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E. R. WILLIAMS

WATER HEATER

Filed Jan. 22, 1924

Fig. 1.

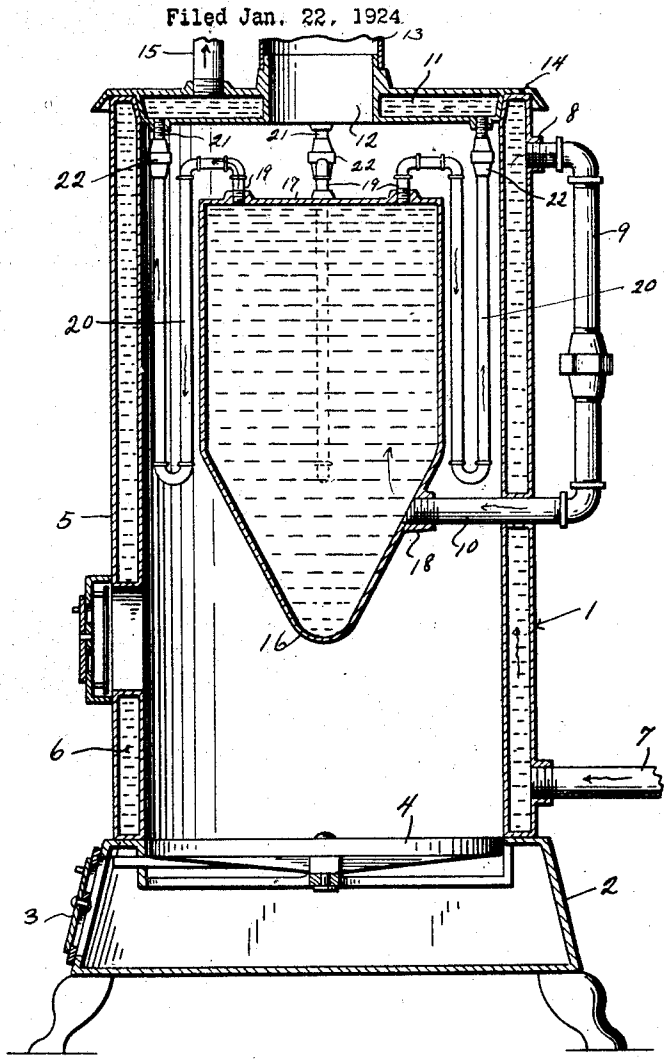
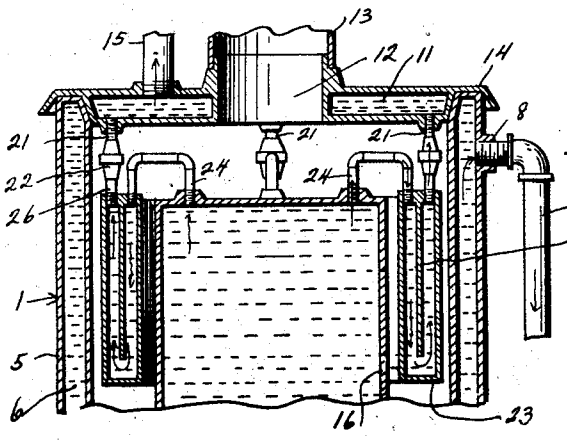



Fig. 2.




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# UNITED STATES PATENT OFFICE.

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## WATER HEATER.

Application filed January 22, 1924. Serial No. 687,798.

*To all whom it may concern:*

Be it known that I, ELMER R. WILLIAMS, a citizen of the United States, residing at Springfield, in the county of Greene and State of Missouri, have invented certain new and useful Improvements in Water Heaters, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to an improved water heater for use in connection with heating stoves such as are used for heating purposes in houses and one object of the invention is to provide a water heater in which the water may be caused to pass through a water jacket provided in the walls of the stove and then delivered to a heating drum within the stove, so that the water will be heated in this drum by the fire within the stove and this heated water then delivered to heating coils positioned between the drum and walls of the stove, so that the water passing through these coils will be further heated to a high degree of temperature and delivered to a hollow head of the stove from which it will pass into the hot water delivery pipe.

