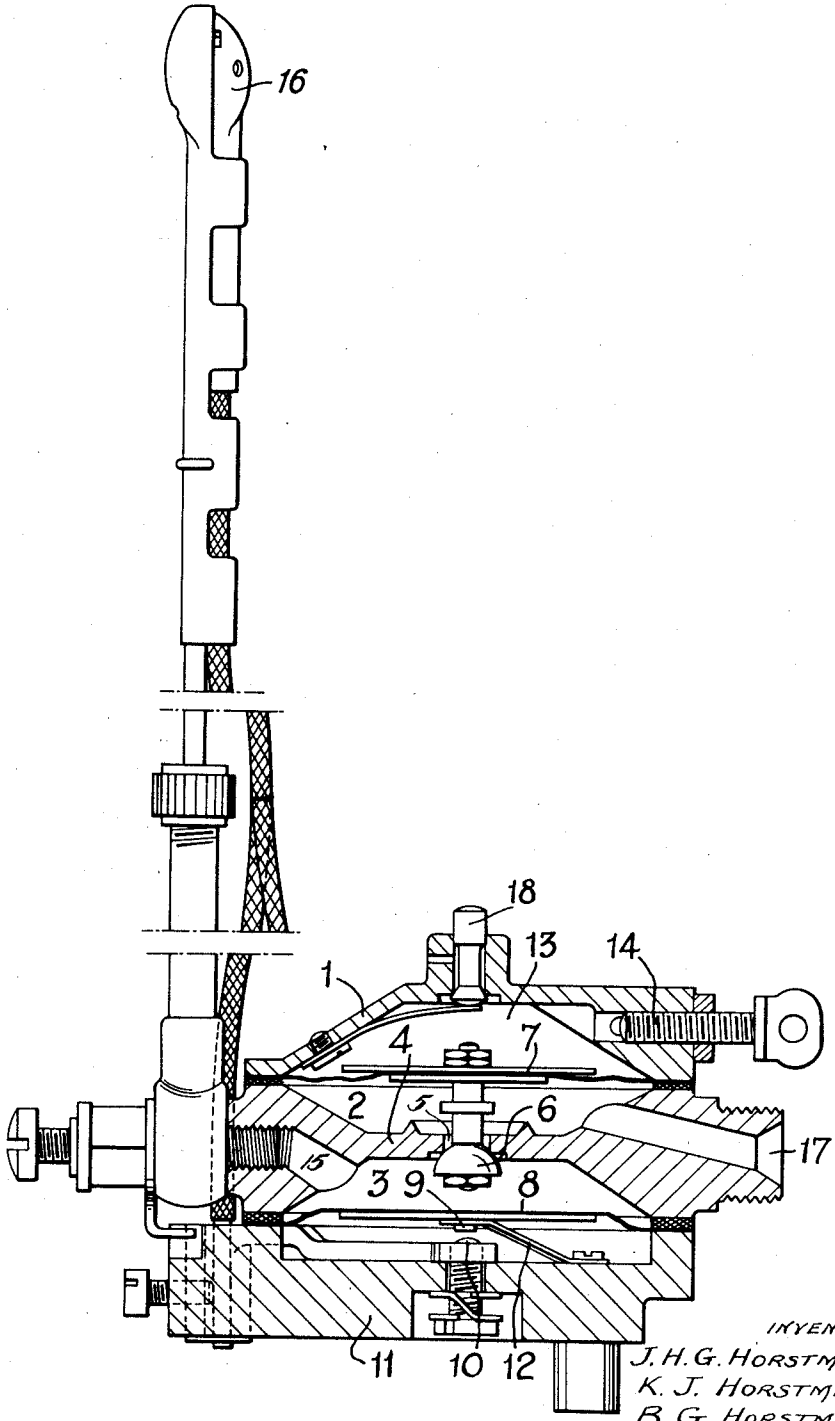
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GAS VALVE

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INVENTORS
J. H. G. HORSTMANN,
K. J. HORSTMANN,
B. G. HORSTMANN,
BY
ATTORNEY

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GAS VALVE

John Hermann Gustav Horstmann, Kenneth John Horstmann, and Bevan Graham Horstmann, Bath, England

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This invention relates to automatically operated gas valves of the type wherein gas entering a gas chamber which houses a diaphragm, piston or the like exerts a pressure on said diaphragm or equivalent and causes the closure of a normally-open valve after a time period determined by the speed with which air displacement at the diaphragm or the like is allowed to take place. The invention is concerned only with valves of the foregoing type which feed burners associated with ignition filaments whereby the mere act of admitting the gas to the aforesaid gas chamber causes automatic ignition at the burner and automatically, after a predetermined time interval, shuts off the supply and extinguishes the flame.

The burner referred to may be used for various purposes wherein a short combustion period is required; for example it may be used as a by-pass burner adapted (after the self-ignition) to ignite a main burner and then to extinguish itself, and in the following description the by-pass application will be cited merely as an example.

According to the invention, automatic ignition devices for gas burners of the above type are constructed so that the valve communicates with a secondary gas chamber containing means to operate a normally open switch in the circuit of an igniting filament, the switch being operable under the action of the said means to close the circuit by the pressure of gas admitted through the valve, and opening again as and when the valve cuts off the supply to the secondary chamber.

An embodiment of the invention will be described by way of example with the aid of the accompanying drawing showing an elevation of the same in vertical section, and as applied to a by-pass burner.

