March 29, 1938. E. M. MEACHAM 2,112,503

REMOTE CONTROL FOR HEAT REGULATORS

Filed May 7, 1935

FIG. 1.

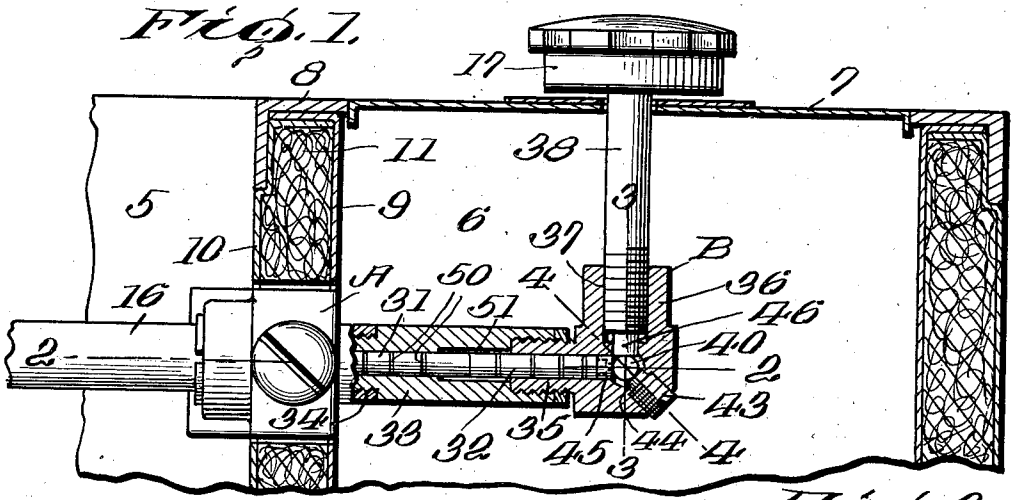


FIG. 2.

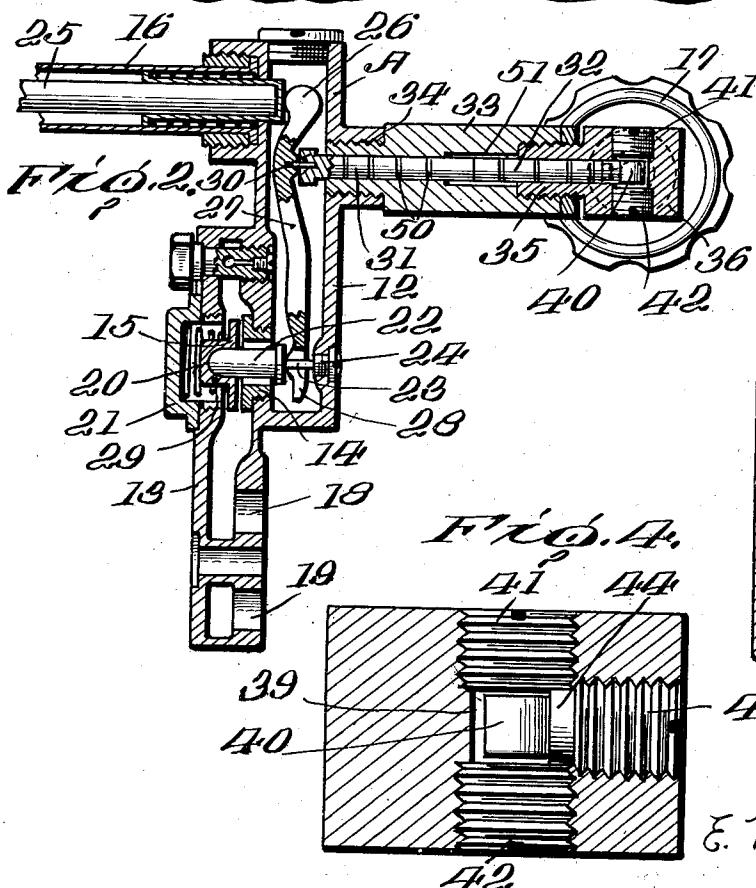


FIG. 3.