Another object of the invention is to so construct this water heating system that the drum and heating coils may be so positioned within the stove that the products of combustion passing upwardly from the fire in the stove will be divided and caused to pass upwardly around the heating drum and in engagement with the coils and then pass between the upper end of the drum and head of the stove and out through a smoke pipe of the stove, thus causing the drum and coils, and also the hollow head of the stove, to be thoroughly heated.

Another object of the invention is to so construct this water heater that the heating drum may be suspended in the body of the stove by means of the heating coils which deliver the water from the drum to the hollow head of the stove.

Another object of the invention is to so construct this heater that it will be very compact and the heating drum and coils occupy the upper portion of the interior of the stove where they will be out of the way and not interfere with the operator placing coal upon the stove through the usual fire door thereof.

Another object of the invention is to so construct this heater that the stove, when viewed externally, will in general appearance resemble stoves now in use and not be unsightly in appearance.

This invention is illustrated in the accompanying drawings wherein:—

Figure 1 is a vertical sectional view through the improved water heater; and

Figure 2 is a vertical sectional view through the upper portion of a water heater showing a slightly modified construction.

This improved water heater includes a stove indicated in general by the numeral 1 and having a base portion 2 provided with the usual door 3 through which ashes may be removed and also provided with the usual grate 4 upon which the fire will be built. The side walls 5 of this stove are hollow thereby providing a water jacket 6 into which cold water will be delivered by the pipe 7 which communicates with the lower end portion of this water jacket. The water jacket is closed at its upper and lower ends and has its upper end portion provided with an outlet 8 from which extends the conduit pipe 9. This pipe 9 extends downwardly externally of the stove and at its lower end is provided with an extension 10 which is projected inwardly through the water jacket. A hollow head 11 is provided for this stove and this hollow head 11 is provided with a passage 12 so that the products of combustion from the fire may pass upwardly through this passage 12 and out through the smoke pipe 13 extending upwardly from the cap 14 of the stove. The cap 14 in addition to being provided with an opening to receive the smoke pipe 13, is also provided with an opening through which passes the hot water pipe 15 for delivering the hot water from the hollow head 11 to the point where it is to be used or to a suitable storage tank.

Within the stove there has been provided a water heating drum 16 which is substantially cylindrical in shape and has its lower end portion tapered and its upper end portion provided with a head 17. This tapered lower end portion of the drum has been provided with a side port 18 internally threaded to receive the inner end of the extension 10 of the conduit 9. Therefore, the water delivered to the water jacket 6 may pass upwardly through the water jacket and through the conduit 9 into the lower end portion of the drum 16. The products of combustion will be divided by the tapered lower end portion of this drum and will,

therefore, pass upwardly about the drum and cause it to be thoroughly heated from all sides. After reaching the upper end of the drum the products of combustion pass over the drum between the hollow head 11 and the head of the drum and out through the passage 12, thereby causing the top of the drum and the hollow head to be thoroughly heated. The water in the drum will, therefore, be heated from all sides and this heated water will move upwardly in the drum and pass outwardly through pipes 19 which project upwardly from the head 17 and extend in radiating relation towards the sides of the drum. It will be understood that as many pipes 19 may be provided as desired and in accordance with the size of the water heater. These pipes 19 in one form of the invention communicate with heating coils 20 which are U-shaped and extend downwardly between the drum and the walls of the stove and are then carried upwardly and connected with nipples 21 between couplings 22. These nipples 21 are screwed into threaded openings formed in the lower wall of the hollow head 11 so that the water will be delivered into the hollow head. Since these pipes are positioned about the drum between the drum and the walls of the stove, they will be heated to a high degree by the products of combustion passing upwardly about the drum and, therefore, the heated water delivered to these coils from the drum will, in passing through the coils, be heated to a very high point. This hot water, when delivered to the hollow head 11, passes out of it through the outlet pipe 15 and by means of this pipe 15 will be delivered to the point where it is to be used or to a storage tank. It will therefore be seen that this water will be heated in a very efficient manner and it will be further seen that the heating coils serve not only as means for causing the water from the drum to be very thoroughly heated but also serve as means to suspend the drum in the upper portion of the stove.

