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GAS BURNER CONTROL MECHANISM

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Fig. 1.

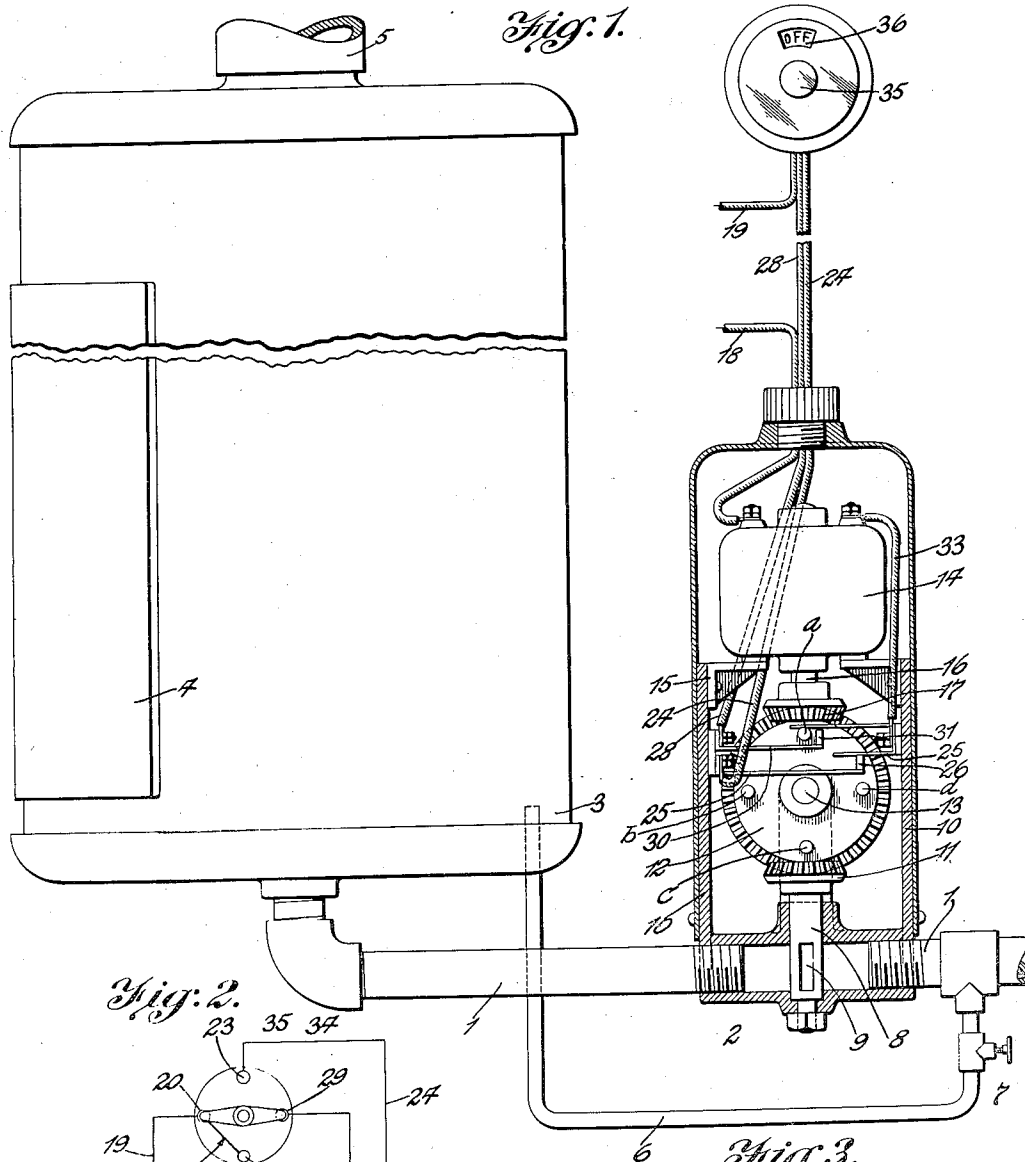


Fig. 2.

