Nov. 6, 1962 M. KUDOBE 3,062,201

STOCK WATER HEATER

Filed July 28, 1960 2 Sheets-Sheet 1

Fig. 1

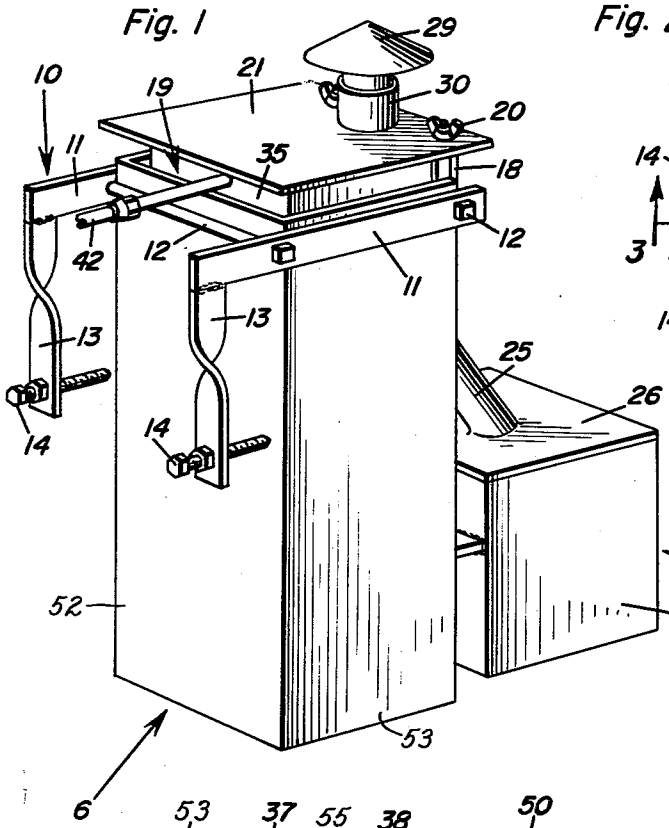


Fig. 2

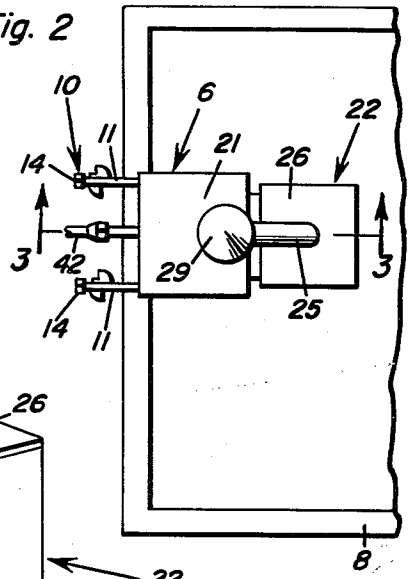


Fig. 4

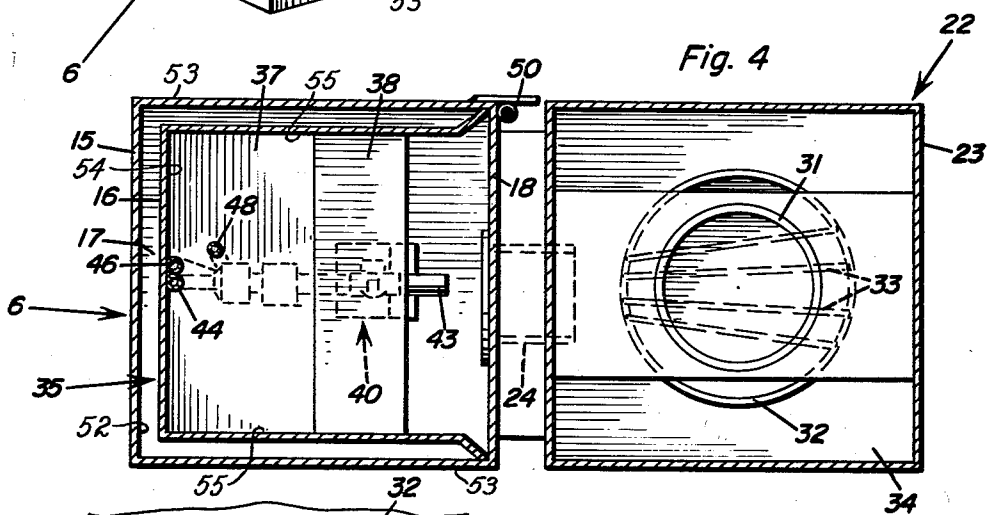
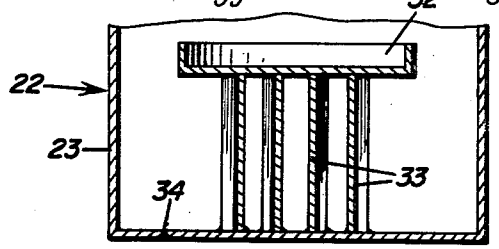


