Nov. 2, 1954 F. DIBERT 2,693,318

AUTOMATIC TEMPERATURE CONTROL

Filed May 24, 1950 2 Sheets-Sheet 1

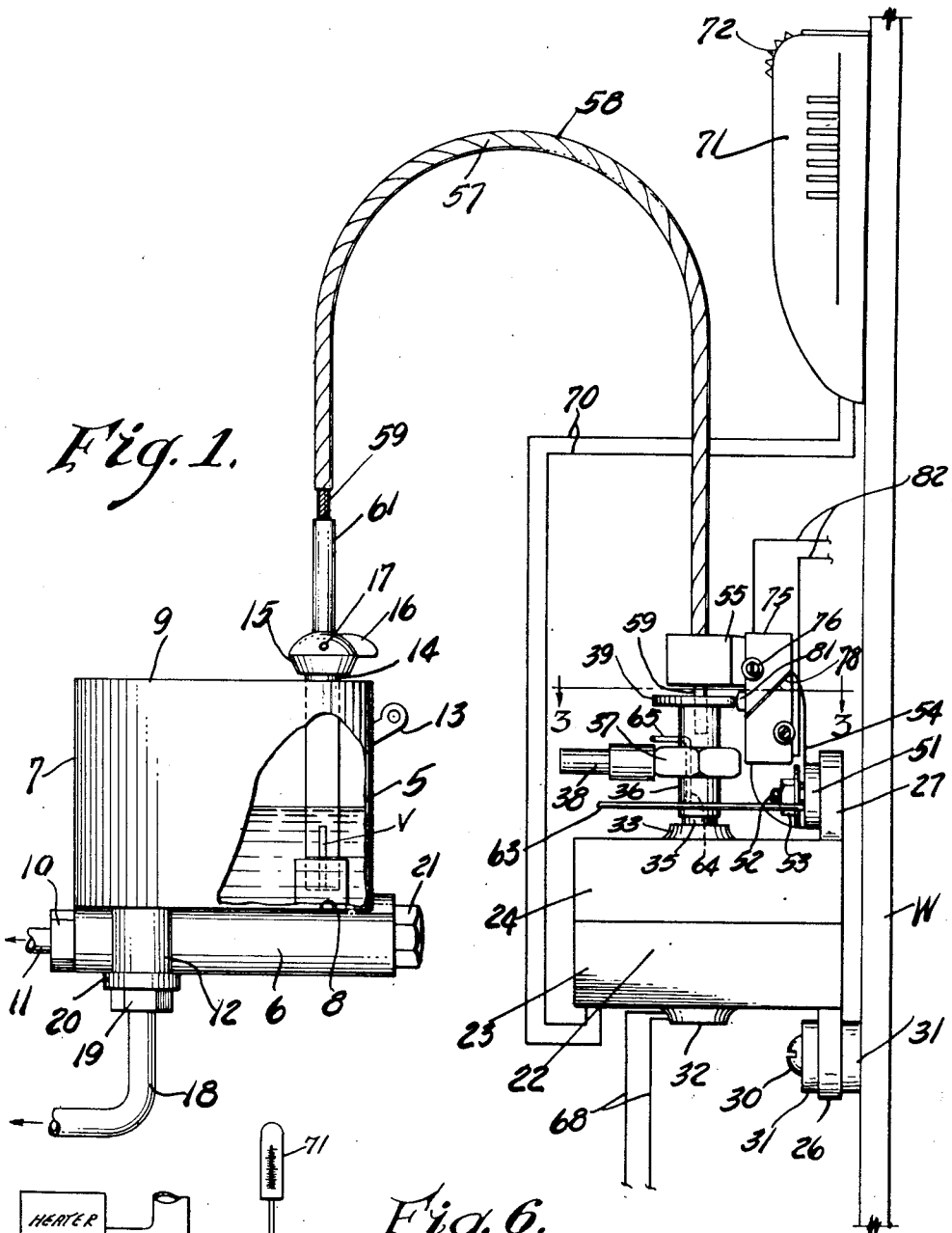


Fig. 1.

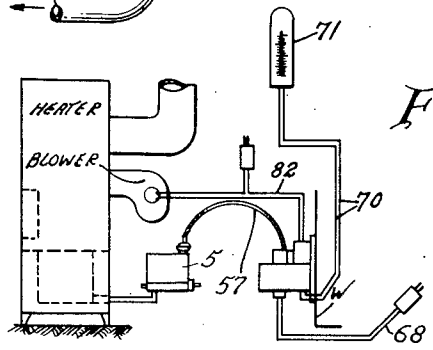


Fig. 6.

