W. H. BRIGHT.

HOT WATER HEATER.

APPLICATION FILED MAR. 15, 1909.

946,836.

Patented Jan. 18, 1910.

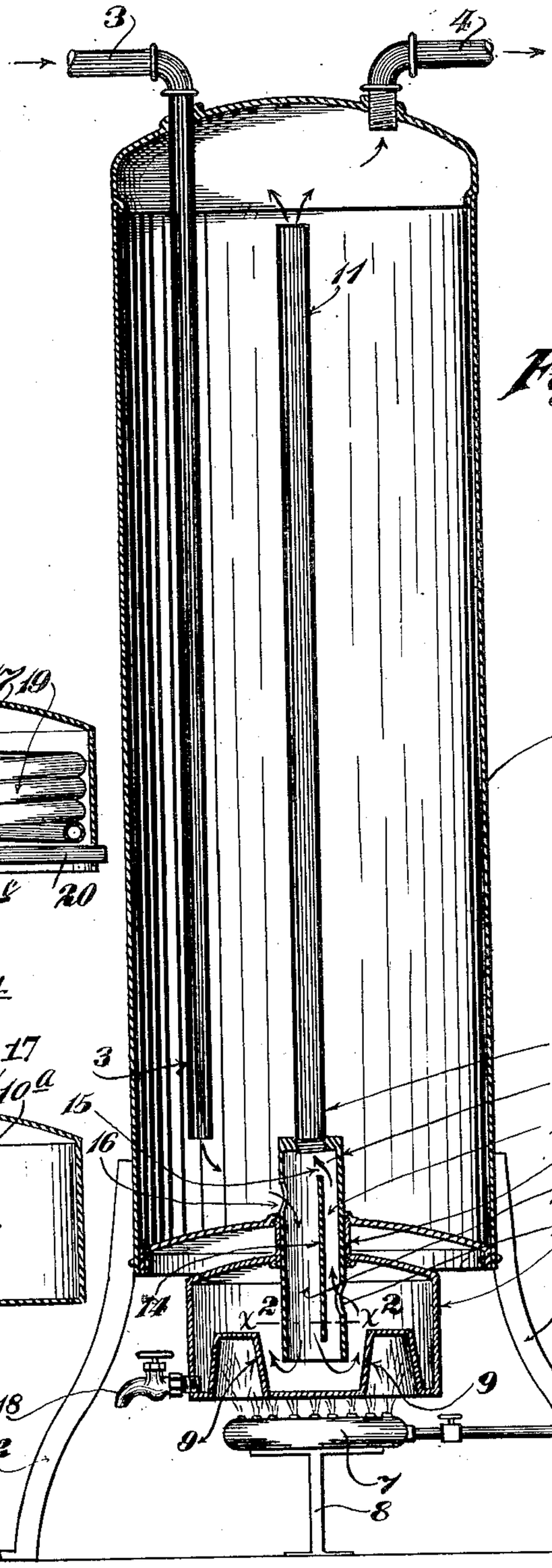
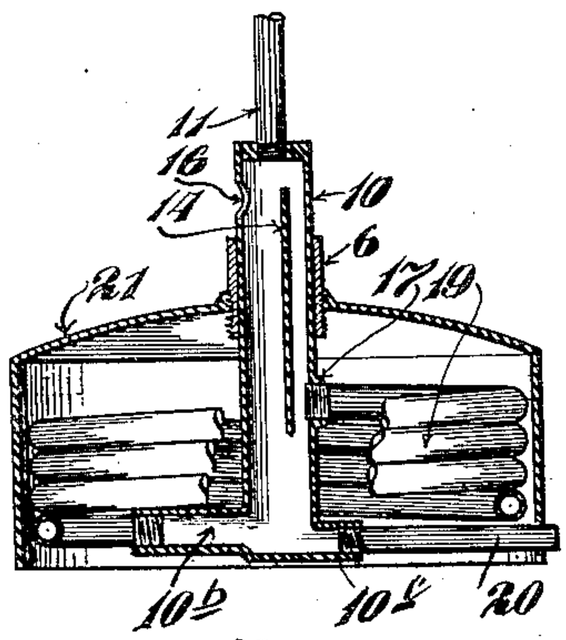


Fig. 1.

Fig. 4.