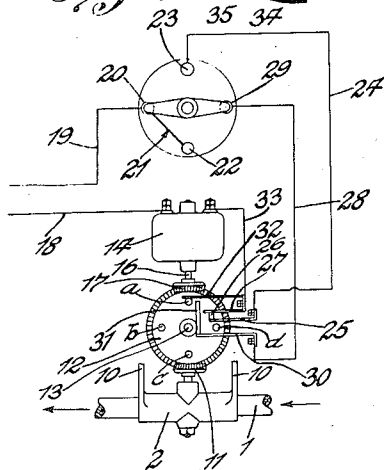
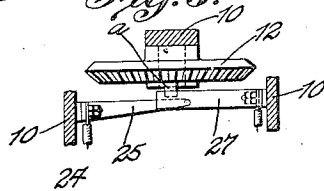


Fig. 3.



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GAS-BURNER-CONTROL MECHANISM.

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This invention relates to gas burner control mechanism.

An object of the invention is to provide a control mechanism for a gas burner comprising a valve for controlling the passage of gas to the burner, a motor operatively connected with the valve, and means located at any selected point with respect to the motor for causing the motor to operate to open and to close the valve, as desired.

Another object of the invention is to provide an apparatus of the character and embodying the subject matter mentioned, comprising switches under control of the driving connections by which the motor operates the valve for opening the electric circuit controlling the motor so that the valve may be selectively operated by the motor to open and to closed positions and maintained in such positions by said connections until the motor is again operated.

Other objects of the invention will appear from the following description, reference being made to the accompanying drawing, in which—

Fig. 1 is a view showing one form of the invention applied to a gas supply pipe for the burner of a water heater.

Fig. 2 is a diagrammatic view of the invention showing the switch devices that are under control of the motor located in a preferred relationship.

Fig. 3 is a detail view showing the relationship of the elements of one of the switches to the motor driven connections whereby the valve is operated.

The gas supply pipe 1 contains a valve chamber 2. The pipe 1 leads to a burner, not shown, enclosed within a casing 3 preferably provided with a door 4 to afford access to the inside and with a pipe or flue 5 to exhaust the fumes. A tube 6 has one end connected with a supply pipe 1 beyond the inlet side of the valve casing 2 and has its open end terminating adjacent to the burner wherever located and serves as a pilot light burner to which a small quantity of gas is delivered for the burner when the valve in the valve chamber 2 is closed. The tube 6 is equipped with a control valve 7.

A valve 8 extends across the chamber 2 and is operative to open and close said chamber to permit or to prevent the passage of gas therethrough to the burner. The

valve body 8 is provided with a passage 9 therethrough. The valve may be turned to position in which the passage 9 is in continuation of the passage through the chamber 2, or to position in which said passage 60 is transverse of the chamber and closed.

A housing 10 enclosing the motor driven mechanism is in connection with the valve chamber. The stem of the valve body 8 extends into the housing 10 and has a pinion 65 11 attached thereto in permanent mesh with a larger pinion 12 supported on an axis 13 at right angles to the axis of the pinion 11. It is obvious that when the pinion 12 is rotated the valve 8 will be turned and that 70 by proper control of the pinion 12 the valve may be controlled to open and to close the gas supply pipe, as desired.

An electric motor 14 is mounted on supports 15 in the housing 10. The shaft 16 75 of the motor has a pinion 17 attached thereto and in constant mesh with the pinion 12.

The circuit wire 18 leads directly to the motor and the other circuit wire 19 leads to a contact member 20 and has a branch 21 80 leading to another contact member 22 of a switch. The switch includes an additional contact member 23 from which a wire 24 leads to a connection with a switch contact member 25 in the housing. The switch 85 contact member 25 extends transversely of the axis of the pinion 12 and has a projection 26 on its end with which a resilient switch element 27 is arranged to contact.

Another wire 28 leads from the contact 90 member 29 in the switch of which the contact members 20, 22 and 23 are parts to connection with a switch contact member 30 supported from the housing 10 similar to the switch contact member 25. The switch 95 contact member 30 is provided with a projection 31 with which a resilient switch member 32 is arranged to contact. A wire 33 leads from connection with the switch members 27 and 32 to proper connection with the opposite 100 side of the motor from the connection with the wire 18.