INVENTOR.
Fred Dibert.
BY
Frank C. Farman.
ATTORNEY

Nov. 2, 1954 F. DIBERT 2,693,318

AUTOMATIC TEMPERATURE CONTROL

Filed May 24, 1950 2 Sheets-Sheet 2

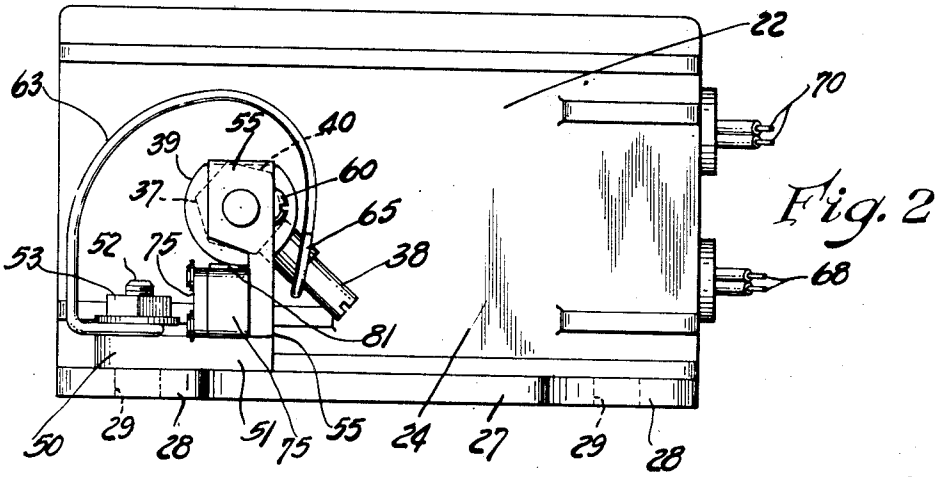


Fig. 2

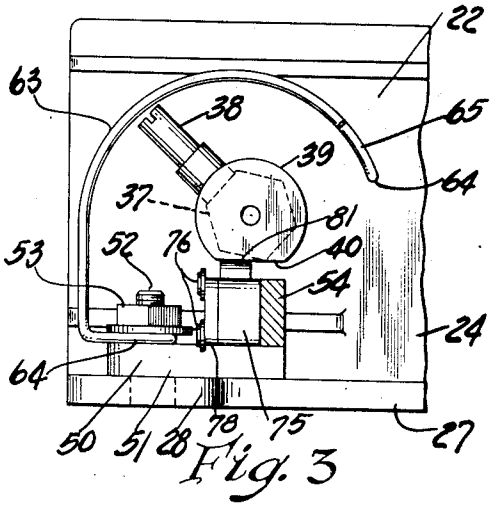


Fig. 3

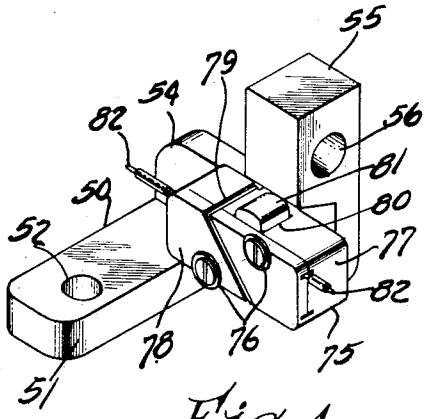


Fig. 4

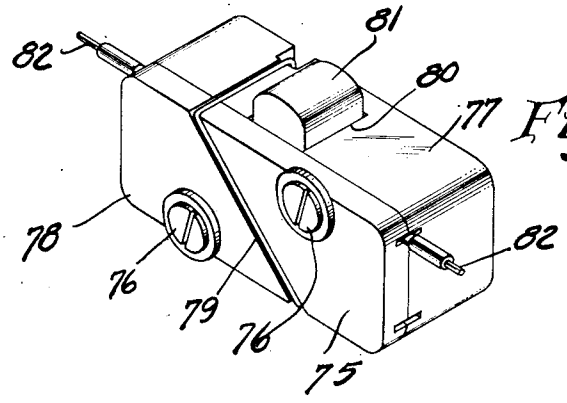


Fig. 5

INVENTOR.
Fred Dibert.
BY
Frank C. Earman.
ATTORNEY

United States Patent Office 2,693,318 Patented Nov. 2, 1954

2,693,318

AUTOMATIC TEMPERATURE CONTROL

Fred Dibert, Flint, Mich.

