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T. MUEHLEISEN

WATER HEATER MECHANISM

Filed Jan. 20, 1920

2 sheets-sheet 1

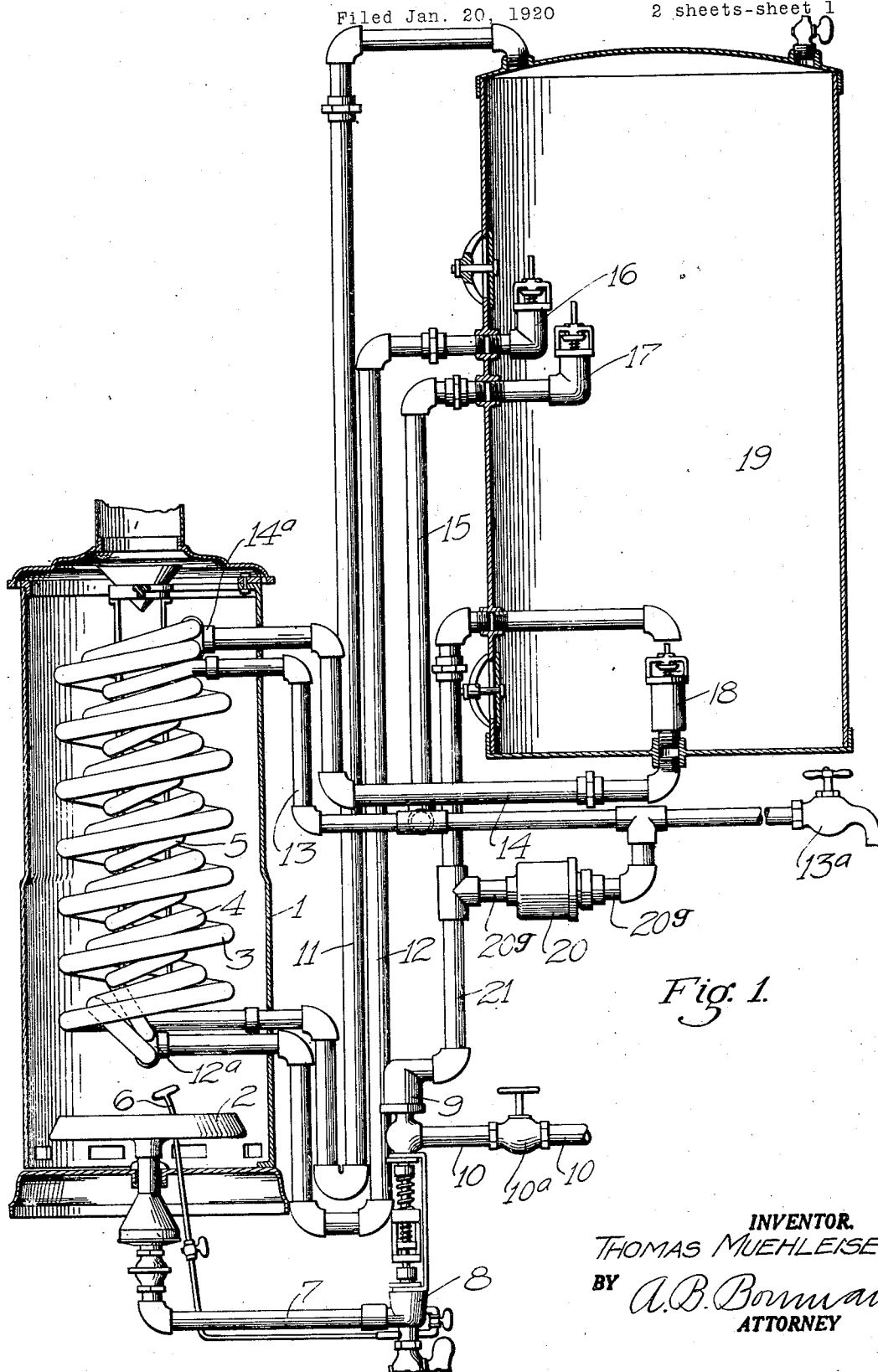


Fig. 1.

