P. B. MOTLEY.

HEATING SYSTEM.

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1,294,517. Patented Feb. 18, 1919.

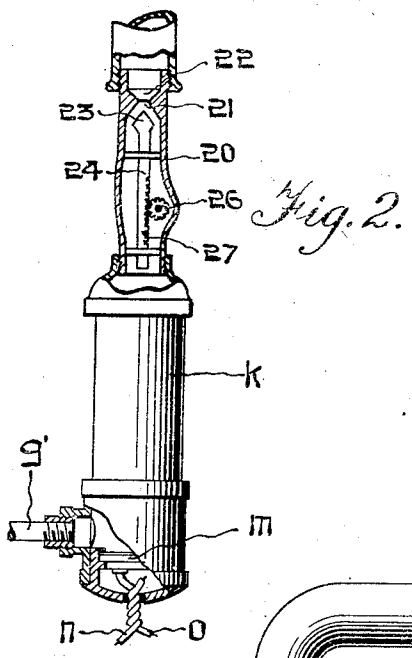


Fig. 2.

Fig. 1.

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HEATING SYSTEM.

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To all whom it may concern:

Be it known that I, PHILLIPS BATHURST MOTLEY, of the city of Westmount, Province of Quebec, Dominion of Canada, a subject of the King of Great Britain, have invented certain new and useful Improvements in Heating Systems; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates particularly to systems utilizing water or other fluid as the heating medium, and more particularly that type comprising a water heating furnace included in a pipe circuit containing one or more radiators by which the heat of the water is radiated in an apartment or apartments, or other space it may be desired to heat; and the invention has for its object to increase the efficiency and reduce the labor and inconvenience of heating systems of this type.

To this end the invention may be said broadly to consist of a supplemental circuit including a portion of the heat radiating circuit and containing a heater, thus constituting this supplemental circuit the heat generating circuit by which heat is transmitted to the radiating circuit. The union between the heating and radiating circuits is restricted for the purpose of causing the relatively high temperature fluid in the heating circuit to be projected into the flow side of the radiating circuit with an accelerating effect. Another feature of the invention consists of a secondary supplemental water heating circuit coupled with the water circuit within the furnace and having for its function to augment the heating circuit.

Figure 1 is an elevation of my improved heating system; and

Fig. 2 is a detail elevation partly in section of one of the electric heaters.

The furnace *b* and radiator *c* are included in a hot water circuit, the flow side of which is indicated at *d* and the return side at *e*. The usual expansion tank (not shown) has a pipe *f* leading thereto. The system illustrated is commonly used for conveying heat to and radiating it in one or more places removed from the source of heat, the furnace in this instance.

According to my invention I couple with this heat radiating circuit a supplemental circuit *g*, g^1, adapted to receive from the radiating circuit a comparatively small portion of the water circulating therein and raise the temperature thereof and project this relatively high temperature fluid at an accelerated velocity into the flow side of the radiating circuit, thus accelerating the flow of the radiating circuit.

The supplemental heating circuit includes the water receptacle *k* of a water heater, the heating element of which may be an electric heating coil *m*, connected by branch leads *n* and *o* to the leads *p* and *q* of a supply circuit. The coupling by which the water heater is connected to the flow pipe of the radiating circuit, consists preferably of an adjustable jet fitting 10 the restricting quality of which may be increased or decreased to meet the varying capacity in the heater and also fluctuations in the intensity of the power. This fitting consists of a casing 20 having therethrough a contracted passage 21 with a flared mouth 22 to afford clearance for the jet, this passage being controlled by a conical valve 23 carried by a spindle 24 operated to move axially by a hand-wheel 25 and pinion 26, the latter engaging a rack 27 forming an integral part of the valve stem. The stem is preferably guided in spiders in the casing. By varying the extent to which the passage 21 is restricted the size of the jet is increased or decreased for the purpose just mentioned. This supplemental circuit is from the water receptacle *k*, jet controller 10, coupling pipe *g*, the radiating circuit and coupling pipe *g'* back to receptacle *k*. To create an acceleration of flow in the radiating circuit is the purpose of restricting the flow from the supplemental circuit to a relatively small bore.

The capacity of the heater is such that the temperature of the water in the receptacle is rapidly raised, and causes the high temperature fluid to be projected into the flow pipes of the radiating circuit with a velocity which insures a thorough commingling in the flow pipes and accelerates the flow to such an extent that a moderately high temperature is maintained at the radiators.

To provide for an augmentation of the radiant heat a secondary supplemental heating circuit *s s'* is coupled to the water space in the furnace and consists of the coupling pipes, which are like the coupling pipes *g* and *g'*, of relatively small bore, the water receptacle of a heat generator and the water space of the furnace. The heating element of this heat generator is also preferably an

electrical appliance, and is connected by branch leads u and v to the leads p and q. The effect of this secondary supplemental circuit is that the relatively small volume of water flowing through its circuit is raised to a comparatively high temperature and is projected at a comparatively high velocity into the water sluggishly circulating within the furnace and the smaller and hotter jet steadily acting on the larger body simultaneously raises its temperature and accelerates its flow.

In order to meet certain requirements the furnace is cut off, as, for instance, when the heat of the supplemental heating circuit is required for the radiating circuit alone apart from the furnace, a by-pass 100 connects the flow and return mains d and e respectively between the furnace and the heat generator k, and valves 12 and 13 provide means for shutting off the furnace; while a valve 14 enables the by-pass to be neutralized when the furnace is included in the circuit.

When the full heating capacity of the system is required, the furnace is lighted and both supplemental circuits are operated, and when less than full capacity is required the furnace fire may be allowed to die out or one of the heating circuits may be cut out.

From the foregoing it will be seen that a hot water system for heating buildings can be economically operated by a relatively small heat generator, and with an acceleration of the flow through the system which is a result not heretofore obtainable in the heating of buildings by hot water, or other fluid.

What I claim is as follows:—

1. The combination with a primary system for heating buildings by hot water circulation such system comprising a furnace, radiator and a pipe circuit consisting of flow and return mains connecting said furnace and radiator, of an electric heat generator and pipes of relatively small bore connecting the outlet and inlet ends of the generator to the flow and return mains respectively, the pipe connecting the outlet end of the said generator to the flow main being disposed at an oblique angle to the latter, means controlling the flow through said pipe, a by-pass connecting said flow and return mains between the heat generator and the furnace, a valve in said by-pass and valves in the flow and return mains between the by-pass and furnace.

2. The combination with a primary system for heating buildings by hot water circulation such system comprising a furnace, radiator and a pipe circuit consisting of flow and return mains connecting said furnace and radiator, of an electric heat generator and pipes of relatively small bore connecting the outlet and inlet ends of the generator to the flow and return mains respectively, the pipe connecting the outlet end of the said generator to the flow main being disposed at an oblique angle to the latter, means controlling the flow through said pipe, a by-pass connecting said flow and return mains between the heat generator and the furnace, a valve in said by-pass and valves in the flow and return mains between the by-pass and furnace; a supplemental secondary electric heater, pipes of relatively small bore connecting the inlet and outlet ends of the said heater with the water circuit within the furnace, a main supply circuit of electrical energy and branch circuits connecting the main electrical supply circuit to both of said electric heaters.

In testimony whereof I have signed my name to this specification in the presence of two witnesses.

PHILLIPS B. MOTLEY.

Witnesses:
WILLIAM J. C. HEWETSON,
GORDON C. COOKE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."