

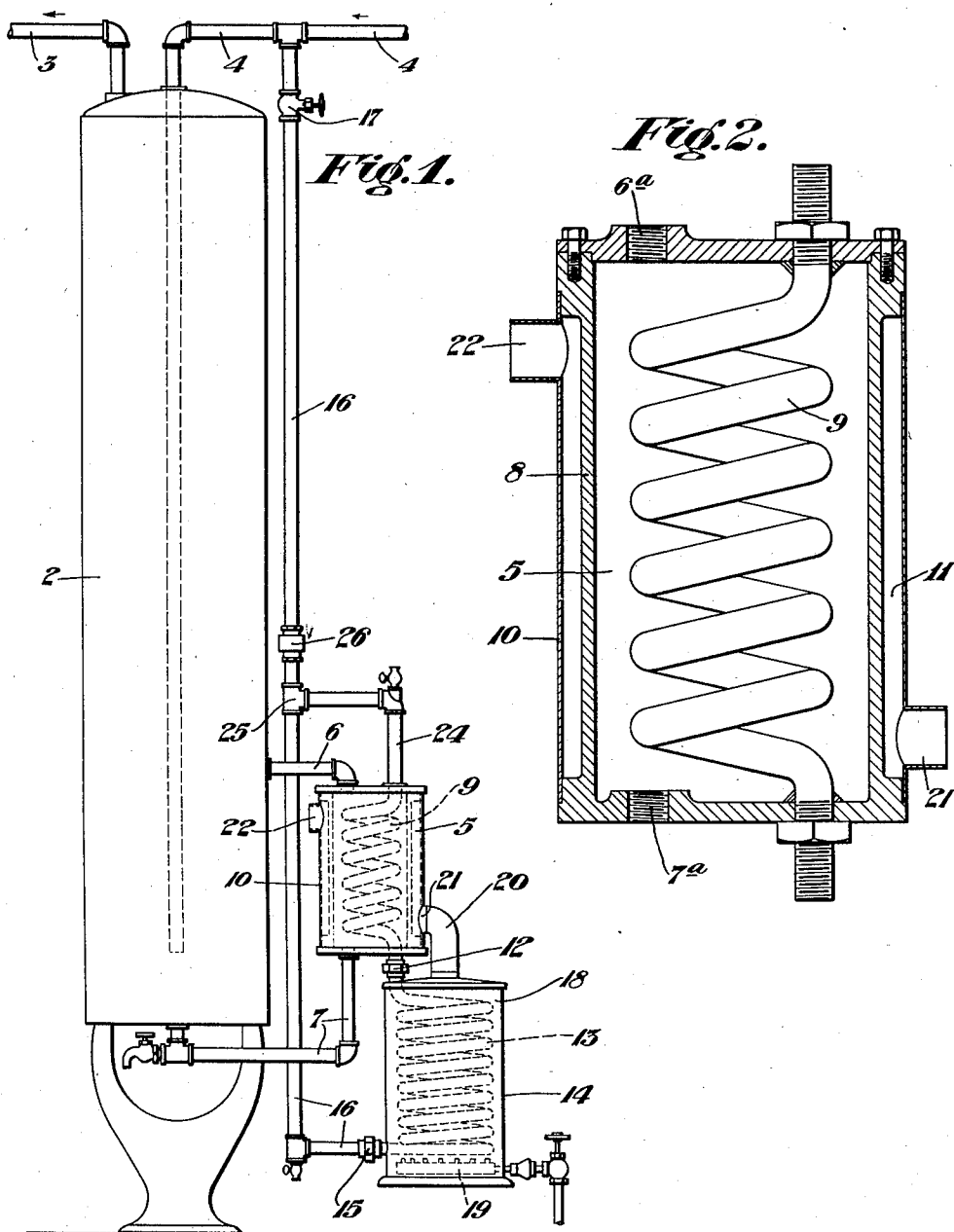
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W. R. POWERS

WATER HEATER

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Witnesses:

Edwin Trueb

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UNITED STATES PATENT OFFICE.

WALTER R. POWERS, OF WILDWOOD, PENNSYLVANIA.

WATER HEATER.

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To all whom it may concern:

Be it known that I, WALTER R. POWERS, a citizen of the United States, and resident of Wildwood, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Water Heaters, of which the following is a specification.

This invention relates to water heaters and more particularly to water heaters including a heat exchanger and storage tank, and has for its principal object the provision of a novel form of heater in which the water is heated, indirectly, by the use of a circulating body of heated fluid passing through the heat exchanger.

Another object is to provide a more efficient form of heat exchanger whereby less heat is necessary to heat a given quantity of water than heretofore.

A further object is to provide a water heater having the novel construction, design and combination of parts hereinafter described and illustrated in the accompanying drawings.

Figure 1 is a side elevation of a hot water heater embodying my invention.

