H. R. BYNUM.

WATER HEATER.

APPLICATION FILED APR. 13, 1917.

1,265,171.

Patented May 7, 1918.

2 SHEETS—SHEET 1.

Fig. 1.

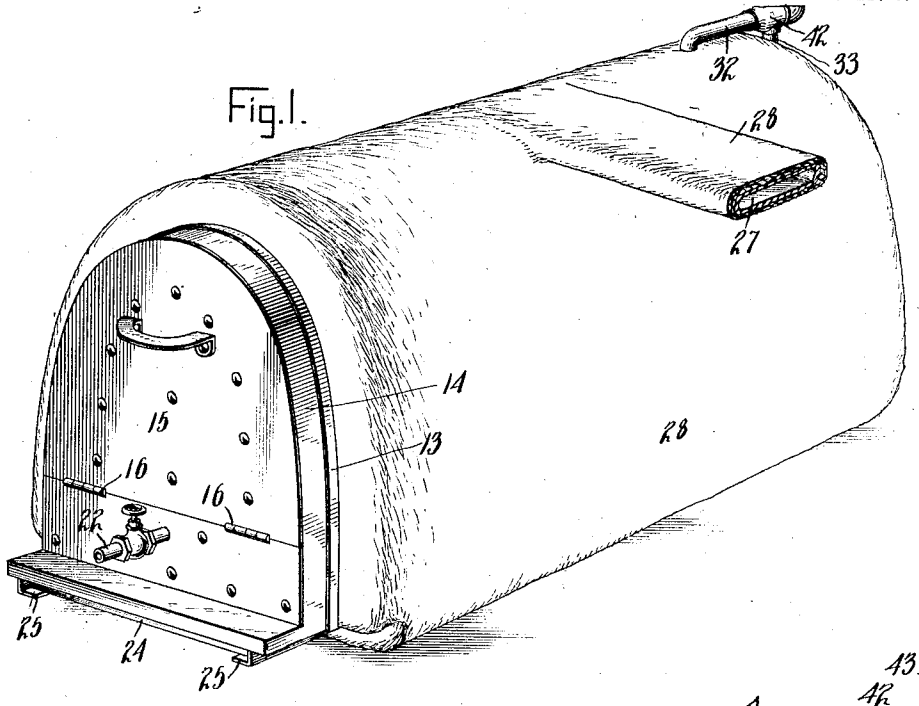
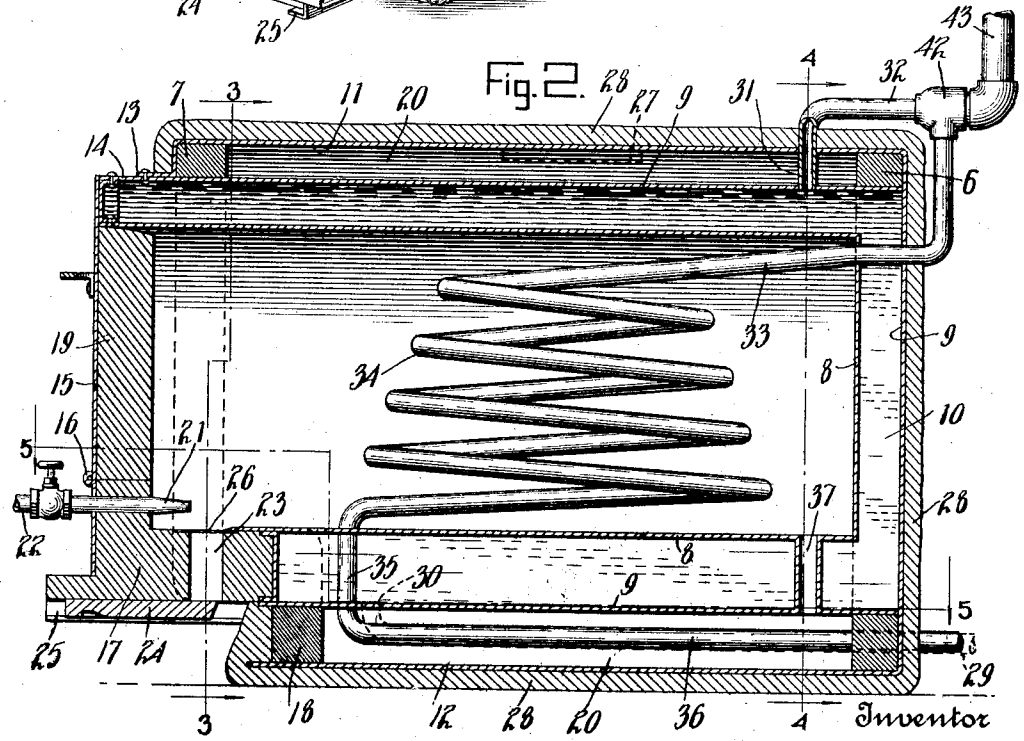