In the embodiment shown the pinion 12 is provided with four projections designated a, b, c and d respectively, and are arranged 105 to operate the resilient switch members 27 and 33 successively to control the operation of the motor, so that the valve 8 will be operated to and stopped in open or closed positions. 110

The switch member 34 provided with an operating knob 35 is adjustable to bridge the gap between the contact members 20 and 29 to close the circuit to the motor through the wire 28, the switch contact member 30, the resilient switch member 32 and the wire 33; or to bridge the gap between the contact members 22 and 23 to close the circuit to the motor through the wire 24, the switch contact member 25, the resilient switch element 27 and the wire 33. The knob 35 operates a visual indicator 36 to indicate the "on" or "off" position of the valve, the "on" position being that in which said valve is open and the "off" position that in which said valve is closed. The "off" position is that in which the switch member 34 bridges the gap between the contact members 20 and 29, and in which the projections *a* pulls the resilient switch member 32 out of contact with the projection 31, thus holding open the circuit to the motor. To start the motor and turn the valve 8 one quarter revolution, which will open the valve, the switch member 34 is turned to bridge the gap between the contact members 22 and 23, thus closing the circuit to the motor through said switch, the wire 24, the switch contact member 25, the resilient switch element 27 and the wire 33. The motor then operates to turn the pinion 12 one-eighth of a revolution, causing the projection *d* to raise the resilient switch member 27 out of contact with the projection 26 of the contact member 25, thereby opening the circuit to the motor at the time the valve is open permitting a continuous flow of gas to the burner. When the circuit is open the motor stops and holds the valve 8 open. The gas passing from the burner is ignited by the pilot light and there is a continuous flow of gas until the motor is again operated to close the valve 8.

When it is desired to close the valve 8 and stop the flow of gas to the burner, the switch member 34 is turned to bridge the gap between the contact members 20 and 29, thus closing the circuit to the motor through said switch, the wire 28, the contact member 30 and its projection 31, the resilient switch member 32 and the wire 33. The motor then operates to turn the pinion 12 one-eighth of a revolution which also turns the valve 8 to closed position. When the motor turns the pinion 12 one-eighth of a revolution and the valve 8 to closed position as stated, the projection *d* engages and raises the resilient contact member 32 out of contact with the projection 31, thus opening the circuit to the motor causing the motor to stop and hold the valve closed. This operation can be repeated as often as it is desired to use the device, each of the projections *a*, *b*, *c* and *d* functioning alternately and successively as described in reference to the projection *d*.

I am aware that the invention may be

varied in numerous respects without departure from the nature and principle thereof, and specifically I do not restrict myself to any particular form of connections for operating the valve from the motor. It is obvious that such connections for operating said valve may be varied widely without departure from the nature and principle of the invention.

What I claim and desire to secure by Letters Patent is:—

1. A device of the character described comprising a valve rotative successively in one direction, a pinion attached to said valve, a pinion supported on an axis at right angles to the axis of said first pinion and meshing therewith, a motor, a pinion rotative on an axis at right angles to the axis of said second pinion and meshing with said second pinion, a circuit for supplying energy to the motor, a switch from closing said circuit, and devices operated by one of said pinions for opening said circuit.

2. A device of the character described comprising a valve rotative successively in one direction, a pinion attached to said valve, a pinion supported on an axis at right angles to the axis of said first pinion and meshing therewith, a motor, a pinion rotative on an axis at right angles to the axis of said second pinion and meshing with said second pinion, a circuit for supplying energy to the motor, a switch for closing said circuit, and devices operated by said second pinion for opening said circuit and causing the motor to stop and hold said valve in closed position.

3. A device of the character described comprising a valve rotative successively in one direction to open and to closed position, a pinion in connection with said valve, a motor, a pinion driven by said motor, a pinion mounted on an axis at right angles to the axes of said first-named pinions and meshing with said two pinions, a circuit for supplying energy to the motor, a switch for closing said circuit, and means operated by one of said pinions for opening said circuit when said valve has moved from open to closed position.

4. A device of the character described comprising a rotative valve, a pinion in connection with said valve, a motor, a pinion rotative by said motor, a third pinion meshing with said two pinions for rotating said valve when the motor is running, an electric circuit for said motor, a switch for closing said circuit, circuit make and break devices located adjacent to said third pinion, and elements on said third pinion for operating said devices to open said circuit and cause the motor to stop and hold said valve in closed position.

5. A device of the character described comprising a valve movable successively in one

direction to open and to closed positions, an electric motor, connections operated by said motor for operating said valve intermittently in a single direction of rotation to
5 said positions, an electric circuit for supplying energy to said motor, a switch settable to close said circuit to cause the motor to start in any position in which the motor is stopped, and means operated by said connections for opening said circuit and causing
10 the motor to stop and hold said valve alternately in open and in closed positions.

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