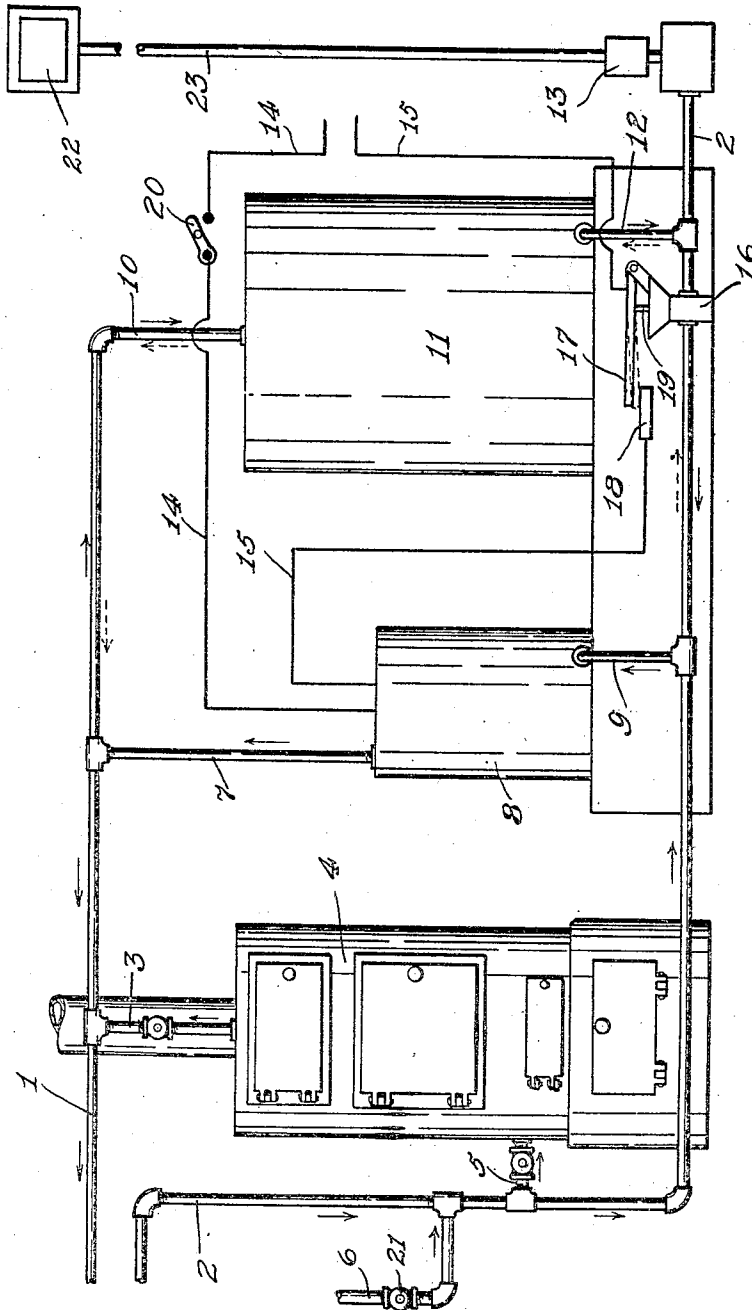


P. J. NEWKUMET,
HOT WATER HEATING SYSTEM.
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1,122,989.

Patented Dec. 29, 1914.



WITNESSES:

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PHILIP J. NEWKUMET, OF SEATTLE, WASHINGTON.

HOT-WATER HEATING SYSTEM.

1,122,989.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, PHILIP J. NEWKUMET, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented a certain new and useful Improvement in Hot-Water Heating Systems, of which the following is a specification.

My invention relates to improvements in hot water heating systems that are adapted for heating rooms of residences, office buildings and the like, and the object of my improvement is to provide a hot water heating system wherein the water may be heated either by a furnace heated boiler or by an electric heater, as may be desired at different times, as; for instance, when the electric generating plant which supplies the electric heater, is called upon to do its maximum work or when it is desired to economize by shutting off the supply of electricity then such boiler may be operated to heat the water instead of the electric heater, and when, at another time, such source of electric current has but little work to do, or when it is preferred to utilize the electric heater, then the fire in such boiler's furnace may be permitted to die out and an electric current be switched on to the electric heater.

A further object of my improvement is to provide such hot water heating system with a tank for storing hot water which hot water may circulate throughout all of the rooms to be heated for a considerable length of time after the means for heating the water has ceased operation.

