(No Model.)

J. K. MESCHTER.

REGULATOR FOR HOT WATER HEATERS.

No. 526,404. Patented Sept. 25, 1894.

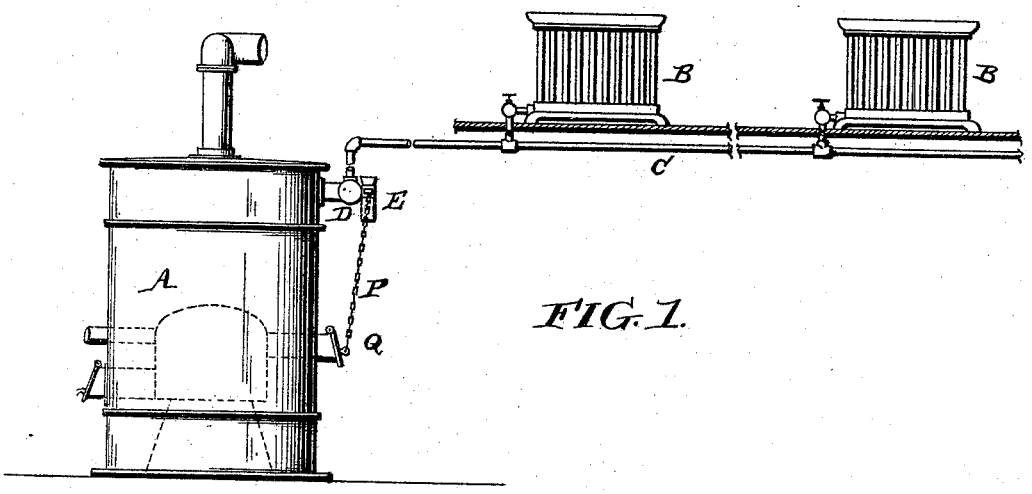


FIG. 1.

FIG. 2.

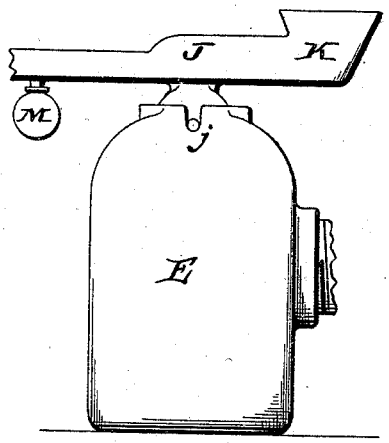


FIG. 3.

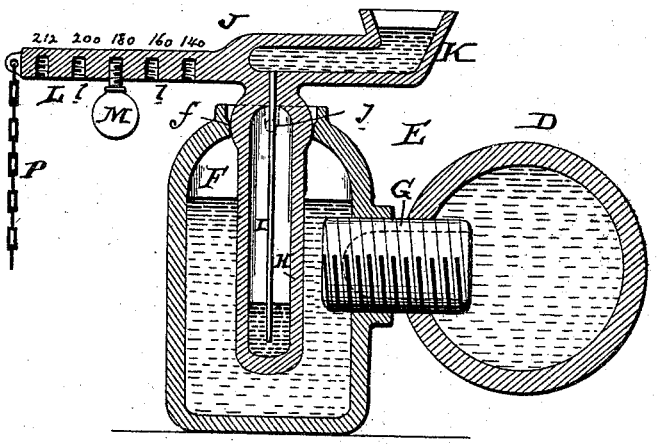
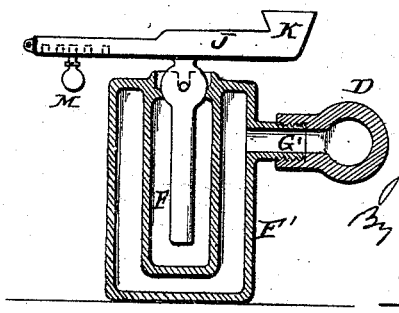


FIG. 4.



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JACOB K. MESCHTER, OF PHILADELPHIA, PENNSYLVANIA.

REGULATOR FOR HOT-WATER HEATERS.

SPECIFICATION forming part of Letters Patent No. 526,404, dated September 25, 1894.

Application filed July 25, 1892. Serial No. 441,089. (No model.)

To all whom it may concern:

Be it known that I, JACOB K. MESCHTER, of Philadelphia, Pennsylvania, have invented an Improvement in Regulators for Hot-Water Heaters, of which the following is a specification.

My invention has reference to regulators for hot water heaters, and consists of certain improvements which are fully set forth in the following specification and are shown in the accompanying drawings which form a part thereof.

The object of my invention is to provide a positively acting regulator for hot water heaters which shall be quick in action and controlled wholly by the variations of temperature. I employ a lever mechanism to operate a damper of the furnace, and cause the oscillations of the said lever mechanism by mercury which is induced to shift its position under the action of varying temperature in the water.

In carrying out my invention, I make the regulator in two parts, consisting of a hollow vessel, and an upper part in the form of a lever which is pivoted to the top of the hollow vessel. The vessel has a screw threaded opening at one side into which a hollow plug is screwed for the purpose of fastening the device to the main hot water supply pipe of the heater. There is also an opening in the top of this vessel through which a portion of the lever structure extends. This lever structure is pivoted at the mouth of the opening. The lever structure is preferably T shaped. The stem of the "T" is hollow and extends downward through the opening in the top of the vessel. On either side of the stem at the point where it joins the cross piece is a pivot which rests in notches cut in the upper edge of the opening. The upper part of the stem is somewhat enlarged, or ball or circular shaped and this loosely fits the inside of the opening, thus preventing the escape of heated air from the hollow vessel. The cross piece forms a lever having its fulcrum at the pivoted point of the stem. One end of this lever is solid and has numerous screw threaded holes placed at regular intervals for adjustable attachment of a weight; the other end contains a hollow receptacle connected with the interior of the stem by a small tube. The hollow stem is filled with mercury, which is caused to rise through the tube into the vessel at the end of the lever under the action of heat. The vessel contains water or air. It is immaterial to the operation of the device which is used. The hot water in the supply pipe of the heater heats the plug, and by conduction heats the water or air in the vessel and causes the mercury to rise in the tube and rise in the receptacle at the top and to one end of the lever. As the temperature rises, enough mercury will pass into this receptacle to cause it to overbalance the weight upon the other end of the lever, raising that end and opening the draft door by means of a chain connection.