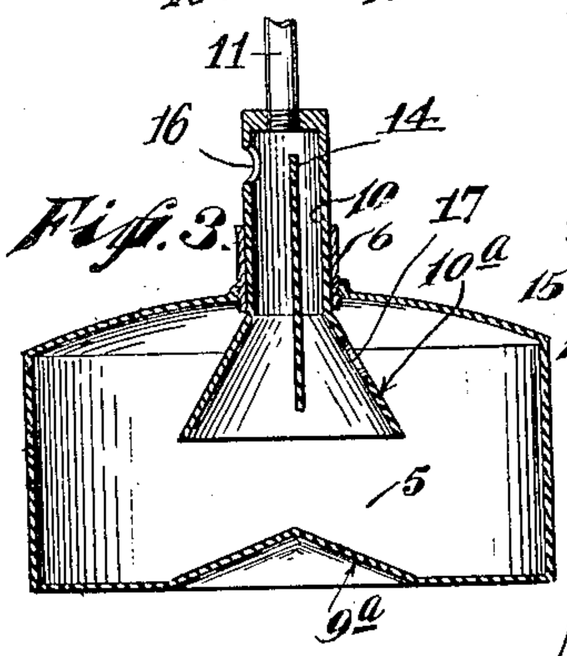


Fig. 3.

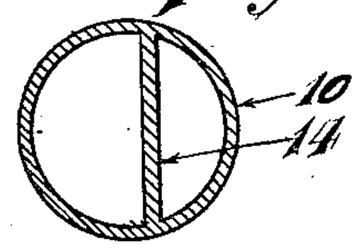


Fig. 2.

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UNITED STATES PATENT OFFICE.

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HOT-WATER HEATER.

946,836. Specification of Letters Patent. **Patented Jan. 18, 1910.**

Application filed March 15, 1909. Serial No. 483,505.

To all whom it may concern:

Be it known that I, WARREN H. BRIGHT, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Hot-Water Heaters; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention has for its object to provide an improved tank heater, especially adapted for use in connection with hot water tanks used to supply hot water for kitchen, bath and similar purposes, and to this end, it consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

Particularly this invention is designed as an improvement on the device shown and claimed in my prior patent No. 863,504, of date August 13, 1907, entitled "heating system."

The invention is illustrated in the accompanying drawings, wherein like characters indicate like parts throughout the several views.

Referring to the drawings: Figure 1 is a view in vertical section illustrating my invention as applied to an ordinary hot water tank; Fig. 2 is an enlarged horizontal section, taken on the line x^2 x^2 of Fig. 1; Fig. 3 is a vertical section showing a slightly modified form of the so-called tank heater; and Fig. 4 is a vertical section showing the tank heater made in the form of a coil.

The hot water tank 1, is shown as supported in an upright position with its lower end above the floor, by means of the customary legs 2. The cold water is supplied to the lower portion of said tank 1 from a suitable source, such as a city water main, by a pipe 3, and the hot water for service is drawn off from the top of said tank through a pipe 4.

In the construction illustrated in Figs. 1, 2 and 3, the boiler or water heater is in the form of a small sheet metal receptacle, located just below the tank 1 and securely connected to the lower head thereof by a short coupling sleeve or collar 6. Below the boiler 5 is a gas burner 7 shown as supported on a floor bracket 8. Preferably the bottom of the boiler 5 is formed with upwardly extended pockets 9, which increase the heat efficiency thereof.

Extending vertically through the coupling collar 6, is a water conducting tube 10, provided at its upper end with an upwardly extended pipe 11 that terminates near the upper end of the tank 1. The lower end of the tube 10 terminates quite close to the bottom of the boiler 5. The tube 10 is divided into hot and cold water conduits, 12 and 13 respectively, by a vertical partition 14 that extends less than from end to end thereof, the upper end of the said partition being spaced from the upper end of the said sleeve 10, so as to leave a port or passage 15 that connects the upper extremities of the said two conduits. A port 16 opens from the bottom of the tank 1 into the upper portion of the cold water conduit 13, through one side of the tube 10, and a port 17 opens from the upper portion of the boiler 5 into the lower portion of the hot water conduit 12 through the other side of said tube 10.

So far as the broad idea of the invention is concerned, the partition 14 may be located either diametrically within or to one side of the axis of the tube 10. However, greatly improved results are obtained by placing the partition to one side of the axis of said tube, so as to give a cold water conduit 13 which has materially greater cross section than the hot water conduit 12.

The numeral 18 indicates a faucet or a valve pipe, which leads from the bottom of the boiler 5. The water which is brought to a very high temperature within the boiler 5 will pass upward through the port 17, conduit 12, and pipe 11, to the top of the tank 1, while the cold water will pass from the bot-

tom of the said tank 1 downward through the port 16 and conduit 13 to the bottom of the boiler 5. Under ordinary conditions, there will be no tendency for the hot water to short circuit or turn directly downward through the conduit 13, but if the pipe 11 should be clogged by sediment, the water may take this short circuit, thus permitting such circulation of the water to prevent generation of steam with the resulting excessive pressure.