A further object of my invention is to provide automatic means in combination with such electric heater that will operate a switch to shut off the current in such electric heater when the coldest portion of the water circulating through the system of pipes has become heated to a desired predetermined temperature at which time all of the water in the storage tank will be heated.

I accomplish these objects by devices indicated diagrammatically in the accompanying drawing wherein—

4 is a boiler, of a common upright type, that is provided with a furnace in its lower portion, and 8 is an electrically heated small tank adapted to contain water and within which may be disposed an electrical heating unit, of any of the well known forms, not

shown, which heating device may be supplied with current through conducting wires 14 and 15, while 11 indicates a large water storage tank. Such boiler 4, small electrically heated tank 8 and storage water tank 11 are preferably disposed in the basement of a structure to be heated.

Connected with the upper portions of the boiler 4, the small electrically heated tank 8 and the water storage tank 11 respectively are pipes 3, 7 and 10 all of which communicate through suitable fittings with the outgoing pipe 1 which may lead to the several rooms, not shown, of such structure to be heated and from such rooms it may lead back to the basement to be connected to the pipe 2 which pipe 2 by means of suitable fittings is connected with the lower portions of the boiler 4, the electrically heated tank 8 and with the water storage tank 11 whereby water may find a path to flow and circulate from the upper portions of the boiler 4, electrically heated tank 8 and water storage tank 11 to each of said several rooms, thence back into the lower portions of the boiler 4, small electrically heated tank 8 and storage tank 11 through the several pipes 5, 9 and 12 respectively. In each of the pipes 3 and 5 is a valve, as indicated, by means of which the flow of water either from the boiler 4 or into such boiler 4 may be intercepted if desired.

Adjacent to the pipe 5 is connected to the pipe 2 a pipe 6 by means of a suitable T fitting which pipe 6 may lead to a source of water, not shown, and such pipe 6 is provided with a valve 21 whereby the supply of water, for filling the boiler 4, the small tank 8 and the storage tank 11, may be shut off.

Adjacent to the pipe 12 beneath the storage tank 11 is a thermostatic device 16 which is interposed in the pipe 2 and whose lever 17 may be moved by a shaft 19 in response to changes in temperature to open or close an electrical circuit between such lever 17 and a contact point 18 which contact point 18 and lever 17 are connected in series in the circuit which includes the electrical heating unit within the tank 8 which may be supplied with electric current through wires 14 and 15 which may be connected to any convenient source of electricity, not shown.

The thermostatic device 16 may be of any of the well known forms to operate in a

well known way to actuate means for opening and closing an electric circuit as the circuit comprising the wires 14 and 15.

A switch 20 that may be manually operated, to open and close the circuit of the electric heating unit of the tank 8 is interposed in the circuit wire 14 as shown.

Adjacent to the pipe 12 the extreme end of the pipe 2 is connected with a well known device, indicated by the numeral 13, which is adapted to embody a column of mercury which column of mercury may be forced to rise to compress air that may be contained within a chamber 22 provided on the top of the pipe 23 containing such column of mercury, in response to the expansion of the water contained in the boiler 4, tank 8, storage tank 11 and all the pipes connected therewith, whereby if such receptacles are completely filled with water they may not burst upon the expansion of such water.

The various devices when associated in the manner that I have illustrated and described may operate as follows: The boiler 4, the tank 8 and the storage tank 11 and the pipes connected therewith, being filled with water supplied through the inlet pipe 6 and the valve 21, such valve 21 is then closed and the valves in the pipes 3 and 5 open while the switch 20 is opened, and thereupon the water in boiler 4 may be heated by the combustion of fuel within its furnace whereupon the heated water at the top of said boiler 4 will flow upwardly through pipe 3 and thence through pipe 1 to the several upper rooms to be heated, thence back to the pipe 2 and thence through pipe 5 into the lower part of the boiler and also heated water will flow through pipe 1 toward the right hand into the tank 8 and into the storage tank 11, while the cooler water in the lower portions of tank 8 and storage tank 11 flows out of the pipes 9 and 12 respectively into the pipe 2 thence back into the lower portion of the boiler 4 through the pipe 5, but the water in such tank 8 and storage tank 11, obviously, will not be heated to any considerable extent until the water in that portion of the pipe 1, which is in the rooms to be heated is hot and after the rooms are well heated then the water in the tank 8 and the storage 11 will more rapidly be increased in temperature and when the water of the storage tank 11 is heated throughout then if the fire in the furnace be allowed to die out such hot water will continue to circulate in the direction, shown by the arrows in dotted line, to maintain the rooms warm as will also the water of the boiler 4 and the tank 8. If it be desired to heat the rooms of the building by electrical energy, with no fire in the furnace of the boiler 4, then the switch 20 will be closed whereby electric current may pass through conductor 14 into and through the electric