Figure 2 is a sectional elevation through my novel form of heat exchanger.

Heretofore the water from hot water storage tanks has generally been circulated through a suitable heating coil heated directly by a gas flame, and the continual passage of water through the coil, due to the acid reactions, mineral deposits and corrosion, caused a deposit of scale to form on the interior of the coil, which in time, due to its insulating effect, made it difficult if not impossible to heat the water, and after only a short operation of the system necessitated the use of considerable heat to penetrate it.

The present invention overcomes the above difficulty by utilizing a small quantity of water, which is heated continually and circulated through a closed system and exchanges or transfers the heat to the continual changing body of water in the storage tank. By utilizing the same body of water over and over the deposit of scale is not formed. and, if desired, the water used in the closed system of the heat exchanger may be treated and made neutral so as to have no effect whatsoever on the parts of the heat exchanger. It will also be understood that if desired other fluids than water

may be employed to conduct the heat into the heat exchanger without departing from my invention.

In the drawings, the numeral 2 designates a hot water storage tank or boiler having a hot water outlet pipe 3 and cold water inlet pipe 4 connected thereto. The discharge end of the cold water inlet pipe 4 extends downwardly within the boiler 2 to a point near its bottom, as is usual in hot water storage tanks.

A heat exchanging tank 5 is connected by an outlet pipe 6 to the boiler 2 at a point intermediate its ends and by an inlet pipe 7 to the bottom of the boiler 2.

The heat exchanger 5 comprises a cylindrical tank or body 8, in which is mounted a copper pipe coil 9. The body portion 8 has flanged end walls around which a sheet iron jacket 10 is secured so as to provide a surrounding air space or chamber 11. The top wall of the heat exchanger is removable for cleaning or repairs.

The lower end wall of the heat exchanger is provided with a water inlet opening 7^a to which the pipe 7 is connected, and the top or upper end wall is provided with a water outlet opening 6^a to which the pipe 6 is connected.

The lower end of the coil 9 in the heat exchanger 5 extends through the lower end of the drum and is connected by a union 12 with the upper end of a coil 13 in a gas fired heater 14. The lower end of the coil 13 is connected by a union 15 to a pipe 16 which extends upwardly and is connected to the cold water supply pipe 4. A valve 17 enables the pipe 16 to be shut off from the water supply line 4 when desired.

The heater 14 is of the usual type and comprises a surrounding jacket 18 and burner 19. The jacket 18 has a flue 20 which connects into the flue inlet 21 in the jacket 10 of the heat exchanger 5, which jacket 10 is also provided with a flue outlet 22 to provide for the escape of the burned gases or products of combustion.

The upper or outlet end of the coil 9 in the heat exchanger 5 is connected by a pipe 24 to the pipe 16 by a T 25, and a check valve 26 is placed in the pipe 16 at a point between the T and the valve 17, this valve being arranged to lift when closing and to drop or lower when opening. The check valve 26 may be of any well known and standard design.

In the operation of this apparatus the boiler 2 is filled with water and the valve 17 is opened to permit the coils 9 and 13 and their connecting pipes to also fill with water. The burner 19 is then lighted to heat the small quantity of water in coil 13 of heater 14, and the heated water rises through the coil 13 and passes through the coil 9 of the heat exchanger 5, the heated water leaving the coil 9 through the pipe 24 and returning through the pipe 16 to the lower end of coil 13, thus setting up circulation of heated water through the heat exchanger coil 9. The check valve 26 prevents the passage of the heated water up through the pipe 16 and also serves to automatically replenish any water lost by evaporation or otherwise from the coils 9 and 13 and their connecting system.

The heated water, in passing through the coil 9 heats the surrounding water within the body or tank 8 of the heat exchanger 5 and this water, as it becomes heated, passes to the boiler 2 through the pipe 6, and as the temperature increases, a circulation is established through the pipe 6, lower portion of boiler 2, pipe 7 and heat exchanger 5.

The heated air and products of combustion pass from the heater 14 through the flue 20 and through inlet 21 into the space 11 between the body wall 8 and the casing 10 of the heat exchanger, and escape through the outlet 22. It will thus be seen that these heated gases, which normally are wasted are utilized, since they will heat the side walls of the heat exchanger and thus aid in heating the water.

The heat exchanger 5 will gradually raise the temperature of the water in the storage tank or boiler 2 to the desired temperature.

A thermostat may be used to regulate the supply of gas to the burner 19 so as to shut off the gas supply when the water in the boiler reaches a desired temperature.

While I have shown and described only one preferred embodiment of my invention, it will be understood that I do not wish to be limited thereto, since various modifications may be made without departing from the scope of my invention as defined in the appended claims.

