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WATER HEATING SYSTEM.

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941.784.

Patented Nov. 30, 1909.

Fig. 1.

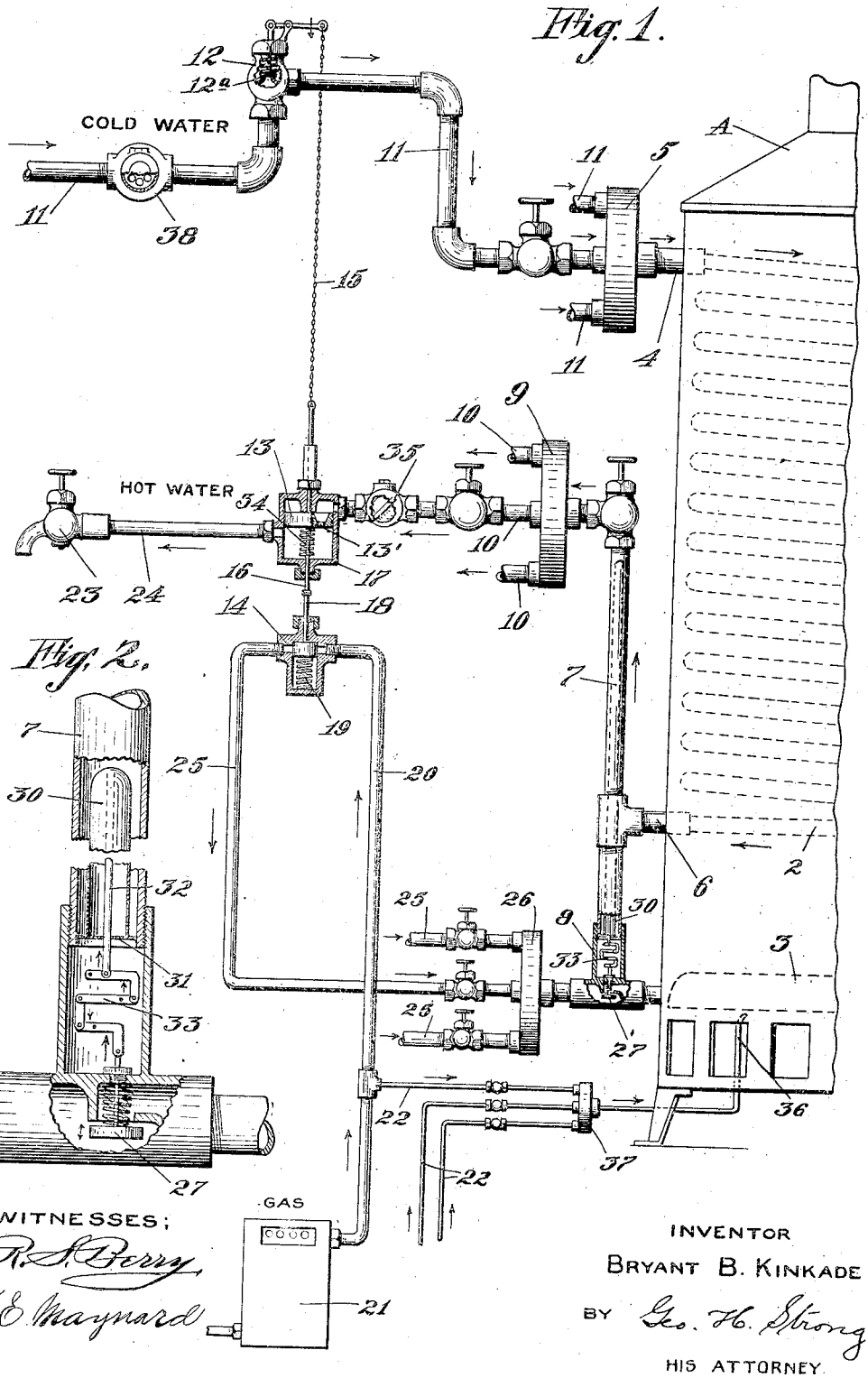

Fig. 2.

WITNESSES;

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WATER-HEATING SYSTEM.

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To all whom it may concern:

Be it known that I, BRYANT B. KINKADE, a citizen of the United States, residing at Berkeley, in the county of Alameda and State of California, have invented new and useful Improvements in Water-Heating Systems, of which the following is a specification.

My invention relates to water-heaters, and pertains especially to an automatically controlled instantaneous water-heater, and system for heating water for a large number of apartments or consumers, wherein it is desired that each consumer shall only pay for his proportion of the gas or water used.

The object of the present invention is to provide a simple, practical construction of automatic heater and water supplying means, and distributing means therefor, whereby each customer will not only pay for just his proportion of the water and gas used in heating the water consumed by him, but in which system a single automatic regulator will be so placed and operated that it will serve for all the units in the system, so that the burner will operate only when the temperature of the water in the boiler or heater falls below a predetermined point.

The invention consists of the parts and the construction and combination of parts, as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a side elevation and partial section representing the invention. Fig. 2 is a detail of the thermostat.

A is a water-heater of any suitable description having a heating coil 2, and a suitable gas-burner 3 for heating the coil. The coil has an inlet pipe 4 from the header or manifold 5, and an outlet for the hot water at 6, through a pipe 7 containing a thermostat at 8; the pipe 7 connecting with the hot water distributing manifold or header 9.

From the hot water manifold or header is led a series of hot water distributing pipes 10 to various parts of the building, or wherever else the water is to be used; each pipe 10 being in the nature of an independent distributing system, and each consumer or user of the hot water paying according to the amount used, or the amount of fuel necessary to heat the amount used.