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

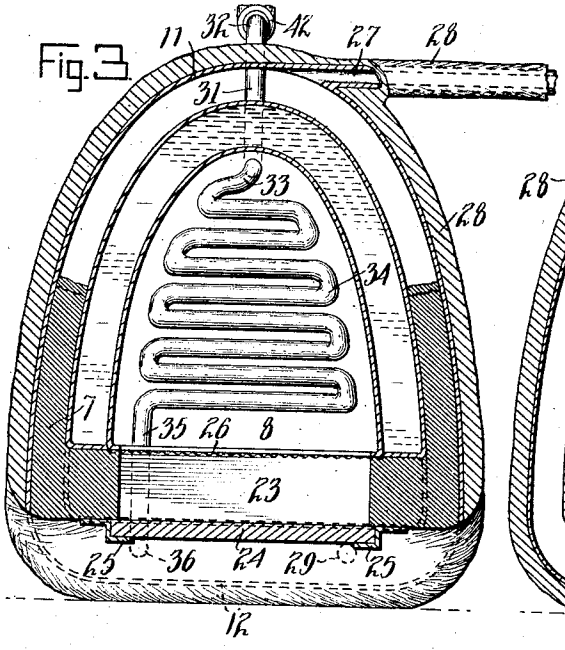


Fig. 4.

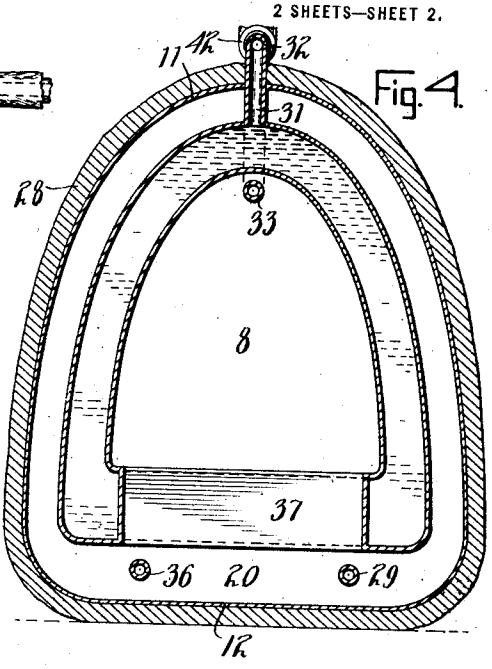
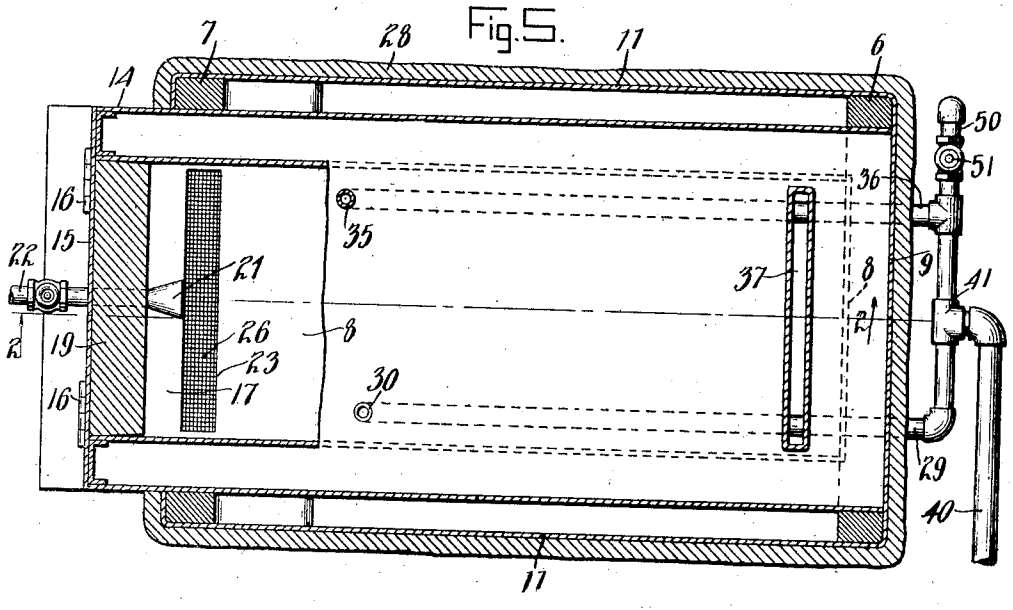


Fig. 5.