Fig. 5



Milo Kudobe

INVENTOR.

BY Clarence A. O'Brien and Harvey B. Jacobson

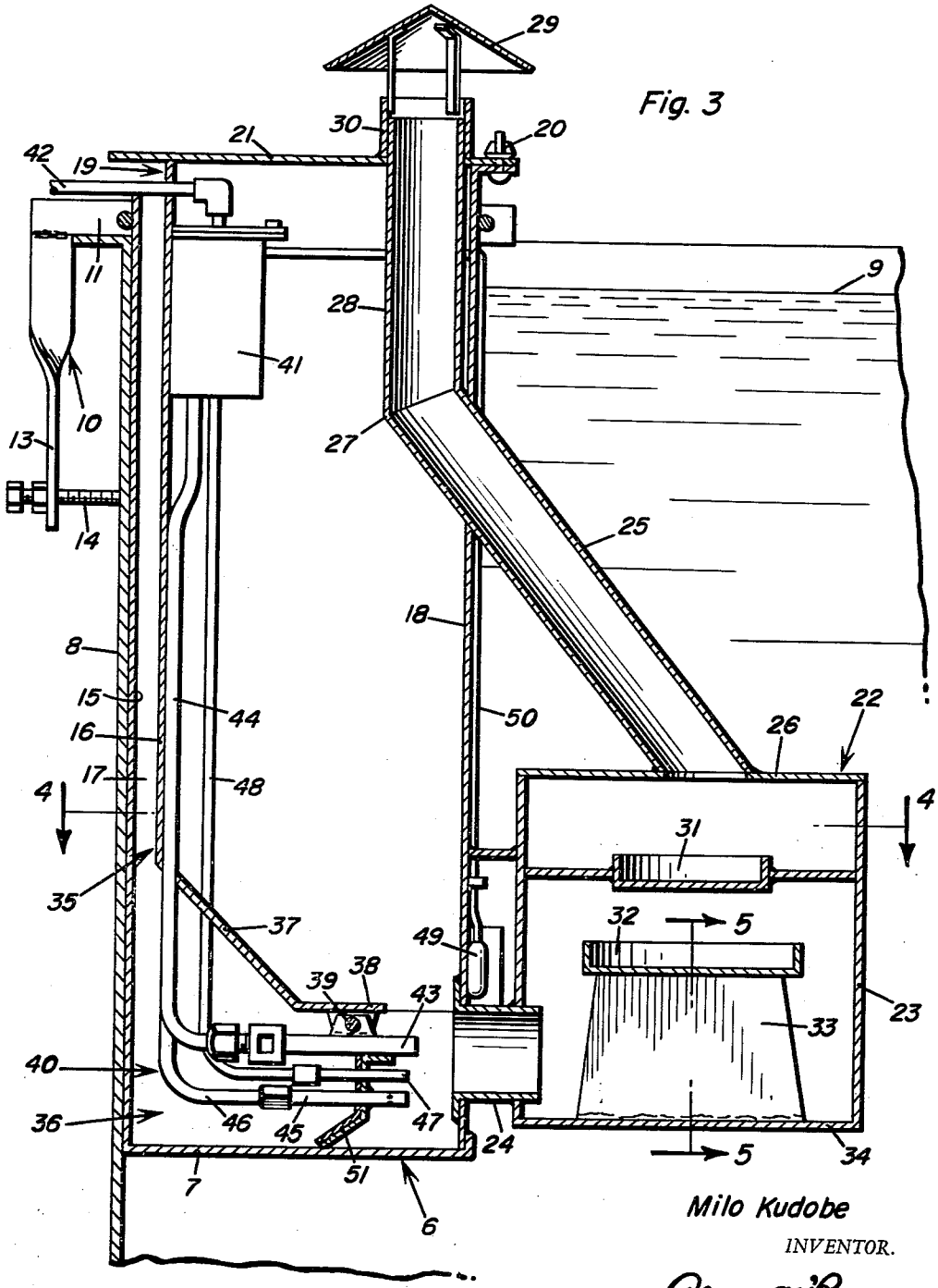
Attorneys

Nov. 6, 1962 M. KUDOBE 3,062,201

STOCK WATER HEATER

Filed July 28, 1960 2 Sheets-Sheet 2

Fig. 3



Milo Kudobe

INVENTOR.

BY Clarence A. O'Brien and Harvey B. Jacobson

Attorneys

United States Patent Office

3,062,201

Patented Nov. 6, 1962

3,062,201

STOCK WATER HEATER

Milo Kudobe, Rte. 1, Mount Pleasant, Iowa

Filed July 28, 1960, Ser. No. 45,875

6 Claims. (Cl. 126—360)

This invention relates to new and useful improvements in stock water heaters of the gas burner operated immersion type and has for its primary object to provide, in a manner as hereinafter set forth, a heater of this character comprising novel means for positively eliminating all condensate which may form.

Another very important object of the present invention is to provide a stock water heater of the aforementioned character wherein the condensate is vaporized and converted to steam which, in turn, is utilized to assist in heating the water, thus materially promoting operating economy.

Still another important object of the invention is to provide, in a stock water heater of the type comprising a well or box and a pilot light ignited gas burner operable therein, unique means for ensuring a proper circulation of air through the box for supporting combustion and preventing the pilot light from being extinguished.

Other objects of the invention are to provide an improved stock water heater of the character set forth which will be comparatively simple in construction, strong, durable, compact, of light weight and which may be manufactured at low cost.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a perspective view of a stock water heater constructed in accordance with the present invention;

FIGURE 2 is a top plan view, showing the device mounted in a stock water tank;