In the drawings: Figure 1 is an elevation of a hot water heater system with my improved regulator applied. Fig. 2 is a side elevation of my improved regulator showing the pivoted connection between the upper and lower parts. Fig. 3 is a cross sectional view of the device; and Fig. 4 is a cross sectional view of a modification of the same.

A is a boiler such as is used in any of the well known systems of hot water heating.

It is immaterial what hot water heating system is used, as that forms no part of my invention.

B, B, are radiators.

C is the radiator supply pipe connected to the main supply pipe D.

E is the regulator and consists of the lower vessel F, which is open at the top and also has a screw threaded opening at one side into which the hollow plug G is screwed for detachable connection with the main supply pipe of the heater. The vessel F may be filled with water, or may contain air alone.

G is the hollow plug closed at one end and screw threaded on both ends for attaching the regulator to the pipe D.

J is the upper "T" shaped part of the lever mechanism and consists of the solid arm L provided with the holes *l*, *l*, arranged at regular intervals in which the adjustable weight M may be screwed; the downwardly extending hollow stem H filled with mercury, the tube I opening from the hollow stem into the receptacle K on the opposite end of the cross piece, and the open receptacle K into which the mercury from the part H may flow.

P is a chain having one end connected to the end of the arm L of the part J, and the other end to the draft door Q of the heater.

j are pivots on either side of the enlarged part of the stem H which work in notches cut in the upper edge of the opening at the top of the vessel F. This opening has the shoulders *f* on the inside adapted to make a close joint with the enlarged portion of the stem H.

In Fig. 4 is shown a modification of my improved regulator in which a vessel F′ is placed around the vessel F, and is directly connected by the pipe G′ with the pipe D, so that the hot water in the pipe acts directly upon the vessel F, instead of by conduction, as is shown in Fig. 3.

The operation of the regulator is as follows: The hot water passes from the boiler A into the pipe D, heating the hollow plug G; or, as in Fig. 4, it passes through the pipe G′ into the vessel F′. The heat of the water, by conduction, heats the water or air in the vessel F and causes the mercury in the stem H to rise through the tube I and pass into the receptacle K in the lever J. As the temperature of the water in the pipe D rises, the mercury will continue to pass into the receptacle K until finally the weight of the mercury overbalances the weight M, and the arm L is raised, pulling on the chain P, and thus opening the draft door Q of the furnace. By placing the weight M in different holes in the arm L, which holes are marked for different degrees of heat, the door may be caused to be opened at any desired temperature. The opening of the draft door Q cools off the fire and the temperature of the water falls. This allows the water or air in the receptacle F to cool, and in turn the mercury flows back into the hollow stem or vessel H, allowing the weighted end of the lever to fall and close the draft door. It will thus be observed that the regulator is automatic. It is also adapted to steam heating when steam takes the place of the circulating water.

I am aware that the broad idea of an automatic draft regulator is not new, and I do not claim that as my invention, but confine myself to my improved device for accomplishing that regulation, substantially as herein set out.

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

1. The combination of a heating apparatus for circulating the heating medium and consisting of heaters or radiators arranged in one or more parts of a building, an unobstructed supply pipe leading from the generator to the heaters or radiators, and a hot liquid heat generator for directly supplying hot liquid to the unobstructed supply pipe and provided with a draft door or valve, with a regulator for controlling the draft door or valve having a chamber supported to one side of the unobstructed supply pipe and exterior thereto and adapted to have its contents heated indirectly by conduction through an impervious metal support connecting the said chamber with the supply pipe, and provided with a pivoted lever mechanism connected with the draft door or valve, and a receptacle supported within the chamber of the regulator containing mercury or other fluid substance having a passageway for conveying the substance to one side of the pivot of the lever when subjected to heat whereby the lever is caused to oscillate.

2. The combination of heating apparatus having a heater provided with a draft door or valve and a main for circulating the heating medium, with a chamber open to the atmosphere and having its interior heated by conduction from the main conveying the heating medium, a T shaped pivoted lever mechanism having a hollow stem movably supported within the chamber and communicating with a vessel located at one end of the horizontal arm of the T shaped lever mechanism, mercury or other expansible fluid substance contained within the hollow stem and adapted to rise by heat in the vessel upon the lever mechanism, and a connection between the T shaped lever mechanism and the draft door or valve to move it.

3. In a regulator for heating apparatus, the combination of a chamber adapted to have its contents heated by conduction and having a contracted neck, a lever mechanism having a vertical hollow stem pivoted in the neck of the vessel and free to oscillate therein and provided with a horizontal arm connecting with the device to be regulated, and a vessel communicating with the interior of the hollow stem, and mercury or other expansible substance contained within the hollow stem adapted under the action of heat to flow into the receptacle upon the horizontal arm to cause it to oscillate.

In testimony of which invention I have hereunto set my hand.

JACOB K. MESCHTER.

Witnesses:
WM. SCHULTZ,
ERNEST HOWARD HUNTER.