Application May 24, 1950, Serial No. 164,003

15 Claims. (Cl. 236—11)

The present invention relates to improvements in remote control appartus for controlling the flow of gases and liquids along a liquid flow path, and more particularly to a remote control assembly for controlling a gravity feed pot type burner for space heating systems and the like.

One object is to provide a remote control assembly which can be conveniently installed and connected to a control motor for actuating the metering valve of a pot type gravity feed oil burner such that the electric controls for the motor, as well as the motor itself, are located remote from the flow chamber of the burner to insure against explosions and the like through ignition of the fuel oil by electrical sparks and arcing of the electrical controls and equipment.

Another object is to provide a remote control assembly for pot type gravity feed oil burners, which includes a bracket adapted to be quickly and easily attached to the base of an electric motor to form a bearing for a flexible control shaft and to support a switch for controlling the blower or fan apparatus of the furnace in which the pot type burner is located.

Another object is to provide a remote control assembly for pot type gravity feed oil burners, including a bracket unit which is adapted to support a spring or yielding element arranged to rotate the armature and control shafts in a counter-clockwise direction upon current failure to cut off the burner or reduce the flame from high to low. It being understood, that in burners of this type the low flame in effect constitutes a pilot.

Another object is to provide a remote control assembly for pot type gravity feed oil burners and the like, having a flexible shaft unit the free end of which is adapted to be quickly and conveniently attached to the metering valve of the constant level burner carburetor or float chamber. In order to connect the flexible shaft the pin is removed from the metering valve fingerpiece and the reduced end of the flexible shaft is inserted and secured in place by a similar pin.

Another object is to provide a remote control assembly which can be conveniently installed, and includes a thermostatic control member in circuit with the electric control motor to thus render the operation of the oil burner completely automatic, and will operate the metering valve when the space being heated calls for heat so as to open the same and permit a greater flow of burner fuel to the burner. After a pre-determined temperature has been reached in the space being heated, the thermostat opens the circuit and energizes the motor to rotate the same in a direction to operate the metering valve and decrease the flow of fuel to the burner to its so-called low burner flame.

Other objects and advantages of the invention will become apparent during the course of the following description of the acompanying drawings, wherein:

Figure 1 is a side elevational view of the remote control assembly illustrating the manner in which the electric control motor is drivingly connected to the metering valve of a constant level float chamber interposed between the fuel supply and a pot type gravity feed oil burner, one wall being broken away to show the control valve. The control thermostat is likewise shown in side elevation and wiring connecting the same to the electric control motor is shown diagrammatically.

Figure 2 is a top elevational view of the electric control motor illustrating the bracket unit of the remote control assembly bolted in place on the base of the motor, and

showing the manner in which the control shaft is biased in one direction of rotation by means of a yielding torque spring.

Figure 3 is a similar view to Figure 2, and illustrates the control shaft in another position, wherein the blower control switch is open to de-energize the blower motor of the pot type gravity feed oil burner heating system.

Figure 4 is a perspective view of the bracket unit illustrating the manner in which the blower control switch is secured to an offset portion thereof so that the switch button will be engaged by an actuator cam on the motor control shaft when the motor control shaft is operated in a direction of angular displacement as shown in Figure 2, and

Figure 5 is a perspective view of the switch unit showing the same detached from the supporting bracket, and illustrating the construction thereof.

Fig. 6 is a diagrammatic view showing a conventional heater with pot-type gravity feed burner etc.

