

A. G. PAUL.
HEATING SYSTEM.
APPLICATION FILED MAY 15, 1900.

937,689.

Patented Oct. 19, 1909.
2 SHEETS—SHEET 1.

Fig. 1,

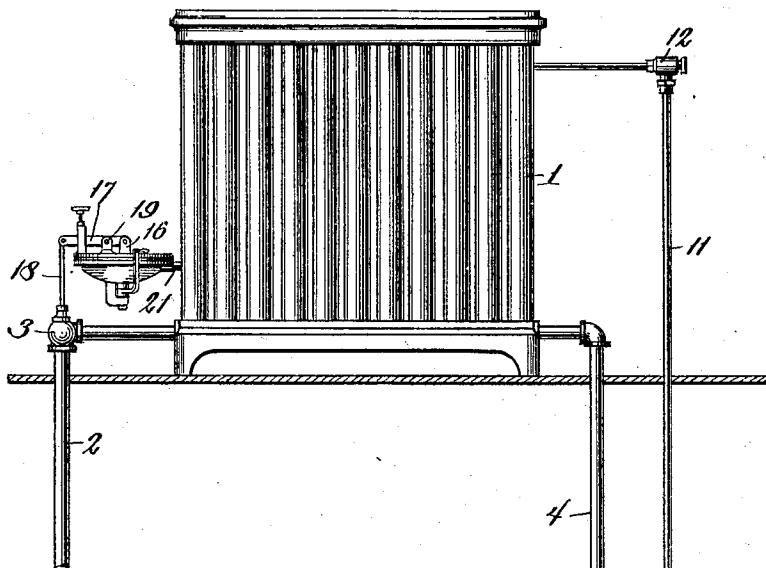


Fig. 2,

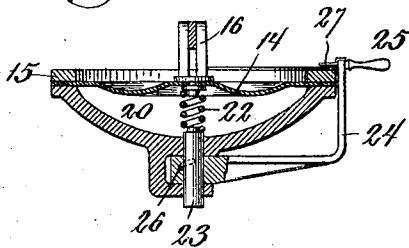
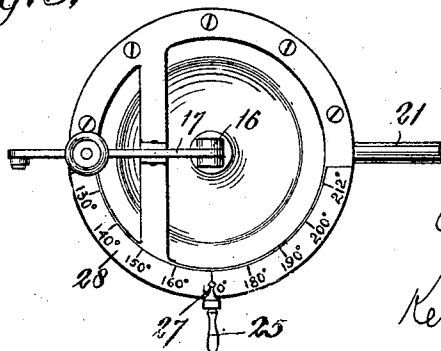


Fig. 3,



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Fig. 4.

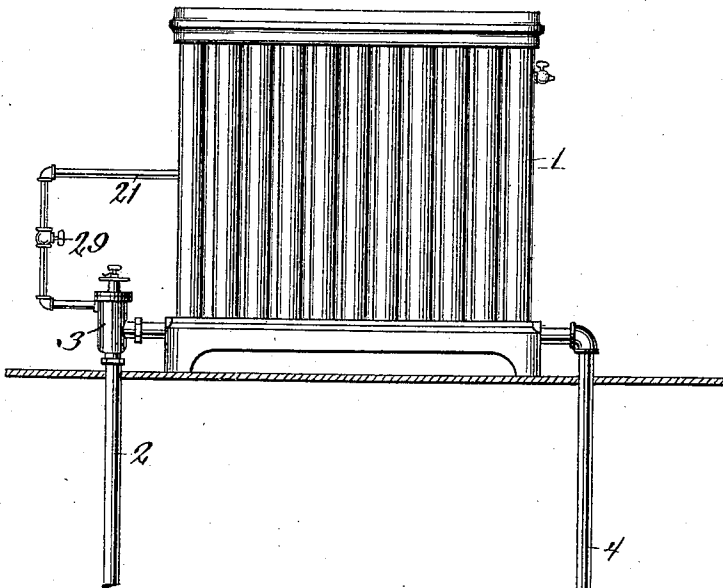
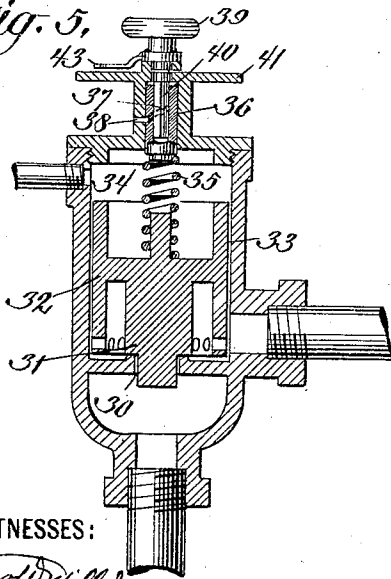


Fig. 5.



