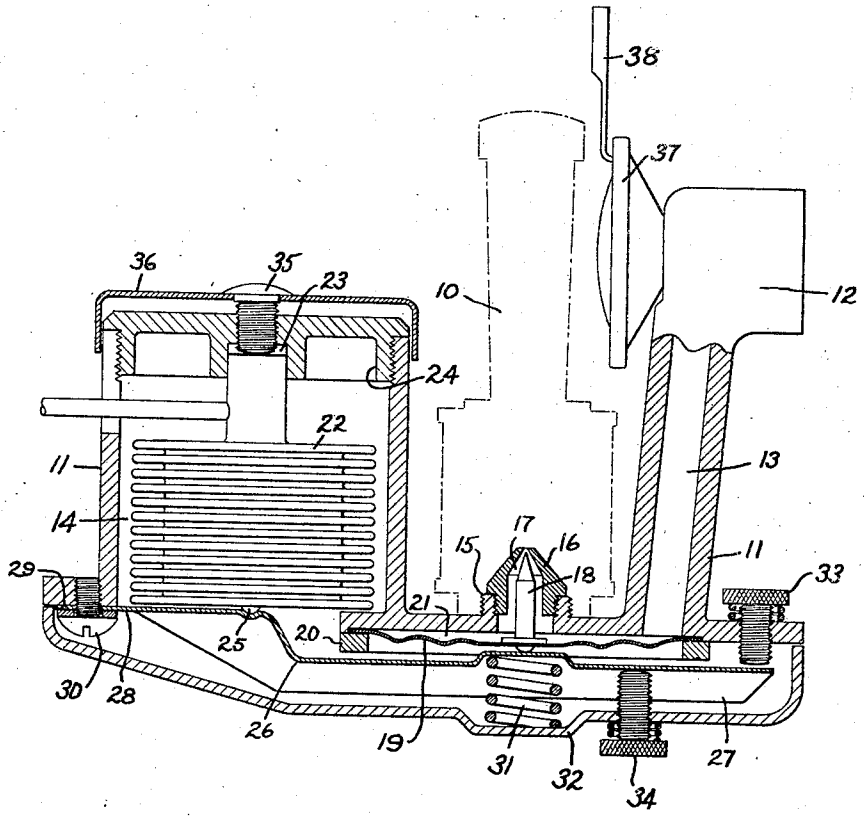
June 5, 1934. S. W. E. ANDERSSON 1,961,325

AUTOMATIC BURNER CONTROL VALVE

Filed Nov. 28, 1932



INVENTOR.
Sven W·E· Andersson
BY
Gates Dowell
ATTORNEY.

Patented June 5, 1934

1,961,325

UNITED STATES PATENT OFFICE

1,961,325

AUTOMATIC BURNER CONTROL VALVE

Sven W. E. Andersson, New York, N. Y., assignor to Electrolux Servel Corporation, New York, N. Y., a corporation of Delaware

Application November 28, 1932, Serial No. 644,595

4 Claims. (Cl. 236—99)

My invention relates to automatic control valves and more particularly to a thermostatically operated valve for a gas burner.

My invention contemplates a valve for controlling the supply of gas to the mixing chamber of a gas burner which is simple in construction and devoid of stuffing boxes, valve stem guides, and similar frictional parts, and therefore of great sensitivity.

I further provide adjustable means for determining the maximum and minimum openings of the valve which are fully accessible.

Further objects and advantages will be apparent from the following description taken in connection with the accompanying drawing in which the figure shows in vertical section a control valve contemplated by my invention for a gas burner.

Referring to the drawing, a gas burner tube, cap, air shutter, and dust screen are indicated generally by the dotted outline 10. These form no part of my present invention but for more complete illustration and description thereof reference may be had to Patent No. 1,841,211 to E. H. Ryden et al. A housing 11 forming a safety cut-off valve casing 12, gas inlet passage 13, and thermostat chamber 14, is preferably an integral casting.

To the outside of a drilled boss 15 on the housing 11 is threaded or otherwise secured the burner tube assembly and on the inside is threaded a member 16 having an orifice or valve opening 17. A needle or valve member 18 movable with respect to the orifice 17 to vary the size of the latter and therefore the passage of gas therethrough, is mounted on a diaphragm 19. The latter is pressed from resilient sheet metal and is so formed that normally it tends to retain the needle 18 in its downward or withdrawn position.

The edge of the diaphragm 19 is secured to the underside of the housing 11 by a retaining ring 20 which is suitably secured by screws, not shown, or the like. I prefer to employ gaskets, not shown, in the joint around the edge of the diaphragm 19 in order to insure that the chamber 21 formed between the diaphragm and the housing 11 is gas tight. The arrangement is such that the chamber 21 communicates with the gas inlet 13 and the diaphragm 19 is centered opposite the orifice 17 with the needle 18 rigidly attached in the center thereof.