In the drawings, and more in detail, attention is directed to Figure 1, wherein the invention is illustrated for the purpose of convenience as applied to a space heater for dwellings and buildings having a warm air furnace provided with a gravity feed pot type oil burner, indicated by name. It is to be understood, that the invention can be applied to various temperature control systems and is primarily intended to convert a conventional manually controlled heating system employing a pot type gravity feed oil burner to one which is completely automatic. In conventional types of gravity feed pot type oil burners a constant level float chamber generally designated **5** is interposed between the fuel tank and the burner to control the flow of fuel oil thereto. The constant level float tank **5** is ovate in elevation and has formed or secured to the bottom wall a diametral tube **6** which extends along the major axis of the ovate float chamber **5**. The side walls of the float chamber as at **7** extend vertically from the bottom wall **8**, and connect with an upper wall **9**. One end of the tubular enlargement or pipe **6** which extends along the major axis of the bottom wall **8** is internally threaded for receiving a correspondingly threaded nipple **10** which forms a coupling for a pipe **11**, which is adapted to be connected to an elevated fuel tank so that the fuel oil will flow by gravity to the carburetor or constant level float tank **5**. Suitable passageways (not shown) are formed in the tubular enlargement **6** to permit the fuel to flow by gravity into the constant level tank **5** through an orifice which is controlled by a float valve (not shown). Also formed in the tubular enlargement is a discharge duct having a discharge orifice leading from the tank **5** to a tubular portion **12** of the pipe **6**, and the discharge orifice is controlled by means of a manually operated lever **13** which is connected to a manual operator such as a flexible chain or cord. In addition, the discharge orifice is further controlled by a valve V having a valve shaft **14** threaded in the top wall **9** and arranged such that the flow of fuel from the constant level tank **5** can be adjusted. A control knob **15** is secured to the upper end of the shaft **14**, and said control knob is provided with a transverse kerf or slot in which is normally anchored a fingerpiece **16** by means of a transverse pin **17**. Liquid fuel from the tank **5** is controlled to the burner through a pipe **18**, which is provided with an external threaded nipple **19** adapted to be received in a correspondingly threaded bore in the annular boss **20** of the enlarged portion **12**. The pipe **18** is connected to a gravity type oil burner (not shown). One end of the tubular enlargement **6** is provided with a clean-out opening adapted to be closed by a plug **21**.

The above structure is typical of a constant level float chamber employed for feeding fuel oil to pot type gravity feed oil burners, and the invention consists in providing an automatic control therefor by means of a reversing motor generally designated **22** similar to a split-phase type motor having two or more field windings, one of which is constantly energized to rotate the armature shaft in one direction until it engages limit stop pins, after which closing of a secondary circuit including auxiliary and relay coils energizes another field coil to rotate the armature shaft in a reverse direction until the shaft is stopped

by a spring biased load. The motor is of the general type as shown in the Gille Patent 2,032,658, March 3, 1936, in that the spring biased armature shaft limits rotation thereof in one direction.

The motor 22 includes a motor housing or casing comprising sections 23 and 24 which are rectangular and are bolted together as usual. Opposed flanges 26 and 27 on the sections 23 and 24 provide a base having enlarged portions 28 in the form of lugs having apertures 29 for receiving hold-down bolts or the like. As shown in Figure 1, hold down bolts or machine screws 30 are passed through the lugs and are anchored in a wall W to secure the motor 22 in a position with the armature shaft extending vertically. Resilient washers 31 may be arranged on opposite sides of the lugs 28 to yieldingly support the motor 22 and prevent undue vibration.

Formed on each of the casing sections 23 and 24 of the electric motor 22 are bearing bosses 32 and 33 for receiving an armature shaft 35. The armature shaft is fitted with a sleeve 36 held in place by set screws or the like (not shown) and formed on the sleeve is a collar 37 having an internally threaded radial bore for receiving the reduced externally threaded portion of an arm 38 (Figs. 1, 2 and 3). The other end of the sleeve 36 is provided with a cam disc 39 having a flattened portion 40 for controlling an electric switch which will be hereinafter later described.

Secured to one of the lugs 28 of the flange 27 of the motor casing section 24 is a bracket generally designated 50 which includes an arm 51 having an opening 52 adjacent one end for receiving an anchoring bolt 52 which is held in place by a retaining nut 53. The bracket 50 is provided with an angular portion 54 (Fig. 4) which terminates in an arm 55 extending in a direction transverse to the armature shaft 35. Formed in the laterally extending arm 55 is a bore 56 which is axially alined with the armature shaft 35 and is adapted to receive one end of a flexible shaft 57 (Fig. 1). The flexible shaft 57 is of the Hotchkiss type, and includes an outer sheath or casing 58 in which is rotatably mounted a steel core 59 formed of a plurality of intertwisted wire cables. The sheath 58 is rigidly anchored in the opening 56 by means of a set screw 60 (Fig. 2) so that the core of the flexible shaft 59 will extend into an opening 60 in the opposite end of the sleeve 36, where it is rigidly secured in place by means of a set screw (not shown).