Referring to the drawing, there is a valve casing 1 comprising primary and secondary gas chambers 2 and 3 respectively divided by a horizontal web 4 in which is formed an aperture 5 constituting a seating for a ball or mushroom type valve 6. A flexible diaphragm is mounted in each chamber, these being designated 7 and 8 respectively. The diaphragm 7 is attached to the valve 6, which is normally open but is automatically closed when the diaphragm 7 rises under gas pressure in the chamber 2.

The other diaphragm 8 is provided on its external face with a contact stud 9 adapted to co-act with a second stud 10 suitably mounted on an insulated support 11 fixed to the valve casing 1. These contact studs 9 and 10 are normally separated by a suitable leaf spring 12 but are closed as and when the diaphragm 8 is forced outwards by gas pressure in the chamber 3. These contact studs provide the make and break switch for the electrical circuit of a catalytic filament employed for igniting a by-pass burner 16.

Above the diaphragm 7 is an enclosed space 13 having an adjustable air valve 14 for the purpose of controlling the rate of upward travel of the diaphragm 7 within suitable limits. This enables the time during which gas is flowing to the pilot burner, as explained later, before being automatically cut off by the valve 6, to be varied.

The valve casing 1 is provided with a gas inlet connection 17 leading to the primary chamber 2 and with a gas outlet connection 15 to feed the pilot, leading from the secondary chamber 3 above the diaphragm 8.

The inlet connection 17 communicates with the main supply on the consumption side of the valve or cock (not shown) controlling the feed to the main burner or burners.

In operation gas enters the primary chamber 2 when the main cock is opened and as a consequence diaphragm 7 is gradually raised, the speed of rise being controlled by the adjustable air valve 14 previously referred to. Having risen to a certain extent, the diaphragm 7 closes the valve 6 and therefore cuts off the supply of gas to the by-pass burner via the secondary chamber 3 above the diaphragm 8. Whilst the incoming gas is raising the diaphragm 7 it also moves the diaphragm 8 which makes circuit between the two contact studs 9 and 10.

After the valve 6 has closed, pressure in the secondary chamber 3 drops and the contacts are allowed to separate under the force of the spring 12.

In the example, it will be seen that immediately a main gas valve (not shown) is opened, gas flows to a main burner (not shown) and to the catalytic pilot head 16 and the electric heating circuit is established practically simultaneously. Following this the supply of gas to the pilot 16 is automatically cut off and the electric circuit interrupted.

The device would normally be constructed to work with the diaphragm in a horizontal plane, in which case the valve attached to the diaphragm 7 would open by its own weight when the flow of gas to the burner is interrupted. The device can, however, be made to work with diaphragms in other than the horizontal position by the aid of suitably arranged springs or weights.

In cases where it is desired to turn the gas

on and off in quick succession there may be incorporated an auxiliary air valve **18** in the chamber **3** so as to enable this space to be refilled quickly with air.

The diagrams **7** and **8** may be replaced by pistons, bellows or other pressure-operated devices.

We claim:—

1. A gas supply and ignition circuit controlling valve comprising a casing, a wall dividing said casing into primary and secondary gas chambers, means for the supply of gas to said primary chamber and for the outlet of gas from said secondary chamber, the wall separating said chambers having a port for flow of gas from the primary to the secondary chamber, a normally open valve controlling said port, means whereby gas admitted to said primary chamber causes said valve to close after the elapse of a predetermined period of time, thereby to cut off the supply of gas to said secondary chamber, an ignition circuit controlling switch, and means whereby said switch is closed by the pressure of gas admitted to said secondary chamber and is opened when said valve is closed and the gas pressure in said secondary chamber falls below a predetermined amount.

2. A gas supply and ignition circuit controlling valve comprising a casing having primary and secondary gas chambers, means for the supply of gas to said primary chamber and for the outlet of gas from said secondary chamber, a normally open valve controlling flow of gas from said primary to said secondary chamber, means operable by the pressure of gas admitted to said primary chamber to close said valve and cut off the flow of gas to said secondary chamber after the elapse of a predetermined period of time, an ignition circuit controlling switch, means tending constantly to open said switch, and means operable in response to the pressure of gas admitted to said secondary chamber to close said switch, the means for opening said swtich being effective to open said switch when the gas supply to the secondary chamber is cut off and the pressure of gas in said secondary chamber falls below a predetermined amount.

3. A gas supply and ignition circuit controlling valve as set forth in claim 1 including means adjustable to regulate the time period required for closing of the normally open valve by the gas pressure for any given pressure of the gas.

4. A gas supply and ignition circuit controlling valve as set forth in claim 2 including means adjustable to regulate the time period required for closing of the normally open valve by the gas pressure for any given pressure of the gas.

5. A gas supply and ignition circuit controlling valve as set forth in claim 2 in which the means responsive to the pressure of gas admitted to the primary chamber for closing the normally open valve comprises a diaphragm in the primary chamber operatively connected to said valve.

6. A gas supply and ignition circuit controlling valve as set forth in claim 2 in which the means operable in response to the pressure of gas admitted to the secondary chamber for closing the switch comprises a diaphragm operatively connected with one of the elements of said switch.

7. A gas supply and ignition circuit controlling valve as set forth in claim 2 in which the means responsive to the pressure of gas admitted to the primary chamber for closing the normally open valve comprises a diaphragm in the primary chamber operatively connected to said valve, and adjustable means for regulating escape of air from said primary chamber outwardly of said diaphragm thereby to predetermine the time period required for closing of said normally open valve by gas under any given pressure.

JOHN HERMANN GUSTAV HORSTMANN.
KENNETH JOHN HORSTMANN.
BEVAN GRAHAM HORSTMANN.