at one side near the bottom and has a water outlet pipe at the top, a casing comprising spaced sheet metal cylinders of different diameters set concentric to provide an annular space between them, heat insulation between said cylinders, the inner of said cylinders being of a diameter to pass over said water heating element, a top member abutting the upper ends of said cylinders and there closing said in-

sulation space, a bottom ring member generally C shape in plan and having upstanding end portions, a bottom member generally inverted U shape in elevation with the legs of the U shape alined with the end portions of said C shape, said bottom members abutting the lower ends of said cylinders and there closing said insulation space, said U shape member having a web substantially closing the opening between the legs and having a recess adapted to embrace the upper side of said water inlet pipe, means securing said top and bottom members together, a burner-chamber-forming member secured to said C shape member, and a part supported rigidly with said last named member and engaging the lower side of said inlet pipe.

CLARENCE H. MORROW.