Dec. 16, 1924.

1,519,395

W. A. CLENCH

WATER HEATER

Filed Aug. 7, 1920

Fig. 1

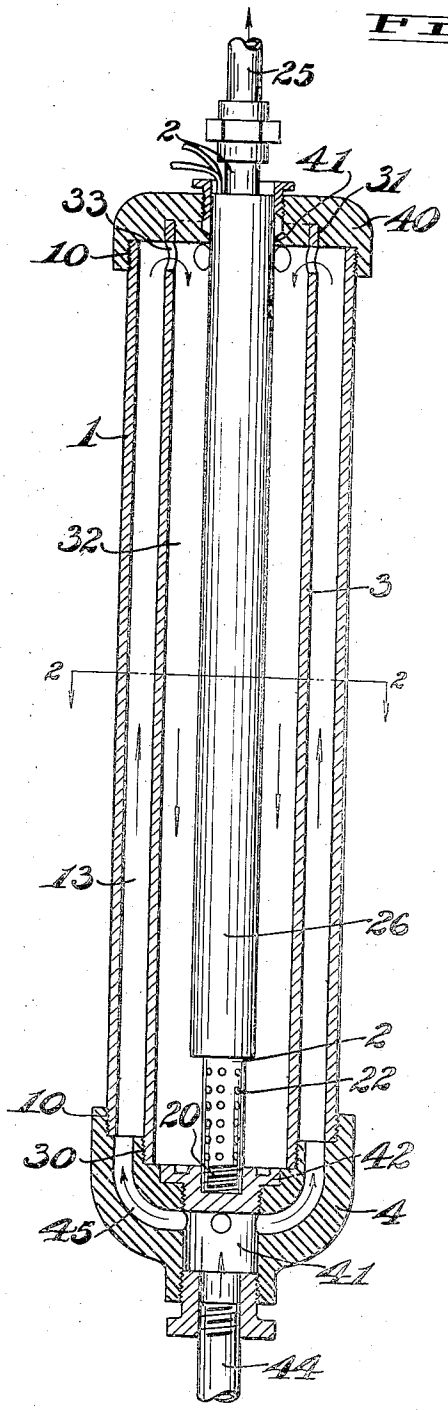


Fig. 3

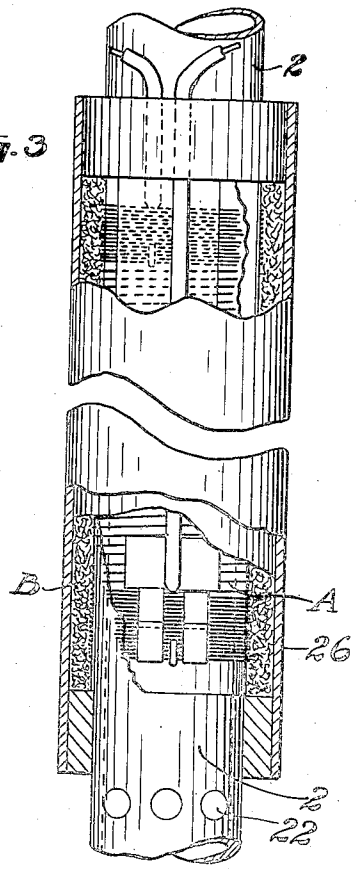
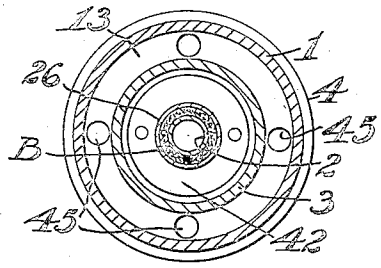


Fig. 2



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UNITED STATES PATENT OFFICE.

WILLIAM A. CLENCH, OF SEATTLE, WASHINGTON, ASSIGNOR OF ONE-HALF TO GEORGE H. SANBURN, OF SEATTLE, WASHINGTON.

WATER HEATER.

Application filed August 7, 1920. Serial No. 401,857.

To all whom it may concern:

Be it known that I, WILLIAM A. CLENCH, a citizen of the United States, and resident of the city of Seattle, county of King, State of Washington, have invented certain new and useful Improvements in Water Heaters, of which the following is a specification.

My invention relates to a heater for fluids, and is particularly designed for heating water in relatively small amounts for household purposes.

The object of my invention is to provide such a water heater which will heat water more quickly, and with a greater conservation of the heat generated in the heating element than the ordinary heater of this type.

Another object is to provide a simple, compact and cheap water heater which may be formed principally of stock materials.

My invention comprises those novel parts and combinations thereof which are shown in the accompanying drawings, described in the specification, and particularly pointed out in the claims terminating the same.

In the accompanying drawings I have shown my invention in a form which is now preferred by me.

Figure 1 is a vertical axial section through my device.

Figure 2 is a section on line 2—2 of Figure 1.

Figure 3 is an elevation, with parts broken away, of the primary heating element and its application within my heater.

