No. 894,806. PATENTED AUG. 4, 1908.

A. F. AMES.

THERMOSTATIC VALVE.

APPLICATION FILED MAR. 29, 1907.

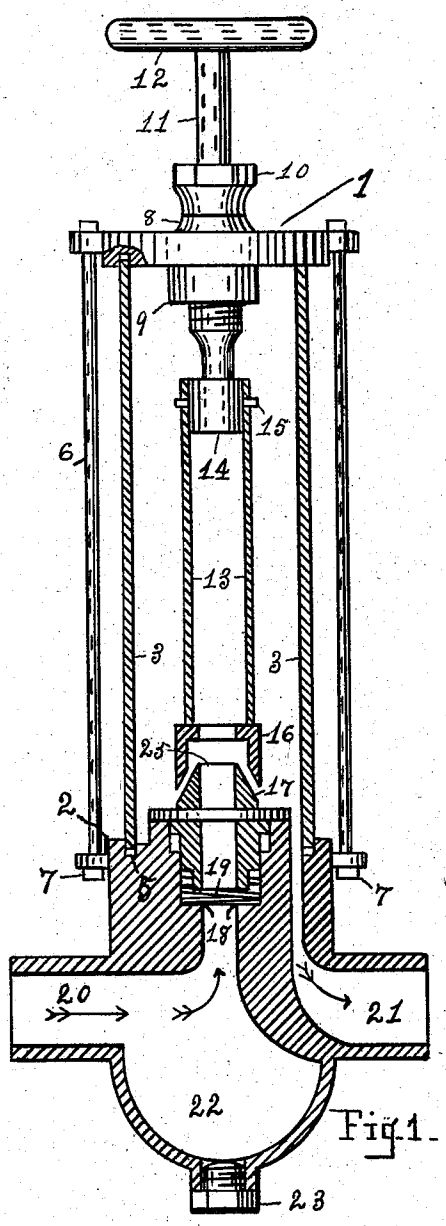


Fig. 1.

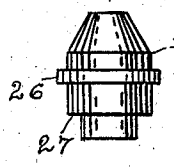


Fig. 4.

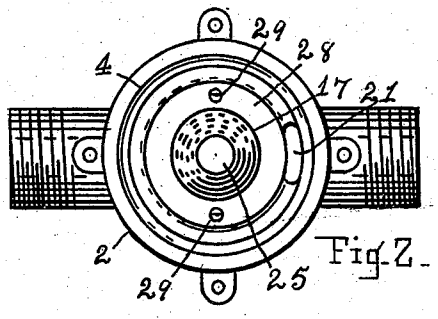


Fig. 2.

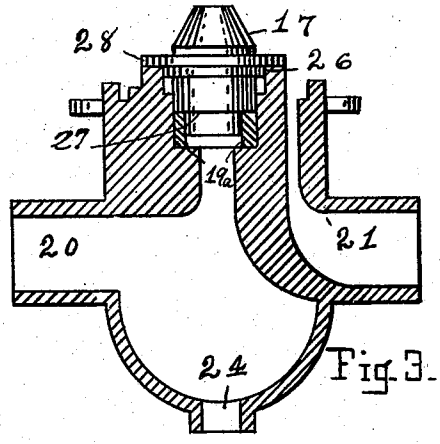


Fig. 3.

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THERMOSTATIC VALVE.

No. 894,806. Specification of Letters Patent. Patented Aug. 4, 1908.

Application filed March 29, 1907. Serial No. 365,398.

To all whom it may concern:

Be it known that I, ALBERT F. AMES, a citizen of the United States, and a resident of Oshkosh, in the county of Winnebago and State of Wisconsin, have invented a new and useful Improvement in Thermostatic Valves, of which the following is a specification.

My invention relates to improvements in thermostatic valves, particularly those adapted for use in connection with steam radiators, heating coils and vacuum work where live or exhaust steam is used for heating and drying purposes, and in conjunction with a vacuum pump.

The following drawings illustrate the construction of the invention.

Figure 1 is a side elevation partly in section of the entire device. Fig. 2 is a plan of the lower plate with the valve seat secured therein. Fig. 3 is a vertical section showing the lower plate and a modified form of spring under the valve seat, from the one shown in Fig. 1. Fig. 4 is a side elevation of the valve seat.

Similar numerals indicate like parts in the several views.

1, indicates the upper plate and 2 the lower or base plate of the device; 3, a glass tube held in recesses 4, having a packing ring 5, in each recess; 6, bolts having nuts 7, for holding the upper and base plates clamped tightly together upon the ends of the glass tube; 8 and 9, bosses upon the upper plate, 10, a collar threaded into the boss 8, and the boss 9 being internally threaded for receiving the threaded part of the shaft 11, of the hand wheel 12. Upon the lower end of the shaft, a tube 13, is secured by its connection with the plug 14 by means of pins 15. This tube constitutes a valve stem which I form of brass, or a material having a relatively high coefficient of expansion, it extending downward to near the lower or base plate, a tubular valve, 16, being secured upon its lower end.