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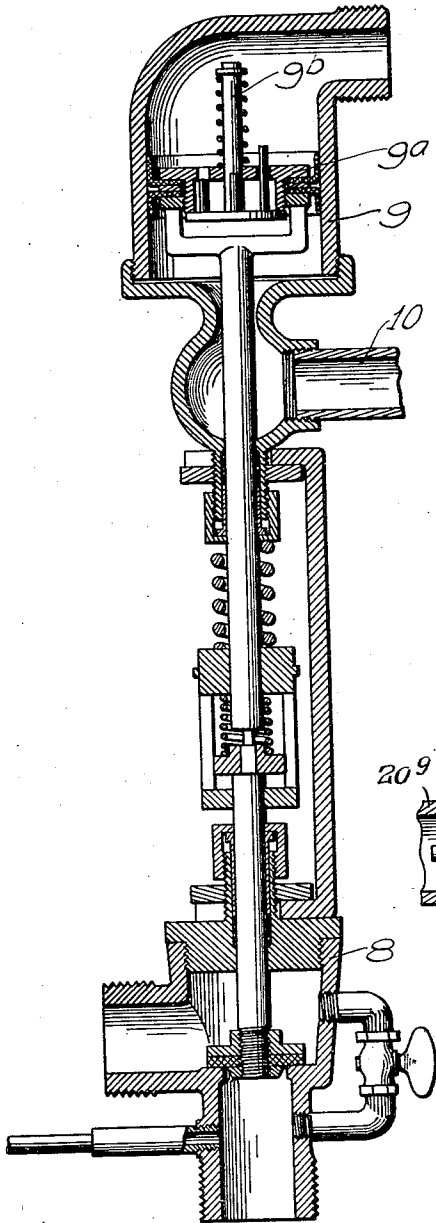


Fig. 2.

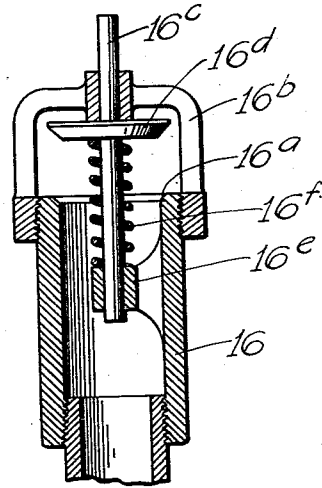


Fig. 3.

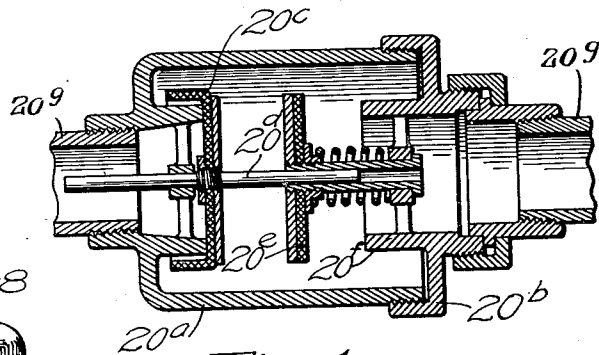


Fig. 4.

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UNITED STATES PATENT OFFICE.

THOMAS MUEHLEISEN, OF SAN DIEGO, CALIFORNIA, ASSIGNOR OF ONE-THIRD TO
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WATER-HEATER MECHANISM.

Application filed January 20, 1920. Serial No. 352,762.

To all whom it may concern:

Be it known that I, THOMAS MUEHLEISEN, a citizen of the United States, residing at San Diego, in the county of San Diego and State of California, have invented certain new and useful Water-Heater Mechanism, of which the following is a specification.

My invention relates to automatic storage water heaters and the objects of my invention are: First, to provide a heater of this class which combines the automatic heater with the storage heater; second, to provide a heater of this class in which the heat from the pilot light is utilized for pre-heating the water in a storage tank after which it is circulated for use similarly to the automatic heater; third, to provide a heater of this class in which the surplus heated water is utilized for pre-heating the water in a storage tank; fourth, to provide a water heater mechanism in which all of the water, before passing through the automatic water heater is pre-heated; fifth, to provide a water heater of this class with circulating means connecting a storage tank with the heater coils with means in connection therewith for regulating the flow of water to and from said storage tank; sixth, to provide a water heater mechanism of this class in which the water drawn at the fixture is taken directly from the central heater coil, thereby utilizing the hottest water from the coil; seventh, to provide an apparatus of this class whereby the circulation of the water is regulated automatically in accordance with the water pressure and eighth, to provide a water heater mechanism of this class which is very simple and economical of construction, durable, easy to operate, positive in its action and which will not readily deteriorate or get out of order.