The free end of the flexible shaft 59 is provided with a tubular fitting 61 which is soldered or otherwise affixed to the core 59, and said fitting has a reduced lower end which is adapted to be received in the kerf of the control knob 15 and held in place by the pin 17 when the conventional fingerpiece 16 has been removed. In order to remove the fingerpiece 16 a punch or the like can be employed to drive the pin 16 out of the opening so that the lower end of the fitting 61 can be inserted in the kerf in the control knob 15 and the pin replaced to anchor said fitting in position. Thus, it will be seen that when the armature shaft 35 is rotated clockwise the control knob 15 will rotate counterclockwise, and similarly when the armature shaft is rotated counterclockwise the control knob 15 will rotate clockwise.

A circular spring 63 partially encircles the sleeve 36 and has one end provided with a loop 64 for receiving the anchoring bolt 52 which is adapted to hold the bracket 50 in place. The free end of the spring is bent vertically as at 64 and terminates in a hook-shaped arm portion 65. The vertical bent portion 64 is thus arranged in the path of the radial arm 38 such that upon clockwise rotation of the armature shaft 35, said arm will engage the vertical portion 64 of the circular spring 63 and place the armature shaft under a spring biased load. Suitable adjusting screws are provided in the collar 37 (not shown) to securely anchor the collar 37 and the radial arm 38 in any desired position of angular adjustment on the sleeve 36.

Returning to the motor 22, electrical cables 68 are connected to the motor and are adapted to be connected to a suitable source of electrical energy such as the 110 volt alternating current supply generally employed in dwellings and the like. When the electrical conductors 68 are connected to a source of electrical energy, one or more of the field windings in the motor are energized to rotate the armature shaft 35 in a counterclockwise direction until stop pins located inside of the motor casing sections 23 and 24 limit such rotation. Thus, certain of the field windings of the motor are constantly energized to maintain the stop pins in contact. In this position of the armature shaft the control knob 15 will be in a position in which the discharge valve of the constant level tank 5 is partially closed and permits a small amount of fuel oil to flow to the pot type burner of the heating system to maintain a low or pilot flame.

Also extending into the motor and connected to auxiliary relay and field windings (not shown) is a pair of electrical conductors 70, which are electrically connected to the contacts of a thermostatic switch 71 of conventional form. The thermostat 71 includes a bi-metallic member or spring arm which flexes in a direction to close the contact when the temperature in the space or dwelling being heated drops. Thus, when the temperature drops the contacts of the swtich element (not shown) in the thermostat 1 close the auxiliary circuit through the electrical conductors 70 to energize the auxiliary and relay field windings in the motor 22 such that the magnetic force will overcome the pull exerted by the constantly energized field windings, and will cause the armature shaft 35 to rotate in a clockwise direction. When the armature shaft is thus rotated through an arc of approximately 300 degrees of angular displacement, the flexible shaft 59, fitting 61 and knob 15 will be rotated in a counterclockwise direction to move the valve on the lower end of the valve stem 14 to an open position so that the burner will maintain a high flame until the temperature within the space being heated such as a building or the like, or dwelling is elevated to the pre-set temperature indicated by a setting knob 72 on the thermostat 71. When the pre-determined temperature has been reached, the switch contacts of the thermostat separate and thereby open the auxiliary circuit through the electrical conductors 70 and through the auxiliary relay and field windings in the motor 22. Thus, the constantly energized field windings will rotate the armature shaft 35 in a counterclockwise direction and will rotate the control knob 15 and coupling fitting 61 clockwise and thereby again partially close the valve on the lower end of the control shaft 14 so as to reduce the flow of fuel oil to the burner to its low or pilot flame position. When the armature shaft 35 is rotated clockwise as above explained, the radial arm 38 will engage the straight portion 64 of the circular spring 63 and thereby place the arm under a load. Thus, by adjusting the spring 64 and the arm 38 the angular displacement of the armature shaft 35 in a clockwise direction can be controlled, so that the control knob 15 on the constant level float chamber 5 may be rotated various distances. By rotating the control knob 15, various angular distances in a counterclockwise direction, it will readily be seen that the control valve on the valve stem 14 will be opened correspondingly. Also, it is to be noted that when the armature shaft 35 has been stopped in its rotation in a clockwise direction by the arm 38 engaging the spring 64, said shaft and arm will be held in this position as long as the switch contacts in the thermostat 71 are closed, and as previously described, opening of the thermostatic contacts permits the constantly energized field windings of the motor to rotate the armature shaft 35 and arm 38 in a counter-clockwise direction until the stop pins (not shown) located within the motor casing 22 engage.

After the control assembly has been attached to the wall and the flexible cable 57 connected to the metering valve control knob 15, the manual operating lever 13 is set in a position in which its operating mechanism is neutral and has no effect upon the fluid fuel flow from the constant level float chamber 5 to the pot type gravity feed oil burner.