FIGURE 3 is a vertical sectional view on an enlarged scale, taken substantially on the line 3—3 of FIGURE 2;

FIGURE 4 is a view in horizontal section through the device; taken substantially on the line 4—4 of FIGURE 3; and

FIGURE 5 is a fragmentary view in transverse section through the lower portion of the heat exchanger, taken substantially on the line 5—5 of FIGURE 3.

Referring now to the drawings in detail, it will be seen that the embodiment of the present invention which has been illustrated comprises a vertically elongated burner control box or well of suitable dimensions and material which is designated generally by the reference character 6. The well 6 which, as best shown in FIGURE 4 of the drawings is substantially square in horizontal section, comprises a closed bottom 7.

The well 6 is adapted to be removably mounted on a conventional stock tank 8 and immersed in the water therein, as indicated at 9. Toward this end, a metallic clamp 10 is provided. The clamp 10 is mounted on the upper portion of the well 6 and comprises a pair of bars 11 between which said well is secured by elongated bolts 12. The bars 11 project rearwardly from the well 6 and have fixed on their rear end portions depending arms 13 in which setscrews 14 are threadedly mounted. The wall of the tank 8 on which the device is mounted is clamped between the well 6 and the setscrews 14.

On three of its four sides the square well 6 comprises spaced outer and inner walls 15 and 16, respectively, defining a downward air passage 17 therebetween. The three inner walls 16 and the front wall 18 of the well 6 extend upwardly beyond the rear or back wall 52 and side walls 53 of said well for providing an air intake opening

19 for the passage 17. Removably secured as at 20 on the upper ends of the walls 16 and 18 is a cover 21 which extends outwardly over and beyond the air intake passage 17 for excluding the weather therefrom.

