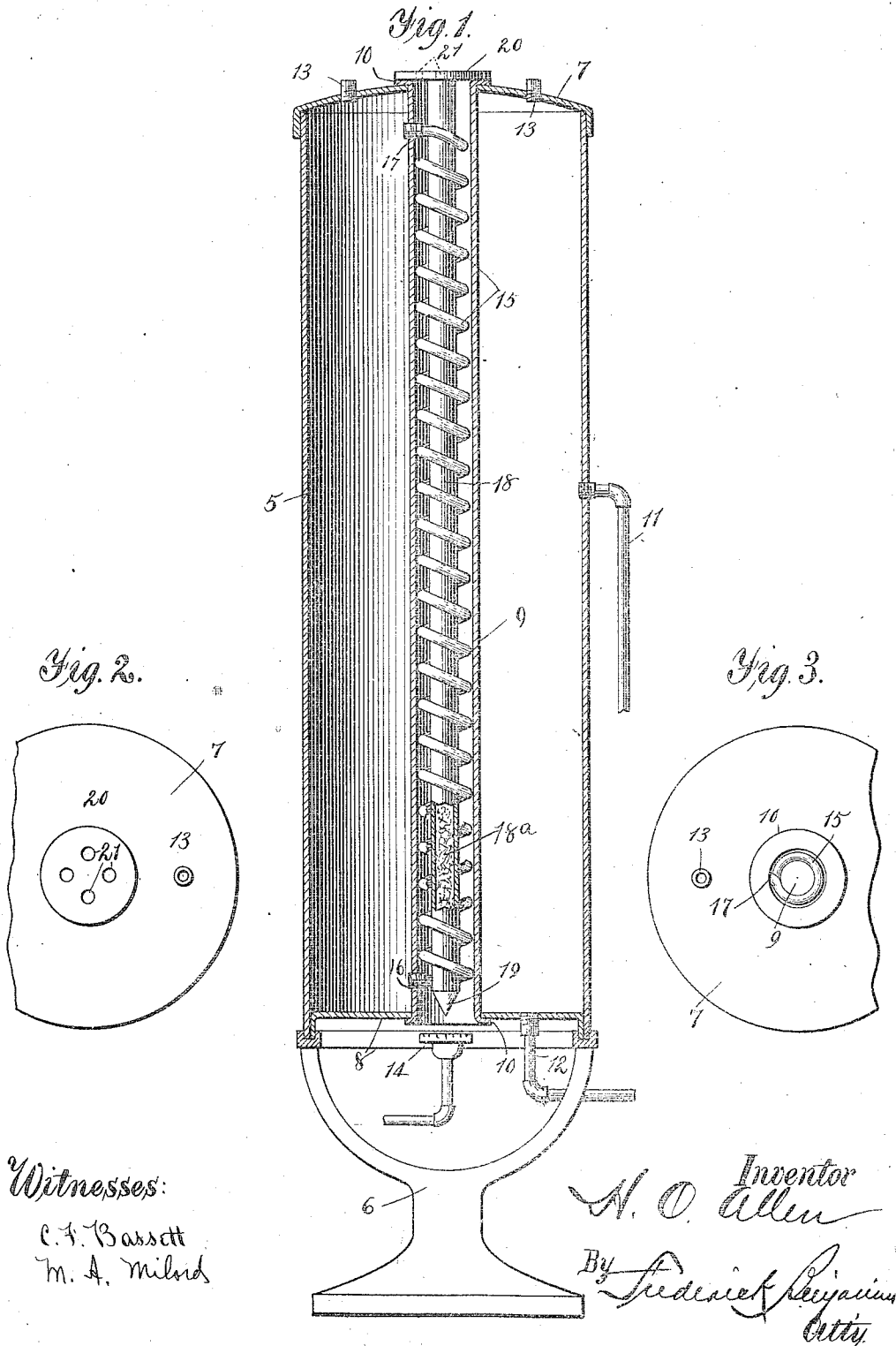


H. O. ALLEN.
WATER HEATER.

APPLICATION FILED NOV. 21, 1910.

1,044,469.

Patented Nov. 19, 1912.



Witnesses:
C. F. Bassett
M. A. Milrod

Inventor
H. O. Allen
By Frederick R. Higgins
Att'y.

UNITED STATES PATENT OFFICE.

HERBERT O. ALLEN, OF AUBURN, CALIFORNIA, ASSIGNOR OF ONE-FOURTH TO ELBERT L. JETT, OF AUBURN, CALIFORNIA.

WATER-HEATER.

1,044,469.

Specification of Letters Patent.

Patented Nov. 19, 1912.

Application filed November 21, 1910. Serial No. 593,307.

To all whom it may concern:

Be it known that I, HERBERT O. ALLEN, citizen of the United States, residing at Auburn, in the county of Placer and State of California, have invented certain new and useful Improvements in Water-Heaters, of which the following is a specification.

My invention relates to water heaters and particularly to that type of apparatus commonly installed in dwellings, hotels, or other places where hot water is required to be supplied at irregular intervals.

