Oct. 25, 1927. 1,646,548

R. MACLAREN

TEMPERATURE CONTROL VALVE

Filed Sept. 11, 1924

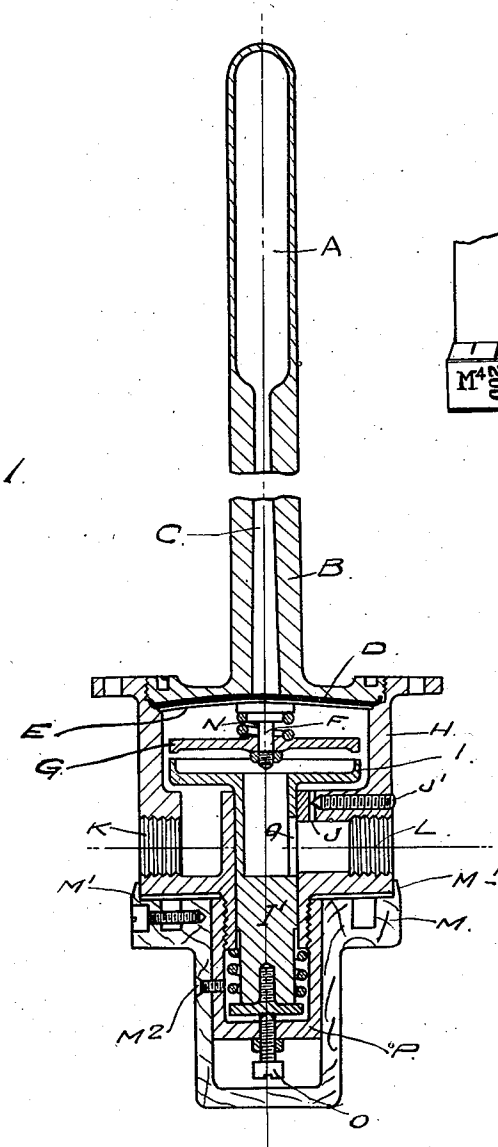


Fig. 1.

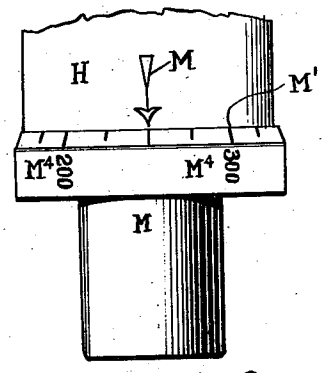


Fig. 3.

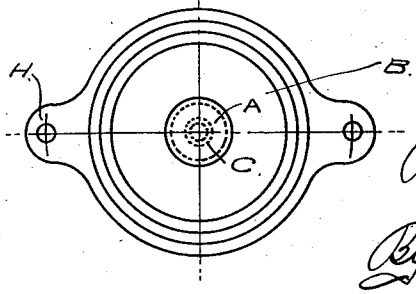


Fig. 2.

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UNITED STATES PATENT OFFICE.

ROBERT MACLAREN, OF CULROSS, FIFE, SCOTLAND.

TEMPERATURE CONTROL VALVE.

Application filed September 11, 1924, Serial No. 737,183, and in Great Britain October 31, 1923.

My invention relates to improvements in temperature control valves, and has for its object to provide improved apparatus of this kind which operates efficiently for the control of gases for constant heating purposes.

With the above and other objects in view, the invention consists in the construction, combination and arrangement of devices hereinafter described and claimed.

In order that my invention may be properly understood and readily carried into effect, I have hereunto appended one sheet of drawings, of which

Figure 1 is a sectional elevation of a temperature control valve constructed according to my invention.

Figure 2 is a plan of Figure 1.

Figure 3 is a detail elevation of my improved control valve.

Referring to the drawings, A is the bulb and B the extension which is suitably screwed to a valve body H, the inner end of said extension being contained within the valve body H and being of parabolic concave formation and being sealed by a diaphragm D of parabolic form to ensure absolute uniformity of movement at all control points. The passage C between the bulb A and extension B is gradually enlarged toward the sealing diaphragm D so that, in the event of the expansion medium being solid at atmospheric temperature, no severe stresses are set up when the bulb A is subjected to heat in chamber to be controlled. A secondary diaphragm E which is also of parabolic concave curvature lies in close contact with the diaphragm D and is fitted with a pin F which carries the valve G, a spring N being carried on the pin F between the diaphragm E and the valve G, so that the valve G and secondary diaphragm E may be kept apart at their extreme limits. This secondary diaphragm carrying pin is used in order to save the sealing diaphragm D being punctured to take the pin.