With these and other objects in view as will appear hereinafter my invention consists of certain novel features of construction, combination and arrangement of parts as will be hereinafter described in detail and particularly set forth in the appended claims reference being had to the accompanying drawings and to the characters of reference thereon, which form a part of this application in which:

Figure 1 is an elevational view of my water heater mechanism showing the storage tank in section; Fig. 2 is a longitudinal sec-

tional view of a valve operating mechanism to be used in connection with gas heater; Fig. 3 is a longitudinal view of the valve mechanism for controlling the circulation of water to and from the storage tank and Fig. 4 is a longitudinal sectional view of the valve means for starting the circulation of the water into the storage tank when the hot water faucet is opened and which automatically closes soon after such circulation starts.

Similar characters of reference refer to similar parts and portions throughout the several views of the drawings.

The heater casing 1, gas burner 2, outer coil 3, intermediate coil 4, inner coil 5, pilot 6, gas conductor 7, gas valve 8, water valve 9, water inlet conductor 10, water conductors 11, 12, 13, 14 and 15 control valves 16, 17 and 18, storage tank 19 and water pressure regulating valve 20 constitute the principal parts of my water heater mechanism.

The water heater casing 1 is a cylindrical casing of the ordinary or conventional type and the burner 2 which is mounted in the lower end thereof is also of any conventional type.

Mounted over the burner 2 in the casing 1 are the coils 3, 4 and 5. The outer coil 3 and intermediate coil 4 are of the same diameter but the inner coil 5 is of smaller diameter. The lower ends of the coils 4 and 5 communicate with each other and the conductor 12 by means of a connection 12^a and the lower end of the coil 3 communicates with the conductor 11. It will be here noted that the conductors 11 and 12 are provided with downwardly extending bends which provide traps which prevent upward circulation of the water in the conductors 11 and 12 from the heater by convection. The upper ends of the coils 3 and 4 communicate with each other and the conductor 14 by means of a connection 14^a, while the upper end of the coil 5 communicates with the conductor 13 which is the service pipe for conducting the hot water to the service faucet 13^a.

Mounted in a suitable position relatively to the heater casing is a storage tank 19 for the storage of the pre-heated water and may also serve the function of a storage tank for use as a kitchen boiler.

The conductor 14 communicates with the

interior of the tank 19 near the bottom of said tank and said conductor is provided with a check valve 18 on its inner end which will be hereinafter described. Communicating with the interior of said tank is another conductor 21 which is the main cold water conductor to said boiler, the inner end of said conductor 21 extends to a position contiguous to the outlet of the valve 18 so as to direct water against the valve 18 tending to close the same as shown best in Fig. 1 of the drawings. The conductor 11 communicates with the upper end of the tank 19. The conductor 12 communicates with the tank 19 intermediate its ends and said conductor is provided on its extended inner end with a control check valve 16 similar to the valve 18. Communicating with the conductor 13 is a conductor 15 which is also provided with a control check valve 17 similar to the valves 16 and 18. Communicating with the conductors 7, 10 and 21 is an automatically actuated and controlled gas and water valve of any conventional type. I have shown a water valve 9 communicating with the conductors 10 and 21 and communicating with the gas conductor 7 is a gas valve 8 which is automatically controlled with the circulation of the water through the conductor 10 shown best in Fig. 2 of the drawings. Connecting with the main gas line is a pilot member 6 which extends to the central portion of the burner for igniting said burner when the gas is turned on by the movement of the water in the conductor 10 and through the valve 9.

Connecting the conductors 21 and 13 is a conductor 20^e which is provided with a valve 20 therein shown best in Fig. 4 which consists of a casing 20^a and cap 20^b and mounted in this casing 20^a is a plunger 20^c secured to a plunger rod 20^d. Reciprocably mounted on this rod 20^d is a valve 20^e which is adapted to engage the seat 20^f on the cap 20^b. When the plunger member 20^c is moved inwardly by the pressure of the water and when it is moved in sufficiently the valve 20^e closes, stopping the circulation of water and the water then circulates upwardly through the conductor 21 to the lower end of the tank 19. This valve 20 is for the purpose of starting the water circulating by opening the valve 9 when the faucet 13^a is opened and as soon as the valve member in the valve 9 is opened slightly this circulation is closed by the valve 20 and as the circulation has started in the conductor 21 it will continue into the tank 19. The control valves 16, 17 and 18 shown best in Fig. 3 each consists of a cylindrical support 16 screwed onto the end of a conductor pipe, and said support is provided with an inwardly extending lug 16^e and is also provided on its upper end with a valve seat 16. Screwed onto the upper end of this member 16 is the spider member 16^b which is provided with a central hole which serves as a support for the upper end of a valve stem 16^c, its other end being supported in the lug 16^e. Mounted on this valve stem 16^c is a valve 16^d and mounted on said valve stem 16^c between the lug 16^e and the valve 16^d is a spring 16^f which is just strong enough to support the valve and stem. These valves, 16, 17 and 18 are for the purpose of permitting the water to flow into the tank 19 from the conductors 12, 14 and 15 under slightly different pressure but prevent the water from passing out through said conductors.