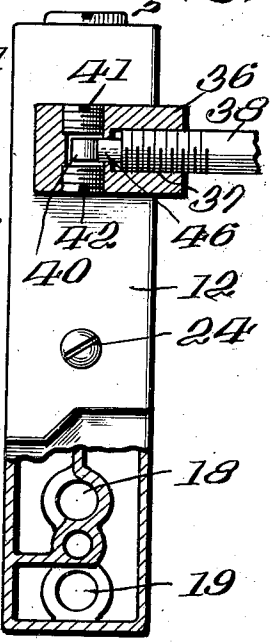


FIG. 4.

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REMOTE CONTROL FOR HEAT REGULATORS

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9 Claims. (Cl. 236—15)

This invention relates to an improvement in a remote control for heat regulators and is directed more particularly and specifically to a control and setting element for the thermostatically operated valve of a gas stove oven temperature regulator.

Many of the stoves as designed today position the setting means for the heat regulator of the stove at the front of the stove whereas the thermostatically operated valve is often so positioned as to be not only remote to the setting means but as to necessitate an angular movement in the connecting means between the valve and the setting means. In other words, the setting means and valve are often arranged at right angles to one another as well as remote to one another, which condition causes a problem to the stove manufacturers in providing an operative connection between them.

The present invention has as one of its objects the provision of a novel and improved operative connection between the valve of a heat regulator and the remotely positioned manual control means of said valve.

Another and further object of the invention is the provision of a device of the character above described which involves the fewest possible number of moving parts; which is simple and inexpensive of manufacture yet highly efficient in operation; and so constructed as to be exceedingly durable and simple of adjustment when adjustment is necessary.

Further specific objects, novel features of construction and improved results of the invention will appear in more detail from the following description when read in conjunction with the accompanying drawing.

In the drawing:

Fig. 1 is a fragmentary view in horizontal section illustrating the application of the invention to a heat control regulator of a gas range.

Fig. 2 is a vertical sectional view taken on the line 2—2 of Fig. 1.

Fig. 3 is a vertical sectional view taken on the line 3—3 of Fig. 1, a portion of the regulator housing being broken away and also shown in vertical section.

Fig. 4 is a detailed enlarged vertical sectional view taken on the line 4—4 of Fig. 1.

The accompanying drawing illustrates one application of the invention to a gas range, but it is to be understood that the parts need not be positioned exactly as illustrated as the invention can be applied and used with the thermostatically operated valve positioned differently than that illustrated by merely altering the dimensions of the parts making up the manual control portion of the apparatus.

Describing the illustrated manner of using the present invention, 5 illustrates the oven chamber of a gas range and 6 a compartment adjacent thereto. The compartment 6 is closed at its front by a suitable panel 7 which would lie preferably in the same plane as the frame 8 which defines the door opening at the front of the oven compartment. The oven compartment and the adjacent compartment 6 are separated by a double wall made up of an outer wall 9 and an inner wall or oven lining 10, which in the better type of ranges is filled with a suitable insulating material 11.

The heat regulator as an entirety is designated at A and the remote control and setting device at B.

The heat regulator is of more or less conventional form and comprises a housing made up of two parts 12 and 13 communication between which is provided through an opening carrying a valve seat 14 which is under the control of a valve 15 which valve, as will be hereinafter pointed out, is automatically operable by the thermostat 16 positioned in the oven or by the operating knob or handle 17 which is remotely positioned in respect to the valve at the exterior of the stove at its front in front of the stove front panel 7.

Describing the heat regulator in detail 18 designates the gas inlet to the regulator housing portion 13 and 19 the gas outlet. The flow of gas or fuel from the inlet to the outlet is under the control of the valve 15. A coil spring 20 the tension of which is adjustable by the cap screw 21 tends to normally urge the valve toward its seat 14. The valve is provided with a stem portion 22 which extends into the housing portion 12 through the valve seat and this stem is reciprocable upon a pin 23 adjustably supported as at 24 in the wall of the housing portion 12. This pin 23 serves as a combined support and guide for the reciprocable movement of the valve.

The thermostat 16 is of the well known "rod and tube" type and its core 25 extends into the housing 12 and engages the end 26 of the lever 27. The lower end of this lever is bifurcated as at 28 to straddle the valve supporting and guiding pin 23 and has engagement with the head portion 29 carried by the inner end of the valve stem 22. This lever between its engagement with the valve stem and the thermostat is fulcrumed on or against the head 30 of the plunger which is pref-

erably made in two sections designated as 31 and 32.