The valve body H has an inlet and outlet K and L respectively and has an adjustable valve seat I which is open and bell-mouthed at the top, an opening Q in the hollow central portion being in communication with the outlet L. A small by-pass opening J is also provided and is controlled by the screw J^1 between the outlet and the inside of the valve body H. The lower portion of the valve seat I is formed by a stem I′ which passes through the valve body H into a cover P suitably connected to the valve body H, an adjusting screw O being provided to raise or lower the valve seat I. This cover P is enclosed in a case M which acts as a handle and is connected to it by a screw M^2. The case M which encloses the bottom of the valve body H is graduated at M^1 to form a register of adjustment.

The operation of my invention is as follows:

The bulb A is charged with a suitable medium expansible by heat and said bulb, in practice is enclosed in a chamber which is heated by the combustion of the gas which passes through the said valve. The gas enters the valve body through the inlet K and passes therefrom to the valve seat I and from thence through the port Q through the outlet L and initially the apparatus is so adjusted and arranged that the port Q is entirely open when the chamber in which the bulb A is located is at the desired temperature. In the event that the temperature of the bulb increases materially the expansible medium therein acts upon the diaphragm D and said diaphragm moves the valve member G toward the seat I, thus tensioning the flow of gas from the inlet K to the outlet L as will be understood. In the event of an abnormal overheating of the bulb A, the member G will close against the seat I. The by-pass *j* when opened by the valve *j′* permits a minimum flow of gas through the apparatus under all conditions, as will be understood.

In order that no stressing of parts occur when going from a high heat to a lower heat, a sliding movement of the valve G on the pin F is allowed for, the spring N coming into operation for a short period until the diaphragm E returns the requisite amount equivalent to the lower heat in the bulb A.

A temperature control using the sliding valve seat with natural working of the expansion medium throughout the whole range requires no spring action for varying the control point, that is, raising the temperature to the boiling point.

The handle and dial, the latter overlapping the body to prevent dust, grease, and the like collecting is graduated in degrees.

The handle has the various temperature

cooking sections moulded on to the corresponding temperature. A pointer mark is on the body.

I claim:

1. Apparatus of the class described comprising a body having a chamber therein and inlet and outlet openings, an adjustable valve seat in said body having a duct and a port establishing communication between said duct and said outlet opening, a parabolic diaphragm in said body opposite said valve seat, an expansion bulb having a duct leading to said diaphragm, a valve movable by said diaphragm toward and from said valve seat, and means connecting said valve to said parabolic diaphragm for limited sliding axial movement, and a spring between said diaphragm and said valve to normally hold the latter at the outer extent of its sliding axial movement relative to the parabolic diaphragm.

2. Apparatus of the class described comprising a body having a chamber therein and inlet and outlet openings, an adjustable valve seat in said body having a duct and a port establishing communication between said duct and said outlet opening, a parabolic diaphragm in said body opposite said valve seat, an expansion bulb having a duct leading to said diaphragm, and a valve movable by said diaphragm toward and from said valve seat, said valve seat having a diametrically enlarged mouth communicating with said duct, said mouth presenting a rim extending therearound and against which said valve closes, a cover encasing the outer end of said stem and provided with means to adjust said valve seat, and a case in which said cover is arranged, said cover having screw-threaded connection with said body and said cover and body having the one a graduated scale and the other a fixed point for cooperation with said scale.

3. Apparatus of the class described comprising a body having a chamber therein and inlet and outlet openings, an adjustable valve seat in said body having a duct and a port establishing communication between said duct and said outlet opening, a parabolic diaphragm in said body opposite said valve seat, an expansion bulb having a duct leading to said diaphragm, and a valve movable by said diaphragm toward and from said valve seat, said valve seat having a stem movable slidably in an opening with which the body is provided, a cover encasing the outer end of said stem and a screw in said cover to adjust said valve seat, and a case in which said cover is arranged, said cover having screw-threaded connection with said body and said cover and body having the one a graduated scale and the other a fixed point for cooperation with said scale.

In witness whereof I affix my signature.

ROBERT MACLAREN.