I prefer to employ electric heating means in this heater. The principal objection to electric heaters has been the difficulty, with ordinary installations, of generating sufficient heat to quickly heat the desired amount of water. Added to this is the loss in previous types of electric water heaters due to radiation to the atmosphere. This radiation constituted a total loss, and it is one of the objects of my present invention to eliminate this loss so far as possible, and to employ the radiation to pre-heat the water which is to be delivered to the primary heating element. By using the radiation to pre-heat the water it may be delivered to the primary heating element warm so that it may be raised through a given range of temperature by this primary heating element in a much shorter space of time, or a higher degree of temperature may be attained, or a larger quantity of water may be raised through a smaller range of temperature.

In carrying out my invention I provide a series of nested pipes so positioned with relation to one another as to form a series of superposed jackets. In the drawings I have shown three such pipes, although it is apparent that a greater number may be employed if desired. These pipes comprise the outer pipe 1, the inner pipe 2 and the intermediate pipe 3. To close the ends of these pipes I may employ a lower head 4 and an upper head 40; both of these heads are provided with axial bores 41. I may extend the inner pipe 2 through the bore 41 in the upper head 40, but the bore in the lower head 4 should be closed so that its lower end does not directly connect with the interior of the heater. This may be done by means of a plug 42 secured in the upper side of this lower head 4.

The outer pipe 1 is secured in any suitable manner within the heads 4 and 40, as by the threads indicated at 10. The intermediate pipe 3 should be secured in one of the heads, probably in the lower head 4, as shown at 30, and may have a guiding support in the opposite head, as illustrated at 31, wherein its upper end fits snugly within a suitable groove in the head 40. The inner pipe 2 should be suitably supported at its lower end, and as I have herein shown it, it is screwed within the plug 42, as shown at 20.

The pipes and the heads, assembled as described, form a series of superposed jackets through which the water may pass. The head 4 is provided with a water intake at 44, this being connected through suitable ports 45 to the outermost jacket 13. The water passes up through the jacket 13 and is then led through perforations 33 in the intermediate pipe into the inner jacket 32. It is then lead downward and through perforations 22 in the lower end of the pipe 2, and passes upward through this pipe and out at the discharge connections 25 at its upper end.

The perforations 33 are positioned at the upper end of the pipe 3 and upon a level with the inner or lower side of the upper head 40. My object in so positioning these perforations is to make certain that there is no space left above the perforations where dead or still water may collect, to be eventually turned into steam. If there were such

a space steam might form therein until the head gained sufficient pressure to cause a steam hammer, or even to shut off the supply of water, and the heater would then be burned out. While I speak of perforations in the various pipes it is evident that the pipes might be cut short of the heads and be suitably supported in some manner other than that shown, although the preferred form is that illustrated, all parts being made of stock materials.

The heating element surrounds the innermost pipe 2 and is covered by the protecting tube 26. The element "A," itself, may be of any suitable or standard construction and may be heat insulated from the tube 26 by a layer of suitable insulation "B." This directs the greater part of the heat to the interior of the pipe 2, where the water about to be discharged is finally heated. A heater formed in the manner described will take in cold water in its outer jacket 13 and during its passage through this jacket it will take up a portion of the radiation which escapes through the tube 26 and the inner jacket 32. In passing downward through the inner jacket 32 the water is further heated, and passes through the perforations 22 warm. Thus, it can be seen that it is comparatively easy to reach a high temperature in finally passing the water through the pipe 2, about which is coiled the heating element "A."

What I claim as my invention is:

1. A water heater comprising, in combination, an upper and a lower head each having a central bore, a plug secured in the upper side of the lower head and closing said bore therein, an outer, an inner and an intermediate pipe nested to form a series of superposed jackets, said inner pipe having its lower end perforated and secured in said plug and its upper end projecting through the bore in the upper head, said outer and intermediate pipes being secured in the heads, and the intermediate pipe being perforated upon a level with the lower side of the upper head, said lower head having an intake port leading to the outer jacket, and a heating element surrounding said inner pipe.

2. A water heater comprising, in combination, an upper and a lower head, said upper head having a central bore, an outer, an inner, and an intermediate pipe nested to form a series of superposed jackets, said inner pipe having its lower end perforated and secured in the lower head, and its upper end projecting through the bore in the upper head, said outer and intermediate pipes being secured in the heads, and the intermediate pipe being perforated at its upper end, said lower head having an intake port communicating with the outer jacket, and a heating element surrounding one of said inner pipes.

3. A water heater comprising, in combination, an upper and a lower head, said upper head having a central bore, an outer, an inner, and an intermediate pipe nested to form a series of superposed jackets, said inner pipe having its lower end perforated and secured in the lower head, a tube surrounding the inner pipe above the perforations therein and forming therewith an annular chamber closed at its lower end, said inner pipe and tube extending through the bore in the upper head, a heating element positioned in said annular chamber, said outer and intermediate pipes being secured in the heads, and the intermediate pipe being perforated at its upper end, and said lower head having an intake port leading to the outer jacket.

Signed at Seattle, Washington, this 29th day of July, 1920.

WILLIAM A. CLENCH.