It is to be understood, that the metering valve shaft 14 is provided with external right hand threads received in a correspondingly threaded opening in the top wall 9 of the constant level float chamber 5 such that rotation of the metering valve knob 15 in a clockwise direction will move the valve (not shown) in a direction toward its closed position, while rotation in a counterclockwise direction will move the valve to its open position.

Mounted on the bracket 50 is an electric switch generally designated 75 which is bolted to the offset portion 54 of the bracket 50 by means of machine screws or the like 76. The electric switch 75 includes a base 77 having a cover 78 held in position by means of a resilient clamping band 79. The base 77 is provided with an opening 80 through which projects a switch

button 81 of a push-button type switch and said switch 75 is adapted to be connected in series with a source of electrical energy and the fan or blower apparatus and motor of an air circulating system used in cooperation with the furnace in which the pot type gravity feed oil burner is located. The switch 75 is arranged so that the push-button 81 is in the path of the cam disc 39 affixed to the sleeve 36 and normally, the flattened portion 40 of the cam disc 39 is presented to the push-button 81. As shown in Figure 3, the other elements of the assembly are in a position in which the pot type burner is operating on the low or pilot flame, with the metering valve control knob 15 in a position in which the valve is partially closed.

In this position the circuit through the switch 75 and through the electrical cables 82 is broken, and the fan or blower motor (not shown) connected in the circuit of the electrical cables 82 is broken. However, when the thermostatic element in the thermostat 71 flexes from a drop in temperature in the space being heated to cause the contacts of the thermostatic switch to close and energize the auxiliary relay and field windings of the motor 22, the armature shaft 35 and cam disc 39 will rotate clockwise to position the circular peripheral portion of the cam 39 in engagement with the push-button 81, and thereby depress said button to close the circuit through the electrical conductors 82, fan or blower motor in circuit therewith and in circuit with the source of electrical energy. Thus, the fan or blower motor of the system will be energized during the period of burner operation, and when the burner flame is in its high position. When the temperature in the space being heated reaches the pre-determined setting of the thermostat 71, the contacts therein will open by reason of the flexing of the bi-metallic strip in a reverse direction to thereby interrupt the circuit through the electrical conductors 70 and de-energize the auxiliary relay and field coils in the motor 22. When this occurs, the normal field coils rotate the armature shaft 35 in a counterclockwise direction, thereby moving the metering valve control knob 15 in a clockwise direction to partially close the fuel valve, and when the pins within the motor 22 engage to limit counterclockwise rotation of the armature shaft 35 the flat portion 40 of the cam disc 39 will be brought into a position opposite the push-button 81, and thereby permit said button to move outwardly and interrupt the fan or blower motor circuit.

Once the remote control assembly is installed and connected to the conventional pot type gravity feed fuel burner by the flexible Hotchkiss cable 57, it will operate continuously and automatically to maintain the temperature within a dwelling, building or space being heated substantially constant.

It is to be understood, that the form of the invention herewith shown and described is to be taken as a preferred embodiment, and that various changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

I claim:

1. In a temperature control apparatus having a rotatable valve for controlling liquid and gaseous flow along a flow path, a reversing motor located remotely from the armature shaft of said motor to said valve, a circuit said valve, a flexible drive shaft drivingly connecting including a source of electrical energy for constantly energizing said motor to normally urge said shaft in one direction of rotation and maintain said valve in its most closed position, and an auxiliary circuit including thermostat means responsive to temperature changes to oppose and overcome the force created by the first circuit and drive the armature shaft in the opposite direction to open said valve.

2. In a temperature control apparatus having a rotatable valve for regulating the flow of liquids and gases along a flow path, an electric motor located remote from said valve, a flexible drive shaft drivingly connecting the armature shaft of said motor to the control shaft of said valve, manually adjustable thermostatic control means including a switch responsive to temperature variations in the room to be heated with relation to the setting of the thermostatic control in circuit with said motor and a source of electrical energy for operating said motor in reverse directions to open and close said valve.