The plunger sections 31 and 32 are reciprocably mounted within a tube 33 one end of which is threadedly mounted as at 34 in the heat regulator housing A while its other end threadedly receives one leg 35 of an L fitting.

The L fitting comprises the leg 35 before mentioned and a leg 36 which threadedly receives as at 37 one end of the shaft 38 which carries at the front of the range the temperature setting handle or knob 17.

Having reference now to Figure 4 which most clearly illustrates the construction of the L-shaped fitting, it will be seen that centrally it is provided with a bore 39 within which is positioned a roller 40. This bore constitutes a chamber for the roller and the dimension of the chamber is adjustable through the medium of oppositely disposed cap screws 41 and 42 which form the top and bottom respectively of the chamber and through the medium of a cap screw 43 carried in the side wall of the fitting and disposed at an angle to the openings of the legs 35 and 36 of the fitting. This plug 43 at its inner end is provided with a case hardened tip 44.

Having reference now to Figure 1 of the drawing it will be seen that the plunger portion 32 is positioned partly within the tube 33 and partly within the leg 35 of the L fitting. This plunger has a case hardened wheel cap or tip 45 which engages the roller 40 while the extreme inner end of the regulator shaft 38 is provided with a case hardened tip 46 which engages the roller at right angles to the engagement of the roller by the plunger 32.

From the structure thus far described it will be seen that as the shaft 38 is rotated by the knob 17 reciprocation is imparted to the plunger 31—32 through the instrumentality of the roller 40 with the result that the lever 27 is moved. The thermostat core 25 is unyielding so that the movement imparted to the lever 27 causes its lower end 28 which is in engagement with the valve stem to move the valve off of its seat against the tension of the coil spring 20. Thus by rotation of the handle or knob 17 the valve is set to maintain any predetermined degree of temperature within the range oven, as is well understood by those skilled in the art.

The cap screws 41 and 42 constitute adjusting plugs by means of which the roller 10 can be properly positioned and confined within its chamber 39 so far as vertical movement of the roller is concerned. The cap screw 43 constitutes an adjusting plug by means of which the roller 40 can be properly positioned in its chamber in respect to the end of the shaft 38 and the end of the plunger 31—32. All automatic heat controls must be initially set so that they are accurate in maintaining within the oven the temperature predetermined by the setting of the regulator handles and it is by means of this adjusting plug 43 that the initial setting of the present device is accomplished. This plug provides an easy and rapid means by which the regulator can be adjusted in the event of wear or in the event adjustability is found necessary through continued and long use of the device.

The drawing illustrates the fuel controlling valve positioned remote from and at right angles to the shaft of the regulating wheel or knob and in many stoves as constructed today the valve of the heat control and the setting wheel of the regulator are so positioned in respect to one another. When the parts are so positioned a problem is presented to provide a connecting operating mechanism which is of simple, cheap yet durable construction. The problem of the provision of such an operating connection is solved by the present invention.

The roller 40 which like the parts it contacts is case hardened and as a consequence will be very durable in use. The parts which the roller engage are case hardened and consequently continued use of the device will result in practically no discernible wear of the parts. Heretofore in devices of this character where power and motion have been transmitted from one plane to another plane of different angularity by means of gears, bell cranks or the like all of which have been objectionable due to lost motion and excessive friction, all of which disadvantages are obviated by the present construction.

The present device is extremely compact, simple both of construction and in operation, productive of the least possible friction in operation and highly efficient in operation. In operation the roller 40 bears against the tip 44 of the adjusting plug 43 which is arranged at a forty-five degree angle and there is as a consequence little friction.

In constructing the present device the tube 33 and the plunger 31—32 should be made of a material having the same co-efficient of heat expansion to insure against oven temperature irregularity due to unequal expansion of these parts when subjected to such heat as is present in the chamber 6 due to its proximity to the oven or due possibly to its proximity to the cooking top burners of the range. To guard further against friction which is objectionable the plunger 31—32 is provided with a series of oil grooves 50 and the bore within the tube 30 is enlarged as at 51 throughout a portion of its length to reduce the frictional engagement between the plunger 31—32 and the tube.

The plunger 31—32 is made in two parts to insure alignment. The tube 33 and the plunger parts 31—32 can be altered as to length to meet the particular requirements of any range.