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John O. Campbell

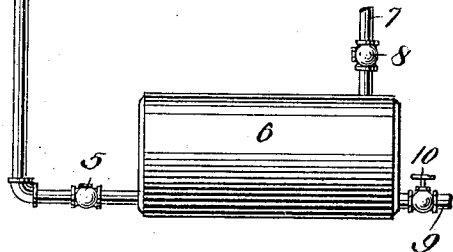
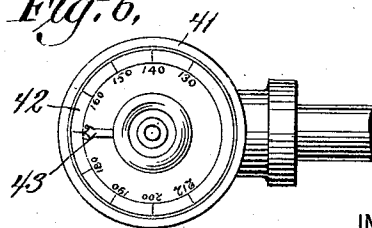


Fig. 6.



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HEATING SYSTEM.

937,689.

Specification of Letters Patent.

Patented Oct. 19, 1909.

Application filed May 15, 1900. Serial No. 16,814.

To all whom it may concern:

Be it known that I, ANDREW G. PAUL, a citizen of the United States, residing in Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Heating Systems, of which the following is a full, clear, and exact specification, reference being had to the accompanying drawings, which form a part hereof.

This invention relates to a heating system wherein steam or other suitable heating agent is circulated for the purpose of conveying and imparting heat to the places desired, and it consists in an improved construction and arrangement of the parts of such a system.

The object of my invention is to enable the pressure within the radiator to be easily and quickly regulated and controlled by the user of the system.

My invention consists in the combination in a heating system of a supply pipe, a supply valve, a motor controlling the said valve either directly or indirectly, a fluid pressure chamber on one side of said motor, a spring adapted to move the motor in a direction opposite to that in which it is moved by the fluid pressure, and means to vary the tension of the spring, and an indicator connected with the said means such, for example, as an index finger adapted to move upon a dial. In the best form of my invention I employ a motor in the form of a diaphragm exposed to the atmosphere on one side, and having on the other side a fluid pressure chamber connected with the radiator.

My invention also consists of other features of construction and combinations of parts hereinafter described and claimed.

My invention is shown in the accompanying drawings in which—

Figure 1 shows my improvement applied to a single radiator; Fig. 2 is a sectional view of the diaphragm for controlling the supply valve, and of the indicating device; Fig. 3 is a top view of the same; Fig. 4 shows a system in which my improved form of supply valve is used in place of the diaphragm, Fig. 5 shows a section of this supply valve and of the indicator, and Fig. 6 is a top view of the same.

Similar numbers indicate similar parts in the different figures.