The use of this diaphragm is the essence of my invention. It centers and guides the valve needle and urges the needle toward its withdrawn position thereby entirely eliminating guide bearings and needle retaining springs thus eliminating friction and drag whereby a thermostat in accordance with my invention is exceedingly sensitive. The diaphragm also seals off the gas passage from the inlet 13 to the orifice 17, thus making unnecessary seals or packing around the housing covers and makes possible adjusting devices wholly accessible from without the valve chamber, as hereinafter described, thus eliminating further packing glands or the like.

Within chamber 14 of the housing 11 is located the bellows 22 of an expansible fluid thermostat, which is well known in the art and requires no further description here. The upper end of the bellows 22 abuts in a recess 23 in a closure member 24 threaded into the upper end of the casing forming chamber 14. The lower end 25 of the bellows abuts in operative relation a lever 26. The latter is formed of spring metal having pressed flanges 27 which make the lever rigid except at the portion 28 adjacent the end 29 which is secured by screws 30 to the casting 11. The rigid portion of the lever 26 abuts upwardly against the diaphragm 19 and is provided with a load compensating spring 31 located between the lever where it abuts the diaphragm and a lower cover plate 32 for the housing 11.

Movement of the lever 26 is limited between adjustable stops formed by screws 33 and 34 threaded through the housing 11 and lower cover plate 32 respectively. The thermostat adjustment or setting is obtained by means of a screw 35 threaded through the closure member 24 into the recess 23 for varying the abutment of the upper end of the bellows 22 therein. A cap 36 secured to the screw 35 and having its edges extending downwardly over the part of casting 11 forming the chamber 14 affords a convenient dial on which may be appropriately inscribed a scale or index cooperating with an index or scale on the casing.

My control valve is particularly adapted for use with a burner for heating an absorption type refrigerating apparatus. In such instance the sensitive bulb of the control thermostat is located adjacent the cooling element and expansion and contraction of the thermostat bellows 22 occurs responsive respectively to increase and decrease in temperature of the cooling element. Upon contraction of the thermostat bellows 22 the lever 26, urged upwardly by the load spring 31, flexes the diaphragm 19 upwardly carrying the needle 18 further into the orifice 17 to decrease the flow

of gas therethrough. The limit of this movement, and therefore the minimum supply of gas to the burner, is predetermined by the setting of the minimum flame adjusting screw 33. Upon expansion of the thermostat bellows 22 the lever 26 is moved downwardly against the action of the load spring 31 allowing the diaphragm 19 to unflex and withdraw the needle 18 from the orifice 17 thereby increasing the flow of gas therethrough. This movement and therefore the maximum flow of gas to the burner is predetermined by the setting of the maximum flame adjusting screw 34.

I consider that it is fully within the scope of my invention to make the orifice or valve opening movable with the diaphragm 19 instead of the needle or valve member and that such an arrangement will be obvious to one skilled in the art in the light of my present disclosure.

The safety cut-off valve in portion 12 of the housing 11 operated by a thermostat assembly 37 heated by the burner flame through the conducting member 38 may be of any type known in the art, for instance as disclosed in Patent No. 1,711,398 to N. T. Sellman, and forms no part of my present invention.

It will be obvious to those skilled in the art that various other changes may be made in the construction and arrangement without departing from the spirit of the invention and therefore the invention is not limited to what is shown in the drawing or described in the specification but only as indicated in the appended claims.

I claim:

1. A gas valve comprising, a valve chamber having a valve opening and formed by a gas tight casing having a flexible wall portion, a valve member in said chamber movable with respect to said opening for varying the size of the latter, a lever without said chamber movable to impart motion to said valve member through said wall portion, a thermostat for operating said lever, and adjustable stops for limiting the movement of said lever.

2. A gas burner valve comprising, a housing having a gas inlet passage and a valve orifice, a resilient diaphragm secured at its edge within said housing to form therewith a gas tight chamber from said passage to said orifice, a valve member for said orifice mounted on said diaphragm, the latter normally retaining said valve member in its open position, a lever in said housing operable to flex and release said diaphragm, a thermostat having an adjustable working element within said housing in operative relation to said lever, a load compensating spring for said lever, and limit stops for said lever adjustable from without said housing.

3. In a gas burner, a gas inlet valve, a gas tight casing forming a gas inlet chamber around said valve and having a flexible wall portion, a gas supply connection to said chamber, a lever without said chamber movable to operate said valve through said flexible wall portion, a thermostat for operating said lever, and stops for limiting the movement of said lever.

4. In a gas burner, a gas inlet valve, a housing having a gas supply passage, a resilient diaphragm secured at its edge to said housing to form therewith a gas tight chamber around said valve communicating with said gas supply passage, the movable member of said valve being attached to said diaphragm and the latter normally retaining said member in its open position, a lever without said chamber operable to flex and release said diaphragm, an adjustable thermostat for operating said lever, and adjustable stops for limiting the movement of said lever.

SVEN W. E. ANDERSSON.