The chief objects of the improvements which constitute the subject matter of this application for patent are:—to provide a water boiler so constructed that an unusually large percentage of the heat will be utilized to arrange the device so that a comparatively small portion of the water in the reserve tank is brought into direct contact with the most effective part of the heating surface at one time, thus permitting an available quantity of hot water to be quickly furnished after first application of the source of heat.

Further objects of this invention are to provide a device that may be employed with any boiler similar to those in common use, giving economical results whatever the character of the fuel supplied to the burner, which may be adapted to burn oil or gas; and as the burner, owing to the manner of applying the flame and conserving the heat supply, may be of comparatively small size, and is placed beneath the tank, there is a marked economy in the amount of space required.

The above and other minor results are obtained by employing the apparatus illustrated in the accompanying drawing which forms a part of this application, the details of construction being shown in the following views:—

Figure 1 is a vertical median section through a water heating tank, embodying my improvements; Fig. 2 is a partial top plan view of the apparatus; and Fig. 3 is a top plan view with the heat retaining member removed.

Referring to the details of the drawing, the numeral 5 indicates an upright tank resembling in a general way the reservoir usually installed in domestic water heating systems. The said tank or reservoir is supported in the ordinary manner upon a suit-

able base 6, and has a top plate 7 and a bottom 8. Extending vertically between the top and bottom plate is a flue 9, preferably located concentrically with the tank walls and having its ends projecting through openings in said plates, the margins being upset or turned outwardly to form retaining flanges 10. The usual range connection is shown at 11, and a drain pipe 12 is attached at the bottom as in all boilers of this type. The top of the boiler is furnished with the usual nipples 13, for connection with the hot and cold water pipes of the distributing system. Immediately below the flue is located a burner 14 which may be of any form but is preferably made round and of a diameter to correspond with the size of the flue. Arranged within the flue is a water coil consisting of a spirally arranged pipe 15, having its lower end 16 connected with the boiler near the bottom, while the upper end 17, enters the boiler near the top of the flue. Occupying the central opening through the coil 15 is a hollow core or tube 18, terminating below in a conical point 19, and having a disk shaped head or flange 20 attached to the upper end. This flange rests upon the margin of the flue and supports the shaft 18 so that its conical end 19 reaches to the lower end of the flue. The said flange 20 is provided with a series of holes 21, located above the flue for the escape of hot air, smoke and gases from the burner 14.

The operation of the device and the reasons for its economy in the application of the heating flame will be readily understood by those skilled in the art to which this invention pertains. The coil 15 being of considerable length and confined in the narrow annular space between the inner wall of the flue and the cylindrical heat retainer 18, will present a comparatively large surface to the action of the ascending hot gases, and the water therein will be quickly heated, producing a constant current through the coil, and as the water circulating through this coil is taken from below and enters the top of the tank its lighter specific gravity will cause it to displace the colder water remaining at the top ready to be drawn off through the hot water pipe. The tube 18 will present a considerable mass to the hot current through the flue, and when once raised to the maximum degree of heat, it

will remain at a constant temperature so long as the flame remains undiminished, and when the latter is turned down or put completely out the heated tube, being in contact with the coil or in close proximity thereto, will give off a large proportion of its heat to the latter, so that the water will cool more gradually than would be the case if equivalent means for thus storing the surplus heat were not employed. The purpose of the lower conical end of the core is to spread the flame from the burner and direct it into the annular space occupied by the coil.

The cavity of the tube 18 is packed with a heat retaining substance, thus causing the members to radiate its heat more slowly than if made entirely of metal, and for this filling I prefer to use asbestos in some of its forms, such material being indicated at 18^a.

Having thus described my invention, what I claim as new, is:—

1. In a water heater, the combination with a tank having inlet and outlet openings and an open ended flue extending therethrough, of a water coil arranged in said flue and communicating directly with the upper and lower portions of said tank, a flame spreading and heat retaining member suspended in the coil extending the length of the flue and consisting of a tube closed at its lower end, and means for supplying heat to said flue, coil and heat retaining tube.

2. In a water heater, the combination with

a tank having a vertical flue extending there- through, a water coil communicating with said tank and arranged in said flue, a heat retaining member, comprising a hollow core arranged within the coil, and a perforated flange on the upper end of the core and engaging the margin of the flue, and means for supplying heat to said flue, coil and core.

3. In a water heater, the combination with a tank, an open flue extending vertically through said tank, a coil arranged within the flue and communicating at each end with the tank, a core having a conical lower end arranged within and extending through said coil, supporting means for the core consisting of a perforated flange engaging the upper margin of said flue, and means for supplying heat to said flue, coil and core.

4. In a water heater, the combination with a tank having a flue extending therethrough, of a water coil arranged in said flue, said coil being connected with the upper and lower portions of the tank, a heat retaining member comprising a hollow cylindrical core extending through said coil, a heat retaining filling in said core, and means for supplying heat to said flue, coil and core.

In testimony whereof I affix my signature in the presence of two witnesses.

HERBERT O. ALLEN.

Witnesses:

ELBERT L. JETT,
G. E. LUKENS.