I claim:

1. In a gas stove, an oven having a burner therein, a fuel line to said burner, a housing in said fuel line, a valve in said housing, a thermostat extending into said oven, a lever operatively connecting the thermostat and the valve, a tube carried by said housing, a shaft reciprocable within said tube and having operative connection with said valve operating lever, an angular fitting carried by said tube, a roller within said fitting, an end of said tube shaft extending into said fitting for engagement with said roller, a setting handle provided with a shaft extending at an angle to said tube shaft and having an end rotatable within said angular fitting, the end of said adjusting shaft adapted to contact said roller, and a member in said fitting extending at an oblique angle to the said shafts for engaging said roller and holding it in contact with the adjacent separated ends of both of the aforementioned shafts, for the purpose described.

2. In a stove, an oven and a heating burner therefor, a fuel line to said burner, a thermostat in the oven, a valve in the fuel line, operative connection between the thermostat and the valve, a setting handle having an extending shaft, a second shaft arranged at right angles to the first shaft and having operative connection with the aforementioned valve, an L-shaped fitting having a centrally arranged chamber, one end of

the setting shaft rotatable within said fitting, one end of said second shaft reciprocable within said fitting, a roller in said fitting chamber intermediate the ends of said shafts, a screw plug in said fitting arranged at a forty-five degree angle to said shafts, and said screw plug having an end extending into said fitting chamber and holding said roller in operative engagement with the ends of said shafts, for the purpose described.

3. A construction such as defined in claim 2, wherein the fitting is provided with screw plugs positioned at the opposite ends of said roller for properly positioning the roller in respect to the axis of said shafts.

4. In a heat regulator, a fuel supply, control means in said fuel supply, a thermally sensitive element operatively engaging said control means, a selecting device, motion transmitting means interconnecting said selecting device and said fuel control means, said motion transmitting means comprising a pair of shafts arranged at an angle to one another, a fitting enclosing the adjacent ends of said shafts, a roller in said fitting positioned between and having engagement with the adjacent shaft ends, and a member adjustably mounted within said fitting and having a surface arranged at an oblique angle to the ends of both of said shafts and holding said roller in engagement with the adjacent ends of said shafts.

5. In a heat regulator, a fuel supply, control means in said fuel supply, a thermally sensitive element operatively engaging said control means, a selecting device, motion transmitting means interconnecting said selecting device and said fuel control means, said motion transmitting means comprising a pair of shafts arranged at an angle to one another, a fitting enclosing the adjacent ends of said shafts, a roller in said fitting positioned between and having engagement with the adjacent shaft ends, and an adjustable member within said fitting and having a face engaging said roller and holding it in engagement with the adjacent ends of said shafts.

6. A construction such as defined in claim 5, wherein the adjustable member which engages the side of the roller has its roller engaging portion arranged at an oblique angle to both of said shafts.

7. In a gas stove, an oven having a burner therein, a fuel line to said burner, a valve in said fuel line, a thermally sensitive element in said oven, means operatively connecting the thermally sensitive element and the valve, a reciprocable shaft engaging said means, a temperature selecting handle provided with a shaft extending at an angle to said first mentioned shaft, an angular fitting for the adjacent ends of said shafts, a round element in said fitting and positioned between and adapted to have its rounded portion engage the adjacent ends of said shafts, and a member within said fitting having a surface arranged at an oblique angle to the adjacent ends of said shafts and engaging the rounded portion of said round element for holding the element in contact with the aforementioned adjacent shaft ends, for the purpose described.

8. In a stove, an oven and a heating burner therefor, a fuel line to said burner, a thermostat in the oven, a valve in the fuel line, operative connection between the thermostat and the valve, a setting handle having an extending shaft, a second shaft arranged at right angles to the first shaft and having operative connection with the aforementioned valve, an L-shaped fitting having a centrally arranged chamber, one end of the setting shaft movable within said fitting, one end of the second shaft also movable within said fitting, a roller in said fitting chamber intermediate the ends of said shafts, an adjustable member in said fitting and having a face portion arranged at a forty-five degree angle to said shafts, and said face portion of said member adapted to engage said roller and hold the same in operative engagement with the ends of said shafts, for the purpose described.

9. A construction such as defined in claim 8, wherein the fitting is also provided with adjustable members positioned at the opposite ends of said roller for properly positioning the roller in respect to the axis of the shafts.

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