3. In a temperature control apparatus having a rotatable valve for regulating liquid and gaseous flow along a flow path, a reversing electric motor located remote from said valve and having an armature shaft, a sleeve located on said armature shaft, a bracket attached to the motor having a portion thereof extending transversely with relation to the axis of the armature shaft, a flexible drive shaft having an outer sheath and a rotatable core for drivingly connecting said motor to said valve, having an opening in said bracket in axial alignment with said armature shaft for receiving and anchoring said sheath, said sleeve receiving the flexible core of said shaft, means for connecting the core of said shaft to rotate with said armature shaft means for detachably connecting the opposite end of said core to the control valve, and thermostat means responsive to temperature changes in the room to be heated in circuit with said motor and a source of electrical energy to operate said motor and thereby said valve in opposite directions.

4. In a temperature remote control assembly for liquid fuel burners of the gravity feed pot type having a rotatable valve for controlling the flow of fuel oil from a source of supply to said burner, a reversing electrical motor remotely located from said valve, a flexible drive shaft drivingly connecting the armature shaft of said motor to the control shaft of said valve, an electrical circuit including a source of electrical energy for said motor for constantly energizing said motor and maintaining said valve in its most closed position and thermostatic control means for reversing said motor in opposition to the force of said circuit to open said valve.

5. In a temperature remote control assembly for pot type gravity feed oil burners having a constant level float chamber provided with a rotatable control valve, an electric reversing motor located remote from said float chamber, a sleeve mounted on the armature shaft of said motor, a bracket attached to the motor casing having an offset arm provided with an opening in axially alined relation with an opening in said sleeve, a flexible drive shaft having an outer sheath received and anchored in the opening of said offset arm, said flexible shaft being arranged with its core anchored in the bore of said sleeve, a coupling fitting on the free end of said flexible shaft core for being removably attached to the control knob of said valve, an electrical circuit including a source of electrical energy for said motor for constantly energizing said motor and maintaining said valve in its most closed position, and thermostat control means for reversing said motor in opposition to the force of said circuit to open said valve.

6. In a remote control assembly for pot type gravity feed oil burners having a constant level float chamber and a rotatable control valve, an electric reversing motor located remote from said chamber, a sleeve adjustably mounted on the armature shaft of said motor, a bracket attached to the motor frame having an offset arm provided with an opening in axial alinement with an opening in said sleeve, a flexible drive shaft having an outer sheath anchored in the opening with its flexible core received and anchored in the opening in said sleeve, a coupling on the free end of the core of said flexible shaft removably attached to one end of the rotatable control valve, a radially extending arm on said sleeve, a circular spring attached to the motor casing and adapted to be engaged by said arm to place the armature shaft under a spring biased load when operating in a direction to open said valve and a control circuit for said motor including a source of electrical energy and a thermostatic control switch.

7. A remote control assembly for pot type gravity feed oil burners having a constant level float chamber provided with a rotatable control valve with a control knob on the upper end, an electric reversing motor located remote from said float chamber, a sleeve mounted on the armature shaft of said motor, a bracket attached to the motor frame having an offset arm provided with an axially alined opening in registry with the opening in said sleeve, a flexible drive shaft having its outer sheath anchored in the opening in the arm and its flexible core anchored in the opening in the sleeve, a coupling on the free end of said flexible shaft adapted to be detachably connected to the control knob of said valve, yielding means for biasing the armature shaft during rotation thereof to open the valve and a control circuit for

said motor, including a source of electrical energy and a thermostatic control switch.

8. In a remote control assembly for liquid fuel heating systems having a pot type gravity feed oil burner, an air circulating blower motor assembly, and a valve for controlling the flow of fuel oil to said burner having a control knob, an electric motor located remote from said valve, a sleeve mounted on the armature shaft of said motor, a bracket attached to the motor having an offset arm provided with an opening alined with the opening in said sleeve, a flexible shaft having its sheath anchored in the arm of said bracket and its core anchored in the opening in said sleeve, a coupling member on the free end of said flexible shaft adapted to be attached to the control knob of said valve by a pin connection, a push-button switch for the blower assembly affixed to said bracket having its push-button presented to said sleeve, an actuating cam on said sleeve for engaging and operating said push-button, a source of electrical energy and circuit for said switch and the motor of said blower assembly, a circuit for the first-named motor including a source of electrical energy, and a thermostatic switch in series with said circuit for controlling the operation of said motor.

9. In a remote control for pot type gravity feed oil burners having a constant level float chamber provided with a rotatable control valve and a motor blower unit, an electric reversing motor located remote from said float chamber, a sleeve on the armature shaft of said motor, a flexible shaft drivingly connecting said sleeve to the rotatable control valve, an electric switch supported by the motor, an electric circuit for said switch and blower motor including a source of electrical energy, a cam mounted on said sleeve for actuating said switch and a circuit for the valve control motor including a source of electrical energy and a thermostatic control switch.