In Fig. 1, I have only shown the mechanism necessary in connection with a single one of the distributing pipes 10, but it is understood that each pipe will be supplied with substantially the same mechanism, each mechanism operating independently of the other. It is also understood that each supply pipe 10 has a corresponding cold water inlet pipe 11, leading to the cold water header 5, and each one of these cold water inlet pipes 11 has a valve 12 in it, which is operated in unison with the automatic hot water valve 13, and the gas valve 14 of a corresponding unit as will be shortly described. Valve 12 is a spring-actuated normally closed valve connected by a chain 15 with the stem of the valve 13, the latter having a downwardly extending projection 16 working in a suitable stuffing-box in the valve casing 17, and bearing on the stem 18 of the gas valve 14. The gas valve 14 is normally pressed upward by a spring 19 to close the inlet to the gas supply pipe 20 which connects with the meter 21. The gas supply pipe 20 is always in communication with a pilot pipe 22, by which a pilot light is maintained in the burner; it being understood that it is only necessary to light the burner when it is desired to draw hot water, and fuel is needed for heating the hot water to be withdrawn. Water passes from the pipe 10 in the top of the casing 17 and acts when hot water cock 23 is opened to depress the valve against the pressure of the supporting spring and allow water to flow from the pipe 10 to the hot water delivery pipe 24, which latter may lead off to any suitable place in the building. In thus opening valve 13, the gas valve 14 is pushed down to compress the spring 19, and the gas can flow from the gas supply pipe 20 to the service pipe 25, and thence to a manifold or header 26, and to the burner whenever the regulating valve 27 which is controlled by the thermostat 8, is opened. This thermostat and its valve may be of any appropriate construction, suitable for regulating the gas supply pipe according to the temperature of the water in the coil.

I have illustrated a well known type of thermostat in Fig. 2, in which there is a copper tube 30 closed at the top and sealed at the bottom to a diaphragm 31 in the pipe 7, and inside this tube is a non-expansible rod 32 of porcelain or equivalent material, connected with the top of the tube, and which rod extends down below the diaphragm 31, and is adapted in the expansion and con-

traction of the tube through a system of multiplying levers 33, to actuate the normally opened valve 27; it being the design to close off the gas at valve 27 only when the water reaches a predetermined temperature, at all other times the flow of gas being controlled for each service unit by a valve 14.

By a service unit is meant an individual hot water pipe 24, with its respective cold water inlet pipe 11, gas pipe 20, and controlling valves 12, 13, 14.

By interposing the thermostat 8 on the system, at the point indicated, that is adjacent to the heater and in the single pipe which enters the gas-burner, and the single pipe from which the hot water first passes out of the heater, it is possible to have a single thermostat serving for a great number of distributing units.

The valves 12 and 13 are each provided with a small by-pass 12ª, 13′, respectively. The port 13′ in the hot water distributing valve 13 provides for the equalization of pressure when cock 23 is closed so valve 13 may close. The port 12ª in the water inlet valve 12 allows a small amount of water to pass from the source of supply to disturb the equilibrium when cock 23 is opened; the port 12ª being slightly larger than port 13′; consequently when cock 23 is closed, equilibrium within the apparatus results through the port 13′, and the return of the valve 13 to closed position is effected by a spring 34. A check valve 35 may be interposed between valve 13 and the heater.

While a single pilot light 36 serves for the whole system, and the pilot light pipe connects with a header 37, yet each unit in the system has its own pilot light supply pipe 22 so that the amount used will be proportionately divided among the consumers.

In practice, any one wanting to draw hot water from any one of the units in the system, turns on a cock 23 whereupon, by reason of the difference in pressure resulting on the two sides of the valve 13, the latter opens, and at the same time opening the cold water valve 12 and the gas valve 14. The pilot light thereupon lights the gas in the burner, and the hot water almost immediately ... the water or gas, or both, because if it is desired to measure the amount of water used, a water meter 38 may be interposed in each cold water supply 11.

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

1. A water-heater comprising a heating coil, and a burner for the coil, a single water supply manifold for the coil, and a single hot water discharge manifold therefor, a plurality of supply and of distributing pipes connected respectively with said manifolds, a valve in each of said supply and distributing pipes, said valves connected in pairs whereby a valve in one distributing pipe may be operated when the water is drawn from said pipe synchronously with a corresponding valve in one of said supply pipes, a fuel pipe for the burner, a manifold connecting with said fuel pipe, and a plurality of individual gas supply pipes, and means for operating one of said gas valves synchronously with a corresponding pair of the aforesaid valves in said supply and distributing pipes, and a thermostat interposed in the hot water passage between the heater and the hot water manifold, and connections between said thermostat and the fuel supply pipe between the burner and its manifold whereby a single thermostat serves for the entire system.

2. In a water heater, a heating coil with a supply pipe and a hot water discharge pipe, a burner with a fuel supply pipe, a manifold fitting and connected with each of said pipes, a thermostat interposed in the hot water connection between the coil and the discharge pipe manifold, and valve mechanism in the fuel supply pipe between the burner and its manifold, a plurality of independent pipes delivering into the supply pipe manifold, and a plurality of hot water distributing pipes connected with the hot water discharge pipe manifold, a plurality of gas supply pipes connected with the fuel supply manifold, valves by which each of said individual connecting pipes are controlled, and connecting mechanism between the corresponding valves of said individual inlet, distributing and gas supply pipes for the with-