The advantages in having the cold water conduit 13 of greater cross section and conductive capacity than the hot water conduit 12, may be stated as follows: It assures a greater volume of cold than of hot water being drawn off, when the faucet 18 is opened. In case the water used contains mud or other impurities, which settles on the bottom of the tank 1, such sediment may be drawn off through the faucet 18 without danger of clogging the relatively large conduit 13 through which the water will be almost entirely drawn. Also it prevents much of the relatively hot water from being drawn from the top of the tank 1 through the pipe 11 and relatively small conduit 12. Furthermore, the said cold water or return conduit 13 is less liable to be clogged under ordinary conditions of circulation. The relatively small hot water conduit 12 also tends to hold the water longer within the boiler 5, so that it will reach a high enough temperature to carry it upward through the pipe 11, which pipe 11 when the heater is started, passes through a relatively cold body of water in the lower portion of the tank 1.

The dividing partition 14 in the tube 10 terminates below the extreme upper end of the said tube 10, or with a passage which connects the upper extremities of the hot and cold water conduits, and this is highly important because it eliminates the danger that might often be found in circulating connections of this general type. This, as already stated, gives the water a chance to work its way to any part of the heater or boiler, even if the pipe 11 or the port 16 should become clogged. It will, of course, be understood that the tube 10 may be provided with any desired number, one or more, of the ports 16 and 17.

The construction shown in Fig. 3 is like that illustrated in Figs. 1 and 2, with the exception that the tube 10 is provided with a downwardly flaring lower end extremity 10^a, and the bottom of the boiler 5, instead of having the several pockets 9 is provided with a single centrally located indentation or pocket 9^a.

In the construction illustrated in Fig. 4, the so-called boiler or heater proper, is in the form of a coil 19, the upper extremity of which is connected to the port 17, and the lower extremity of which is connected to a lateral extension 10^b. Also as shown, in this view, the lower end of the tube 10 is provided with another lateral extension 10^c, to which a drain pipe 20 having a valve or cock, not shown, is attached. The coil 19 is also shown as placed within a hood or housing 21, supported by the lower end of the coupling sleeve 6.

What I claim is:

1. The combination with a water tank, of a boiler located below the same, a tube extending from said boiler upward into said tank, and provided with a longitudinally extended partition, dividing said tube into hot and cold water conduits, having communication at their upper extremities, said hot water compartment having an inlet opening thereinto from the upper portion of said boiler, and said cold water conduit having a port opening thereinto from the lower portion of said tank.

2. The combination with a tank and a boiler located below the same, of a tube extending from the lower portion of said tank into said boiler, and having an open lower end, a pipe extending upward from the upper end of said tube, and a longitudinally extended partition in said tube terminating at its upper end below the upper end of said tube, and dividing said tube into hot and cold water conduits, said hot water conduit having a port connecting the same to the upper portion of said boiler, and said cold water conduit having a port that connects the same to the lower portion of said tank.

3. The combination with a tank and a boiler located below the same, of a tube formed with a hot water conduit connecting the upper portion of said boiler with the upper portion of said tank and with a cold water conduit connecting the lower portion of said tank with the lower portion of said boiler, said cold water conduit having a materially greater cross section or conducting capacity than the said hot water conduit.

4. The combination with a tank and a boiler located below the same, of a tube extending from said tank into said boiler, a longitudinally extended partition located in said tube at one side of its center, and dividing the same into a relatively small hot water conduit and a relatively large cold water conduit, said hot water conduit having a port connecting the same with the upper portion of said boiler, and said cold water conduit having a port connecting the same to the lower portion of said tank.

5. The combination with a tank and a boiler located below the same, of a tube ex-

tending from said tank into said boiler and provided with an open lower end, a pipe extending from the upper end of said tube to the upper portion of said tank, and a longitudinally extended dividing partition located in said tube at one side of its center, terminating at its upper extremity below the upper extremity of said tube, and dividing said tube in a relatively small hot water conduit and a relatively large cold water conduit, said hot water conduit having a port connecting the same with the upper portion of said boiler, and said cold water conduit having a port connecting the same with the lower portion of the said tank.

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

WARREN H. BRIGHT.

Witnesses:
F. D. MERCHANT,
HARRY D. KILGORE.