10. In a remote control for space heaters having a pot type gravity feed oil burner provided with a constant level float chamber having a rotatable control valve and a motor blower unit for circulating air in said furnace and heater, an electric reversing motor located remote from said float chamber, a sleeve adjustably mounted on the armature shaft of said motor, a bracket adapted to be bolted to the frame of said motor having an offset arm provided with an opening in axial alinement with the opening in said sleeve, a flexible shaft having its sheath anchored in the opening in said arm and its flexible core anchored in the opening in said sleeve, a coupling on the free end of said flexible shaft core adapted to be detachably connected to the control valve of said float chamber, a circuit including a source of electrical energy for said motor, a thermostatic control switch in said circuit for causing the motor to rotate clockwise and counterclockwise in response to temperature variations, an electric switch mounted on said bracket having a push-button, a cam disc on said sleeve engageable with said push-button, a circuit including a source of electrical energy for said switch and the motor of the motor blower unit, an arm adjustably affixed to said sleeve and a circular spring having one end attached to the motor frame and its opposite end shaped to provide a stop for yieldingly limiting rotational movement of said arm in a direction to close said valve and yieldingly biasing said arm for movement in a counter-clockwise direction upon failure of the source of electrical energy in the circuit for said remote control motor.

11. In a temperature control apparatus having a rotatable valve for regulating the flow of liquids and gases along a flow path, an electric motor located remote from said valve, a flexible drive shaft drivingly connecting the armature shaft of said motor to the control shaft of said valve, manually adjustable thermostatic control means including a switch responsive to temperature variations in the room to be heated with relation to the set of the thermostatic control, in circuit with said motor and a source of electrical energy for operating said motor in reverse directions to open and close said valve, and spring means opposing the travel of the armature shaft in a direction to open the valve to return the shaft and valve to its most closed position on failure of the electric current.

12. In a remote control assembly for pot type gravity feed oil burners having a constant level float chamber and a rotatable control valve, an electric reversing motor located remote from said chamber, a flexible drive shaft connected to the armature shaft of said motor and to the control valve, a control circuit for said motor including a source of electrical energy and a thermostatic control means to drive said motor in opposite directions responsive to temperature changes in the room to be heated and actuate said valve to its open or most closed position, a radially extending arm on said armature shaft, and a circular spring on the motor casing positioned to be engaged by said arm to place the armature shaft under a spring-biased load when said shaft is operating in a direction to open said valve.

13. In a remote control assembly for pot type gravity feed oil burners having a constant level float chamber and a rotatable control valve, an electric reversing motor located remote from said chamber, a flexible drive shaft connected to the armature shaft of said motor and to the control valve, a closed circuit including a source of electrical energy for constantly energizing said motor to urge said shaft in one direction of rotation and maintain said valve in its most closed position, and an auxiliary circuit including thermostat means responsive to temperature changes in the heated space to oppose and overcome the forces created by the first circuit and drive the armature in the opposite direction to open said valve, a radially extending arm on said armature shaft, and a circular spring on the motor casing positioned to be engaged by said arm to place the armature shaft under a spring-biased load when said shaft is operating in a direction to open said valve.

14. In a remote control for pot type gravity feed oil burners having a constant level float chamber provided with a rotatable control valve and a motor blower unit, an electric reversing motor including an armature shaft located remote from said float chamber, a flexible shaft drivingly connecting said armature shaft to the rotatable control valve, an electric switch for actuating the blower unit supported by the motor, an electric circuit for said switch and blower motor including a source of electrical energy, a cam on said armature shaft for actuating said blower unit switch, an electrical circuit including a source of electrical energy for said motor for constantly energizing said motor and maintaining said valve in its most closed position, and thermostatic control means for reversing said motor in opposition to the force created by said circuit to open said valve.

15. The combination defined in claim 14 in which spring means is provided to oppose the travel of the armature shaft in a direction to open the valve to return the shaft and valve to its most closed position on failure of the electric current.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,349,954	Hartford	Aug. 17, 1920
1,979,340	Norman	Nov. 6, 1934
1,997,604	Stewart	Apr. 16, 1935
2,020,168	Williams	Nov. 5, 1935
2,155,233	Mantz	Apr. 18, 1939
2,249,844	Martin	July 22, 1941
2,313,554	Jones	Mar. 9, 1943
2,363,696	Russel	Nov. 28, 1944
2,368,457	Eisenbeis	Jan. 30, 1945