Instead of using the heating coils as means for thoroughly heating the water passing from the drum to the hollow head 11, there may be provided a shell 23 which is cylindrical in shape and positioned about the drum in spaced relation to the drum and the side walls of the stove. This shell is connected with the drum 16 by the short pipes 24 so that the water will be delivered from the upper end of the drum into the shell. A baffle 25 has been provided extending from the upper end of the shell to a point adjacent the lower end thereof so that the water delivered to this shell by the pipes 24 must pass downwardly through it and then upwardly in order to reach the pipes 26 which lead from the upper end of the shell and will be connected with the nipples 21 by couplings corresponding to the couplings 22.

When this heater is in use it will be positioned in a kitchen or at any other suitable point and the cold water pipe 7 and pipe 15 connected with the water jacket and hollow head 11. The water will be turned on and as this water passes from the pipe 7 it will fill the water jacket and drum and also fill the heating coils 20 and hollow head of the stove. When the fire is built in the stove, the drum, heating coils, water jacket and head of the stove will be thoroughly heated and a circulation of the water set in action. As the water is heated in the coils this water passes upwardly into the head and out through the pipe 15 and a fresh supply of water passes from the pipe 7 into the water jacket 6 and upwardly through this water jacket into the pipe 9 through which it flows into the lower end portion of the drum. It will, therefore, be seen that the water from the pipe 7 passes upwardly through the water jacket where it will be heated a certain amount and will then pass downwardly through the pipe 9 and into the lower end portion of the drum 16. The heat from the fire heats this drum and, therefore, as the water goes upwardly in the drum it will be gradually heated to a greater extent and the water in the upper portion of the drum will be hotter than the water in the lower portion. This heated water passes outwardly through the pipes 19 into the heating coils and as this heated water passes downwardly through the coils and then upwardly and into the hollow head, it will be heated to a very high point. There has therefore been provided a water heater which will be very effective in its operation and may be used not only as a water heater but also as a stove for heating a room.

While it has been stated that the stove is to be used for heating houses it will of course be understood that it could be used for heating a manufacturing plant or any other building desired and that it would be of a proper size to heat the building in which it is to be used.

What I claim is:—

1. In a water heater, the combination of a stove having spaced walls constituting a water jacket and having a hollow head in non-communicating relation to said jacket, an outlet pipe leading from the head, an inlet pipe at the lower portion of the jacket, a drum located within the stove in spaced relation to the head and jacket, a pipe located exteriorly of the stove and having one end communicating with the upper portion of the jacket and its other end extending through the jacket and connected with the lower portion of the drum, and a plurality of pipe coils connected at one end with the top of the drum and connected at their

other ends with said head, said coils extending downwardly between the drum and the jacket and constituting the sole source of supply to said head.

2. In a water heater, the combination of a stove having hollow walls forming a water jacket and a hollow head having a hot water outlet, a heating drum within said stove in spaced relation to the walls thereof, a conduit leading from the upper portion of said water jacket and communicating with the lower portion of said drum, and heating coils leading from the upper end of said drum and extending downwardly and then upwardly between the drum and walls of the stove and communicating with the hollow head.

3. In a water heater, the combination of a stove having hollow walls forming a water jacket and a hollow head having a hot water outlet, said water jacket having a cold water inlet adjacent its lower end, a water heating drum in said stove having a tapered lower end portion, a conduit leading from the upper portion of said water jacket and extending downwardly externally of the stove and projected through the water jacket and communicating with the tapered lower portion of said drum, and water heating coils leading from the upper end of said drum and projected downwardly and then upwardly between the drum and walls of the stove and connected with the hollow head to deliver heated water thereto from the drum.

In testimony whereof I hereunto affix my signature.

ELMER R. WILLIAMS.