Mounted on the well 6 on the lower portion of the front wall 18 thereof and spaced therefrom is a heat exchanger 22. The heat exchanger 22 comprises a generally square housing 23 of suitable metal having communication with the lower portion of the well 6 through a tube or tubular connection 24. A flue or vent stack 25 is provided for the housing 23. One end of the stack 25 is affixed to the top 26 of the housing 23. The stack 25 extends at an upward and rearward inclination from the top 26 of the housing 23 into the well 6 through the front wall 18 thereof and is angulated at 27 to provide the vertical upper end portion 28 which projects through an opening provided therefor in the removable cover 21. Fixed on the removable cover 21 is a cap 29 for the stack 25. In the embodiment shown, the cap 29 includes a cylindrical base 30 which is fixed to the cover 21 and which telescopically receives the upper end portion 28 of the stack 25.

The heat exchanger 22 further comprises a trap in the form of a cup or the like 31 in the upper portion of the housing 23 for the reception of condensate. Also mounted in the housing 23, below the cup 31 for receiving overflow therefrom, is a drip pan 32. The pan 32 is fixed on the upper edges of a plurality of forwardly divergent baffles 33 which are fixed on the bottom 34 of the housing 23 forwardly of the tubular connection 24.

The spaced inner walls 16 of the well 6 provide what may be considered a liner 35 of generally U-shaped horizontal section for said well, said liner comprising rear and side walls 54 and 55, respectively. The liner 35 terminates at its lower end at a point in vertically spaced relation to the bottom 7 of the well 6 to define, in conjunction with said well, a burner chamber 36. The rear wall of the liner 35 includes a forwardly and downwardly inclined lower portion 37 terminating in a horizontal lower end portion 38. Mounted as indicated at 39 beneath the liner portion 38 is a Bunsen-type burner 40. The burner 40 receives gas from a thermally controlled valve 41 in the upper rear portion of the liner 35. The control valve 41 receives L.P. gas from a supply source through a line 42 which enters the upper portion of the well 6 through the rear thereof.

The unit 40 comprises a burner proper 43 which is connected by a pipe 44 to the valve 41. The burner 40 further comprises a pilot light 45 which is connected to the valve 41 by a pipe 46. The burner 40 still further comprises a thermocouple 47 which is connected at 48 to the valve 41. The gas to the burner 40 is controlled by a thermostat 49 on the lower portion of the front 18 of the well 6. A tube 50 connects the thermostat 49 to the control valve 41. Mounted on the pilot light 45 of the burner 40 is a laminated plate 51 of suitable metal, preferably copper, which absorbs and stores heat from said pilot light.

It is thought that the operation of the device will be readily apparent from a consideration of the foregoing. Briefly, the well 6 with the exchanger 22 thereon is immersed in the water 9 in the tank 8 and secured on one of the walls of said tank by tightening the setscrews 14. With the burner 40 in operation flame therefrom passes through the tubular connection 24 into the housing 23 and heats the exchanger 22 thus warming the water 9. The products of combustion pass upwardly through the stack 25 and are exhausted to the atmosphere in an obvious manner beneath the cap 29 thus further heating the water 9. Condensate forming in the housing 23 and the stack 25 is collected in the cup 31 where it is vaporized, being converted to steam which passes upwardly through the

stack 25 thus still further heating the water 9. The flame from the burner 40 entering the housing 23 through the tubular connection 24 is played on the forwardly divergent baffles 33 for rapidly heating said baffles in addition to uniformly distributing the heat throughout the housing 23. Thus, the drip pan 32 is heated and any overflow which is caught therein from the vaporizing trap or cup 31 is instantly converted to steam which passes upwardly through the stack 25. Of course, air for the burner 40 enters the well 6 through the intake 19 at the top of said well on three sides thereof and flows downwardly through the passage 17 into the chamber 36. The construction and arrangement is such that any change in wind direction has no effect on the source of oxygen to the burner 40. The laminated plate 51 absorbs and stores heat from the pilot light 45. This stored heat is given off continuously by the laminated plate 51 for promoting the circulation of air thus preventing a stagnant condition or downdraft and consequent extinguishing of the pilot light.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A stock water heater comprising a well for immersion in the water, said well including a closed bottom, a heat exchanger mounted on the well and including a housing communicating therewith, a burner in the well for directing flame therefrom into the housing, a stack connected to the housing and extending therefrom into and upwardly in the well to the atmosphere, and condensate vaporizing means in the housing, said means comprising a plurality of heat absorbing baffles in the housing forwardly of the burner for receiving incoming flame therefrom, and a pan mounted on said baffles beneath the stack for the reception of the condensate therefrom.