The base plate 2 is counter-bored centrally, and a valve seat 17, loosely mounted therein, a spring resting upon ledges 18 of the counter-bore and supporting the valve seat. This spring may be a coiled spring formed of wire, as 19, in Fig. 1, or be of any material and form suited to its use, as 19^a, in Fig. 3. The meeting faces of the valve and its seat are preferably of a tapering form, although other forms may give fair results. An inlet port 20, is provided for admitting steam from a heating coil or other source, it passing in the direction of the arrows up into the space in and around the hollow valve stem, said space being adapted for holding steam when it is admitted through the inlet 20, excepting for its escape after partial condensation through the outlet 21, which is provided for the discharge of the water of condensation and its conduct to the vacuum pump, the heating coil and vacuum pump not being shown. A catch basin 22, is provided in connection with the inlet port, into which any scale or sediment may settle, a removable cover 23, being provided for its outlet 24, for the removal of any undesirable matter. The valve seat 17 is provided with a central bore 25, and a collar 26, integral with it, the collar being for preventing the spring under the shoulder 27 of the valve seat, from permitting the valve seat to rise above a determined point, its rising being limited by the engagement of said collar with the ring 28, which ring is secured to the top of the plate 2 by screws 29. The ring limits the upward movement of the valve seat, and the valve can be adjusted vertically, so as to leave a narrow space between the valve and its seat before steam is admitted to the interior of the glass tube, and thereby providing for the proper space to be left below the valve for permitting expansion of the valve stem before the space between the valve and its seat will be closed.

The operation of the device may be substantially as follows. The valve being adjusted in a slightly open position by means of the vertical adjustment of the upper end of the valve stem, and steam admitted through the port 20, from a heating coil or radiator, it will pass into and around the tubular valve stem and expand it and thereby close the valve. Should the expansion be too great for the space between the valve and its seat, the spring under the valve seat will permit the lengthening of the tube to any extent likely to occur, and thereby avoid any liability of the buckling of said tube, of injuring the valve or its seat, or of breaking the bolts 6. The action of the device is to retain the latent heat units of the steam admitted to the system until condensed, and when this takes place, the tube contracts and the vacuum pump maintaining all the way from 10 to 15 inches of vacuum, expels this condensation, and air is followed up by live steam. The difference of temperature in the

system causes the expansion tube to expand and contract as the difference of temperature varies from time to time.

The receptacle below the valve seat is for a catch basin. The wheel shaft connected to the valve stem, or expansion tube, by reason of its vertical movement, in addition to adjusting the valve relative to its seat, is to free the device from scale that may accumulate at the valve seat and let it drop into the catch basin. The device is under perfect control at all times and the operator has the satisfaction of seeing it working, and can tell if it is giving the results for which it was intended.

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

1. A thermostatic valve comprising an upper plate and a lower, or base plate spaced apart, a glass tube arranged between said plates for inclosing said space, suitable packing arranged between the ends of said tube and said plates, a plurality of bolts formed of a material having a relatively low coefficient of expansion, arranged outside of said tube for clamping said plates and tube together, and forming within the tube a steam holding space having suitable inlet and outlet ports, a screw threaded shaft passing through the upper one of said plates, a hand attachment upon the upper end of said shaft for turning the same, a tube formed of a material having a relatively high coefficient of expansion connected with said shaft and extending downward therefrom to near the lower, or base plate, and serving as a valve stem, a tubular valve secured upon the lower end of said valve stem, a tubular valve seat, vertically movable, arranged centrally within the lower, or base plate and under said valve, a collar integral with, and extending around said valve seat, a ring secured upon said lower, or base plate, through which the upper end of said valve seat is movable, vertically, a spring arranged for pressing said valve seat upward until its collar is arrested by said ring, and a catch basin in connection with the inlet port which is provided with an outlet having a removable cover at the lowest point thereof, substantially as described.

2. A thermostatic valve, comprising an upper plate and a lower, or base plate spaced apart, a glass tube arranged between said plates for inclosing said space, suitable packing arranged between the ends of said tube and said plates, a plurality of bolts formed of a material having a relatively low coefficient of expansion arranged outside of said tube for clamping said plates and tube together and forming within the tube a steam holding space having suitable inlet and outlet ports, a tubular valve arranged near the lower end of said glass tube, a tubular valve stem extending upward from said valve to near the upper plate, means for suspending said valve stem by its upper end from said upper plate and for its vertical adjustment within the glass tube, a tubular valve seat, vertically movable, arranged centrally within the lower, or base plate and under said valve, a collar integral with, and extending around said valve seat, a ring secured upon said lower plate through which the upper end of said valve seat is vertically movable, a spring arranged for pressing said valve seat upward until its collar is arrested by said ring, and a catch basin in connection with the inlet port which is provided with an outlet having a removable cover at the lowest point thereof, substantially as set forth.

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Witnesses:
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