Referring to Figs. 1 to 3, 1 is a radiator, 2

is a supply pipe, 3 is a supply valve, 4 is the discharge pipe provided with a check valve 5, 6 is the tank for the water of condensation, 7 is the relief pipe provided with any suitable valve 8, 9 is a pipe through which the water of condensation can be pumped to the boiler or to any other place desired, this pipe being provided with any suitable form of valve 10. 11 is an air pipe provided with any suitable form of automatic air valve 12 and connected at its outer end with the exhauster 13. 14 is a diaphragm mounted in a suitable casing 15 and connected with the supply valve by means of the arm 16, the lever 17 and the rod 18 as shown. The lever 17 is pivoted at 19. 20 is a fluid pressure chamber underneath the diaphragm connected by pipe 21 with the radiator. 22 is a coiled spring adapted to press upwardly against the diaphragm 14 and tending to close the supply valve 3. The tension of this spring is adjusted by means of the rod 23. 24 is an arm or lever provided with a handle 25 at its upper end and adapted to turn upon the rod 23 at its lower end as shown. The rod 23 is provided with a pin 26 projecting into a slot in the arm 24, as shown in Fig. 2. The upper end of the arm 24 is provided with an index finger 27 which moves over the face of a dial 28. This dial is suitably marked or graduated with the different degrees of temperature that it may be desirable to employ in the radiator, the dial, as shown, representing a range between 130 degrees and 212 degrees Fahrenheit. Instead of marking the temperatures upon the dial, the different pressures corresponding with these temperatures could be marked thereon. By turning the handle 24 the rod 23 can be raised or lowered so as to vary the tension upon the spring 22. The rod 23 and the arm 24 are so constructed and arranged that when the arm is turned to any point shown on the dial, the tension upon the spring and the pressure upon the diaphragm 14 will be such that should the pressure in the radiator fall below a point corresponding with the temperature indicated on the dial, the supply valve will be opened, but should the pressure rise above that point the supply valve will be closed. The arm 24 can be turned so as to bring the index finger opposite any desired temperature, and the result will be that the pressure in the radiator will be automatically maintained at the point corresponding with that temperature.

Referring to Figs. 4, 5 and 6, the parts are constructed and arranged as already explained, with the following differences. The supply valve is made to correspond in form with my improved valve described and claimed in my previous patent No. 899,838. The fluid pressure chamber of this supply valve is connected with the radiator by means of the pipe 21, and this pipe is provided with any suitable form of hand valve 29, by closing which the supply valve will be shut. 30 is the supply port, 31 is the supply valve, 32 is a piston connected with the supply valve, and having between it and the casing the equalizing vent passage 33. 34 is the fluid pressure chamber above the piston, and 35 is a coiled spring adapted to bear down upon the top of the piston. The tension of this spring can be varied by means of the rod 36, provided with a groove 37 into which a pin 38 projects, the pin 38 being fixed in the casing of the valve. 39 is a hand wheel connected with the stem 40 which projects into a central opening in the rod 36 and so arranged that when the stem 40 is revolved the rod 36 is also turned. By turning the wheel 39 the rod 36 is revolved and is caused to move up and down by the pin and slot connection 37, 38, thereby varying the tension of the spring 35. 41 is a plate provided on its face with the dial 42 over which moves the index finger 43 which is connected with the hand wheel 39. These parts are so constructed that when the hand wheel is turned so as to bring the index finger 43 opposite any degree of temperature indicated on the dial, the tension of the spring 35 will be so regulated as to hold the pressure in the radiator at a point corresponding to the indicated temperature.

The advantages of my improvement will be manifest. By simply turning the arm 24 in the one case, or the hand wheel 39 in the other, so as to bring the index finger opposite the temperature or pressure which it is desired to maintain in the system, the system will be caused to operate automatically

at that pressure or temperature. In this way the operation of the system can be very easily regulated.

What I claim as new and desire to secure by Letters Patent, is:

1. In a heating system the combination of a radiator, a supply pipe, a supply valve, a motor controlling said valve, a fluid pressure chamber on one side of said motor, a pipe connecting said fluid pressure chamber with the radiator independently of the supply pipe, a spring adapted to move the motor in a direction opposite to that in which it is moved by the fluid pressure, means to vary the tension of the spring, and an indicator connected with said means, substantially as set forth.

2. In a heating system the combination of a radiator, a supply pipe, a supply valve, a diaphragm controlling said valve and exposed to the atmosphere on one side, a fluid pressure chamber on the other side of said diaphragm, a pipe connecting said fluid pressure chamber with the radiator independently of the supply pipe, a spring adapted to move the diaphragm in a direction opposite to that in which it is moved by the fluid pressure, means to vary the tension of the spring and an indicator connected with said means, substantially as set forth.

3. In a heating system the combination of a radiator, a supply pipe, a supply valve, a diaphragm connected with the supply valve by suitable means, a fluid pressure chamber, a pipe connecting the fluid pressure chamber with the radiator, a spring, a rod connected thereto, an arm connected with the said rod by a pin and a slot connection, an index finger movable with said arm and a dial, substantially as set forth.

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

ANDREW G. PAUL.

Witnesses:

THOMAS K. PETERS,
NANNIE FINLEY.