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UNITED STATES PATENT OFFICE.

HUGH ROBERT BYNUM, OF CLARKSDALE, MISSISSIPPI.

WATER-HEATER.

1,265,171. Specification of Letters Patent. Patented May 7, 1918.

Application filed April 13, 1917. Serial No. 161,821.

To all whom it may concern:

Be it known that I, HUGH ROBERT BYNUM, a citizen of the United States, residing at Clarksdale, Coahoma county, and State of Mississippi, have invented and discovered certain new and useful Improvements in Water-Heaters, of which the following is a specification.

My said invention relates to water heaters and consists in the combinations and arrangements of elements hereinafter described and particularly set forth in the accompanying claims.

The object of the invention is to provide a heater for use in supplying heat for buildings, or for any other purpose for which it may be found appropriate, in which the heating apparatus is of comparatively simple and inexpensive construction, capable of being quickly and easily installed, and in which the maximum of the heat units from the fuel will be utilized in heating the water, which is designed to serve as the principal heating medium, all as hereinafter described and claimed.

The invention is shown by way of illustration in the accompanying drawings, wherein—

Figure 1 is a perspective view of the water heater,

Fig. 2 a longitudinal sectional view taken on the dotted line 2—2 in Fig. 5,

Fig. 3 a transverse sectional view taken on the line 3—3 of Fig. 2,

Fig. 4 a similar view taken on the line 4—4 of Fig. 2, and

Fig. 5 a horizontal sectional view taken on the line 5—5 of Fig. 2.

Referring to the construction in detail, the heater consists of a suitable frame comprising arch pieces or yokes 6 and 7, located at either end of the frame and supporting the tank or vessel comprising an inner section 8 and an outer section 9, leaving between them a water space or chamber 10 substantially surrounding said section 8, and which constitutes the initial or primary heater of the apparatus. A suitable incasement or housing 11 surrounds the outer wall 9 of the heater and is formed integral, or continuously united with the rear wall thereof, and, in like manner, with the bottom wall 12 that provides a base for the heater.

The front portion of the casing 11 is formed with a flange 13, and the sections 8 and 9 project beyond and have a frame or yoke 14 between them forming the front door frame of the heater. A door 15 is hingedly mounted, as at 16, thus giving access to the interior of the heater, as shown. Said end closure frame is constructed with a body portion 17 (see Fig. 2), supported by the inset part 18 of the front frame piece 7, and the door part of the closure is likewise provided with a body piece or lining 19, which, with the portion 17, is preferably constructed of suitable heat insulating material.

The outer casing 11 is suitably spaced from the wall 9 of the water heater, thus forming a surrounding air heater chamber 20 for the water vessel, and a burner 21 is projected into the interior of the heater and connects with the source of fuel supply, through the pipe 22. Either liquid or gaseous fuel may be used with the heater, and in either case the necessary type of burner would be employed. A vent opening 23 is formed in the closure portion 17, and the passage therethrough is regulated by a slide piece or damper 24, which is adjustable in the pair of guide members 25 secured on the underside of the end closure. A screen 26 overlies the outlet of the vent opening 23 and is adapted for guarding against the entrance of dirt, or the like, into the heating chamber. An outlet flue 27 is located at the top of the heating chamber and is preferably disposed laterally for the purpose of economy in space, after the manner shown in Figs. 1 and 3. Said flue may connect with any other appropriate flue or chimney leading to the outside, or lead into a stove or hot air heater (not shown), interposed in a suitable location, for utilizing the heat, as may be desired.

The entire exterior surface of the casing walls 11 and 12, and the rear wall portion 9 of the heater, are covered by a suitable heat insulating material 28, of asbestos or the like, to the end that the heating contents of the heater may be conserved; and the flue 27 is in like manner covered, as shown.

The water circulating system consists of a water supply pipe 40, which leads to an expansion tank, or any source of supply, and also preferably connects, through a connection not shown, with the heating system at its terminus in an outward direction. It connects with a drainage pipe 50, controlled by a valve 51, by which the system may be drained. Said pipe 40 is also connected by a T 41 with pipes 29 and 30. Pipe 29 leads

through the rear wall of the heater and discharges into the water chamber 10 at a point 30 (see Fig. 2.) Pipe 36 leads through the rear wall of the heater and connects with the coil 34 at a point found convenient, such as at 35. The water circulates through chamber 10 surrounding the heating chamber and passes out from the upper side thereof near its rear end through a pipe 32, which is connected by a T 42 with a pipe 43 which leads to the radiators, to a coil in the kitchen boiler, or to other heating members (not shown) where it may be desired to utilize the heat. After continuing through the heating system it returns to the supply pipe 40 and is again heated, over and over, mingling with the supply coming from any appropriate source sufficient to maintain the pipes and heating system full.