The operation of the heater is as follows:

The pipe 10 is connected with the ordinary service water pipe and the valve 10^a therein open thus providing a practically equal pressure throughout the mechanism. The faucet 13^a is opened when it is desired to use any water at the fixtures, the water passed through the pipe 10 into the valve 9, raising the plunger 9^a therein at the same time opening the gas valve 8 starting the burner 2. The raising of the plunger 9^a causes the valve stem 9^b to be depressed permitting the water to pass through the plunger 9^a up through the conductor 21 and against the plunger 20^c in the valve 20 forcing the valve 20^e against its seat 20^f closing the same. However, the circulation of the water having been started will continue up through the conductor 21 into the tank 19, at the same time the water being drawn from the conductor 13 and coil 5 will cause the water to be drawn from the tank 19 through the conductor 11 up through the outer coil 3 down through the intermediate coil 4 and up through the inner coil 5 and out through the conductor 13. When the faucet 13^a is closed any heated water of sufficient temperature to increase the pressure will circulate into the tank 19 through the conductors 12 and 15 thus utilizing the heated water for pre-heating the water in the storage tank, also the pilot burner 6 will heat the coils 3, 4 and 5 particularly the coil 5 which is a central and small coil causing the water to gradually circulate from the upper portion of the tank 19 and back into the tank 19 through the conductors 13 and 15 and valve 17 thus utilizing the heat from the pilot light for pre-heating the water in the storage tank.

Though I have shown and described a particular construction, combination and arrangement of parts I do not wish to be limited to this particular construction, combination and arrangement but desire to include in the purview of my invention the construction, combination and arrangement substantially as set forth in the appended claims.

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

1. An automatic storage water heater mechanism, including a triple coil heater, a storage tank, a cold water conductor communicating with the lower portion of said storage tank, water conducting means connecting the lower ends of two of the coils of said triple coil heater with the interior of said tank intermediate its ends and the lower end of the other coil of said triple coil heater communicating with the upper end of said tank, the upper end of one of the two first mentioned coils communicating with a service faucet and with the interior of said tank intermediate its ends and the upper ends of the other two coils communicating with the interior of said tank at its lower end in close proximity to the exit end of the cold water conductor.
2. An automatic storage water heater mechanism, including a triple coil heater, a storage tank, a cold water conductor communicating with the lower portion of said storage tank, water conducting means connecting the lower ends of two of the coils of said triple coil heater with the interior of said tank intermediate its ends and the lower end of the other coil of said triple coil heater communicating with the upper end of said tank, the upper end of one of the two first mentioned coils communicating with a service faucet and with the interior of said tank intermediate its ends and the upper ends of the other two coils communicating with the interior of said tank at its lower end in close proximity to the exit end of the cold water conductor and means for preventing the flow of water from said tank through said conductors excepting the one at the upper end of said tank.
3. An automatic storage water heater mechanism, including a water heater coil, a storage tank, a conductor connecting the upper end of said storage tank with one

end of the water heater coil, another conductor connecting the opposite end of said water heater coil with a service pipe, a branch extending from said service pipe into the lower end of said tank and a check valve in said branch adapted to permit water to pass from said service pipe into said tank but prevent its passage backwardly through said pipe.

4. An automatic storage water heater mechanism, including a water heater coil, a storage tank, a conductor connecting the upper end of said storage tank with one end of the water heater coil, another conductor connecting the opposite end of said water heater coil with a service pipe, a branch extending from said service pipe into the lower end of said tank, a check valve in said branch adapted to permit water to pass from said service pipe into said tank but prevent its passage backwardly through said pipe and a water conductor communicating at one end with said branch between the check valve and said tank and at its other end with a cold water service pipe.

5. An automatic storage water heater mechanism, including a multiple coil heater, a storage tank, water conducting means connecting the upper end of said tank with the lower end of said heater provided with a trap extending below the lower end of said heater, another conductor connecting the upper end of said heater with the interior of said tank at its lower end, a check valve in connection with said conductor at the lower end of said tank for permitting the water to pass from said heater into said tank but preventing the water from passing from said tank into said conductor and a service pipe in connection with the upper end of said heater.

In testimony whereof, I have hereunto set my hand at San Diego, California this 13th day of January 1920.

THOMAS MUEHLEISEN.