I claim:—

1. A water heating system comprising a heat exchanging tank having hollow side walls forming a surrounding air space, a heating coil in said tank adapted to contain a quantity of fluid, water inlet and outlet pipes communicating with the opposite ends of said tank to provide for a circulation of water through said tank, a second coil having its upper end connected to the lower end of said first named coil, suitable piping connecting the lower end of said last named coil to the upper end of said first

named coil to form a closed circulating system, a casing enclosing said last named coil, a suitable source of heat within said casing adapted to heat the fluid in said last named coil, and means for conducting heated air from within said casing to said air space in the side walls of said heat exchanging tank.

2. A water heating system comprising a heat exchanging tank having hollow side walls forming a surrounding air space, a heating coil in said tank adapted to contain a quantity of fluid, water inlet and outlet pipes communicating with the opposite ends of said tank to provide for a circulation of water through said tank, a second coil having its upper end connected to the lower end of said first named coil, suitable piping connecting the lower end of said last named coil to the upper end of said first named coil to form a closed circulating system, a casing enclosing said last named coil, a suitable gas burner within said casing adapted to heat the fluid in said last named coil, and means for conducting the products of combustion and heated air from within said casing to said air space in the side walls of said heat exchanging tank.

3. The combination with a hot water storage tank, of a water heating apparatus comprising a heat exchanging tank having hollow side walls forming a surrounding air space, a heating coil in said tank, water inlet and outlet pipes communicating with the opposite ends of said heat exchanging tank and said hot water storage tank to provide for a circulation of water from said storage tank through said heat exchanging tank, a second coil having its upper end connected to the lower end of said first coil, suitable pipes connecting the upper end of said first named coil and the lower end of said second named coil, said coils and pipes forming a closed circulating system adapted to be filled with water, an enclosing casing around said second named coil, a gas burner within said casing adapted to heat the water in said second named coil and cause a circulation through said first and second named coils and said connecting pipes, whereby the water in said heat exchanging pipe will be heated by the transfer of heat from the heated water in said first named coil and caused to circulate through said storage tank, and means connecting said casing around said second named coil with the hollow side walls of said heat exchanging tank whereby the products of combustion and heated air will pass from said casing into said walls to aid in heating the water in said heat exchanging tank.

4. The combination with a hot water storage tank, of a water heating apparatus comprising a heat exchanging tank having hollow side walls forming a surrounding air

space, a heating coil in said tank, water inlet and outlet pipes communicating with the opposite ends of said heat exchanging tank and said hot water storage tank to provide for a circulation of water from said storage tank through said heat exchanging tank, a second coil having its upper end connected to the lower end of said first coil, suitable pipes connecting the upper end of said first named coil and the lower end of said second named coil, said coils and pipes forming a closed circulating system adapted to be filled with water, an enclosing casing around said second named coil, a gas burner within said casing adapted to heat the water in said second named coil and cause a circulation through said first and second named coils and said connecting pipes, whereby the water in said heat exchanging pipe will be heated by the transfer of heat from the heated water in said first named coil and caused to circulate through said storage tank, means connecting said casing around said second named coil with the hollow side walls of said heat exchanging tank whereby the products of combustion and heated air will pass from said casing into said walls to aid in heating the water in said heat exchanging tank, and means for automatically supplying water to said coils when the quantity therein is diminished by any cause.

5. A domestic hot water heating system comprising a heat exchanging tank having hollow side walls, a heating coil in said tank adapted to contain a quantity of fluid, water inlet and outlet pipes communicating with the interior of said tank to provide for a circulation of water through said tank, a second coil having its ends connected to the ends of said first named coil to form a closed circulating system, a gas burner located below said last named coil adapted to direct a

heating flame on said coil to heat the fluid therein and cause a circulation of the fluid through said coils, the several parts of said apparatus being arranged so that the products of combustion will travel through the hollow side walls of said tank to aid in the heating of the water in said tank.

6. A water heating system comprising a heat exchanging tank, a jacket around said tank, a heating coil in said tank adapted to contain a quantity of fluid, water inlet and outlet pipes communicating with the interior of said tank to provide for a circulation of water through said tank and around said coil, a second coil having its ends connected to the ends of said first named coil to form a closed circulating system, and a gas burner located below said last named coil and adapted to heat the fluid therein so as to provide a circulation of fluid through said coils, the whole of said system being so arranged that the products of combustion from said burner will pass upwardly between said tank and jacket to aid in the heating of the water in said tank.

7. A water heating system comprising a heat exchanging tank having hollow side walls, a heating coil in said tank adapted to contain a quantity of fluid, water inlet and outlet pipes communicating with the interior of said tank to provide for a circulation of water through said tank, a second coil having its ends connected to the ends of said first named coil to form a closed circulating system, and a suitable source of heat arranged to heat the fluid in said last named coil and to permit the products of combustion to travel through the hollow side walls of said tank.

In testimony whereof I have hereunto signed my name.

WALTER R. POWERS.