2. A stock water heater of the character described comprising a well for immersion in the water, said well including a closed bottom, a heat exchanger mounted on the well and including a housing communicating therewith, a burner in the well for directing flame therefrom into the housing, a stack connected to the top of the housing and extending therefrom into and upwardly in the well to the atmosphere, and condensate vaporizing means in the housing, said vaporizing means comprising a cup mounted in the upper portion of the housing beneath the stack for the reception of condensate therefrom, a plurality of upstanding, forwardly divergent heat absorbing baffles mounted in the housing forwardly of the burner for receiving incoming flame therefrom and for slowing said flame and absorbing heat therefrom, and a drip pan mounted on said baffles to be heated thereby and located beneath the cup for receiving overflow therefrom.

3. A stock water heater comprising a well, means for securing said well in a stock water tank, said well including front back and side walls and a bottom, a liner of generally U-shaped horizontal section mounted in the well in spaced relation to the bottom thereof, said liner including rear and side walls spaced from the corresponding well walls and defining a downward air passage in conjunction therewith, said rear liner wall comprising a forwardly and downwardly inclined lower portion terminating in a horizontal end portion providing a burner chamber communicating with the air passage, a heat exchanger mounted on the front wall of the well in spaced relation thereto and including a housing, a tube connecting the housing to the well, and a burner unit in the chamber aligned with the tube for ejecting flames therethrough into the housing for heating same, said burner unit being suspended from said horizontal end portion of said rear liner wall, said burner unit including a pilot light, and a laminated plate mounted on the burner unit for receiving and storing heat from the pilot light.

4. A stock water heater comprising a well, means for securing said well in a stock water tank, said well including front, back and side walls and a bottom, a liner of generally U-shaped horizontal section mounted in the well in spaced relation to the bottom thereof, said liner including rear and side walls spaced from the corresponding well walls and defining a downward air passage in conjunction therewith, said rear liner wall comprising a forwardly and downwardly inclined lower portion terminating in a horizontal end portion providing a burner chamber communicating with the air passage, a heat exchanger mounted on the front wall of the well in spaced relation thereto and including a housing, a tube connecting the housing to the well, and a burner unit in the chamber aligned with the tube for ejecting flames therethrough into the housing for heating same, said burner unit being suspended from said horizontal end portion of said rear liner wall, said heat exchanger further including a plurality of upstanding, forwardly divergent heat-absorbing baffles in the housing forwardly of the burner unit for receiving flames therefrom through the tube, a stack rising from the housing, and a vaporizing cup mounted in the housing between the baffles and the stack for receiving a condensate from the latter.

5. A stock water heater in accordance with claim 4, wherein said heat exchanger still further includes a drip pan mounted on the baffles beneath the vaporizing cup for receiving overflow therefrom.

6. A stock water heater comprising a well for immersion in the water, a heat exchanger including a housing adjacent the well in communication therewith, a stack communicating the housing with the atmosphere, a burner in the well for directing flame therefrom into the housing, a plurality of flat baffles in the housing spaced from the vertical walls thereof and located forwardly of the burner for receiving incoming flame therefrom and distributing same in the housing and for absorbing heat from said flame and conducting said heat to the housing, said housing including a bottom, said baffles being integral with said bottom and rising vertically therefrom, said baffles further being spaced from each other and forwardly divergent, and a drip pan mounted on said baffles to be heated thereby and positioned beneath the stack for the reception of condensate therefrom.

References Cited in the file of this patent

UNITED STATES PATENTS

806,526	Daly	Dec. 5, 1905
894,688	Neusus et al.	July 28, 1908
1,961,231	Maier	June 5, 1934
2,092,139	Ramer	Sept. 17, 1937
2,543,835	Dewey	Mar. 6, 1951
2,696,815	Johnson	Dec. 14, 1954
2,698,616	Kudobe	Jan. 4, 1955