heating unit within the tank 8 thence through conducting wire 15, contact point 18 and lever 17 of the thermostat 16 to heat such electric heating unit and the water within such tank 8, which water as it is heated will flow upwardly through pipe 7 into pipe 1 passing toward the left hand, first to heat the rooms and then to pass toward the right hand to heat the water of the storage tank 11 while at the same time a portion of such heated water will pass toward the left hand to enter the boiler through pipe 3, and, obviously, a continuation of the operation of the heating unit in the tank 8 will gradually heat all of the water in the boiler 4 and storage tank 11 until that portion of the water within the pipe 2 adjacent to the thermostat 16 reaches a desired predetermined temperature in response to which predetermined temperature the levers 17 may be actuated to interrupt the flow of electricity through the electric heating unit in the tank 8 and thereafter the hot water in the several receptacles 4, 8 and 11 may circulate through the pipe 1 to maintain the rooms warm for a long time.

Manifestly the valves in pipes 3 and 5 may be shut off wholly thus to dispense with the use of the boiler 4, if desired, or such boiler 4 may be completely disconnected from the system, but preferably the boiler 4 is made available in the system in order that if the source of electric current for the electric heating unit be overtaxed the circuit in such heating unit may be opened by the switch 20 and the boiler 4 be used in its place until such source of current is relieved of its maximum load. Thus, by my invention as described and illustrated, when the central station, which is supplying electricity to the electric unit of tank 8, is carrying its high peak load then such load may be lessened by opening the switch 20 and permitting the water in the tank 11, which is now heated, to circulate through the pipes 1 and 2 to heat the rooms or, if desired, putting the boiler 4 into operation, and when the electric heating unit is in operation then the boiler 4 may act as a hot water reservoir in the same manner as does the storage tank 11.

It will be observed that the water in pipe 2 will always be at a lower temperature than the water in any other portion of the heating system and the pipe 2 will not become very warm until the water in the several receptacles 4, 8 and 11, is well heated and therefore, thermostat 16 may not actuate switch 17 to shut off the current from the electric heating unit until all the water in the whole system is well heated.

Of course, any form of electric heating unit and any form of an electric switch that is adapted to be controlled by a thermostat may be employed in connection with my invention and minor changes may be made in

the several parts thereof without departing from the spirit thereof.

What I claim is:

1. In a heating system of the class described, the combination with a boiler, of a storage tank for hot water, an electric heater interposed between said boiler and said storage tank, a circuit adapted to conduct an electrical circuit to said heater, an outlet pipe communicating with the top portion of said boiler and said storage tank and said electric heater, said outlet pipe leading to a point at a higher elevation to which hot water is to be conducted, a return pipe leading from said point at a higher elevation and communicating with the lowermost portion of said boiler and said storage tank and said electric heater, and a thermostat interposed in the lowermost portion of said return pipe, said thermostat being adapted to break said electric circuit to disconnect said heater when the water in said return pipe becomes hot and to close said electric circuit to cause said electric heater to become operative when the water in said return pipe becomes cold.

2. In a heating system of the class described, the combination with a boiler, of water pipes connected with said boiler and adapted to lead to a point at a higher elevation to which it is desired to conduct hot water, a storage tank having its bottom portion connected with one of said pipes and its top portion connected with the other of said pipes, an electric heater interposed be-

tween said boiler and said storage tank, and connected with said two pipes, a circuit adapted to conduct an electrical current to said heater, a switch provided in said circuit, and a thermostat associated with the lowermost portion of said storage tank and adapted to open and close said switch in response to changes in the temperature of the water in the bottom portion of said tank.

3. In a heating system of the class described, the combination with an electric heater, of pipes communicating with the upper and lower portions, respectively, of said heater and adapted to extend to a point at a higher elevation to which hot water is to be conducted, a storage tank, means for connecting said upper and said lower pipes respectively, with the upper and the lower portions of said storage tank whereby water may flow between said tank and said heater, an electrical circuit connected with said electric heater, a switch provided in said circuit and a thermostat interposed in said lowermost water connection between said tank and said heater, said thermostat being adapted to open and close said switch in response to a change in the temperature of the coldest water in said heating system.

In witness whereof, I hereunto subscribe my name this fourth day of December A. D., 1913.

PHILIP J. NEWKUMET.

Witnesses:

F. C. MATHENY,
A. HASKINS.