The fluid fuel, such as gas or oil, coming through pipe 22 is ignited at burner 21 and a draft of appropriate force established by the adjustment of damper 24. The fire from the burner heats the chamber surrounded by wall 8 to a very high degree, heating the water within coil 34 and also the coil in the water jacket 10 surrounding said chamber, thus providing two sources of utilizing the heat units in the heating chamber, and providing a maximum heater capacity in an apparatus of minimum size and cost. The air for supporting combustion enters through the vent opening 23 at the front end into the heating chamber and from said heating chamber the air and products of combustion pass through vent opening 37 to the hot air chamber, or jacket which surrounds the water jacket 10, and from the extreme upper side (see especially Figs. 1 and 3) passes out flue 27 to any location where it may be desired either to utilize the heat, or to discharge the commingled air and gases.

By this construction a heater is provided that is not only cheap to install and to operate, but it will be noted that the heating chamber is completely surrounded by water except at the front, and the water chambers completely surrounded by air, except at the front, thus providing an effective protection and a heater capable of withstanding very high heating tests with only one end lined or protected by fire brick or other protecting material.

It is obvious that those skilled in the art may vary the details of construction and arrangements of parts without departing from the spirit of my invention, and I therefore do not wish to be limited to such details except as may be required by the claims.

Having thus fully described my said invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a water heating apparatus the combination of a frame structure, a section providing a horizontally disposed heating chamber, a section inclosing the inner section and providing therewith a water space at the top, back, sides, and bottom, both of said sections located within the frame structure; an incasement mounted on the outside of the frame structure and surrounding said outer section and forming therewith an air heating chamber inclosing the water chamber at the top, sides and bottom; said surrounding air chamber communicating with the inner heating chamber and having an outlet for the passage of exhaust gases, a pipe coil located in said inner heating chamber, water feed pipes entering the lower side of the outer heating chamber and communicating with said water space and the coil, an outlet water pipe for said space and coil, and a fuel burner located in the inner heating chamber, substantially as set forth.

2. In a water heating apparatus the combination of a frame structure comprising two yoke members, an inner section providing a horizontally disposed heating chamber, an outer section inclosing the inner section and providing a water space therewith, an end section secured to said inner and outer sections and having an overhanging under portion provided with a vent opening, an incasement surrounding said outer section and providing an air heating chamber therewith, said chamber communicating with the inner heating chamber; a pipe coil located in said inner heating chamber, means for feeding water to and taking water from said water chamber and the coil, and a fuel burner located in the inner heating chamber, substantially as set forth.

3. In a water heating apparatus the combination of a frame structure comprising two yoke members disposed at either end of the heater and one of said members having an inset lower portion, an inner section providing a horizontally disposed heating chamber, an outer section inclosing the inner section and providing a water space therewith, an end section secured to said inner and outer sections and having a lower portion fitting the lower inset portion of said yoke member, an incasement surrounding said outer section and forming an air heating chamber therewith, said chamber communicating with the inner heating chamber and having an outlet flue, a pipe coil located in said inner heating chamber, water feed pipes entering said outer heating chamber and communicating with said coil and the water space, outlet pipes for said water space and the coil, and a burner located in the inner heating chamber, substantially as set forth.

4. In a water heating apparatus the combination of a frame structure, an inner casing providing a heating chamber, an outer casing inclosing said inner casing and providing a water space therewith, an incase-

ment surrounding said outer casing providing an air heating chamber therewith, an end section having an overhanging under portion provided with a vent opening, a slide for regulating said opening, a door hinged on said end section giving access to the inner heating chamber, a pipe coil in the inner heating chamber, means for feeding water to and taking water from said coil and the water spaces, means providing communication between said inner and outer heating chambers at the lower rear portion of the inner heating chamber, an outlet flue for the outer heating chamber, an asbestos lining covering the outlet flue and the heater body excepting the end sections thereof, and a fuel burner mounted on said end section, substantially as set forth.

In witness whereof, I have hereunto set my hand and seal at Clarksdale, Mississippi, this 10th day of March, A. D. nineteen hundred and seventeen.

HUGH ROBERT BYNUM. [L. S.]

Witnesses:

P. L. WALDROP,

THOS. J. TULLY, Jr.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."