

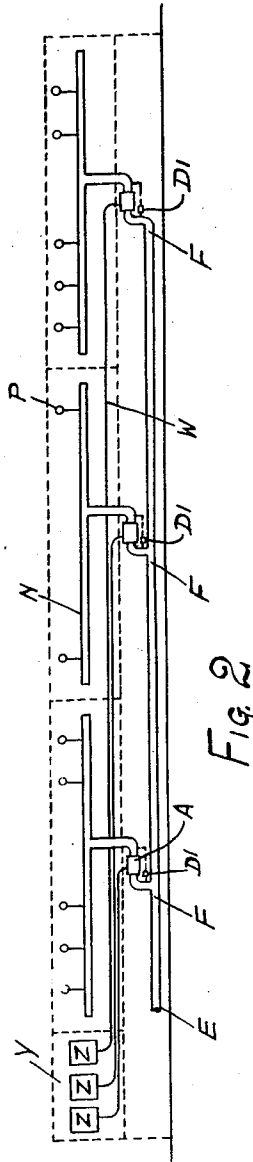
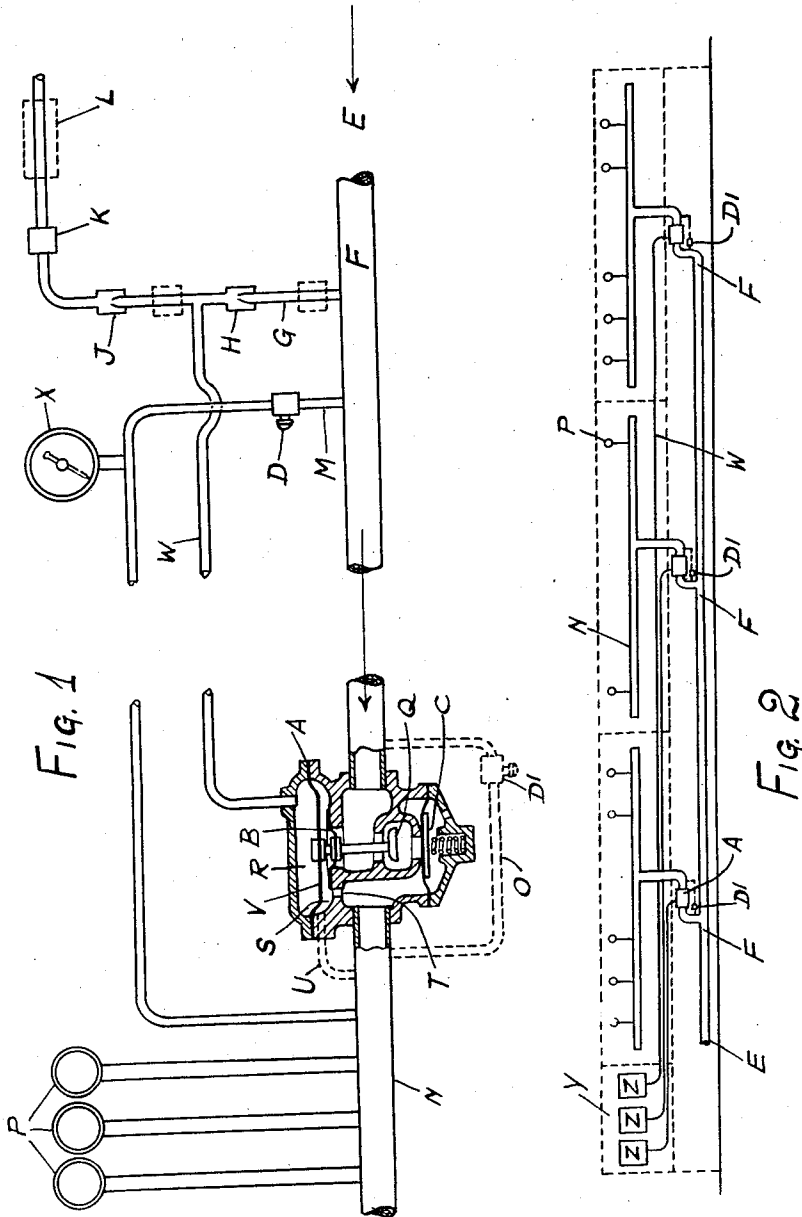
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E. E. TAVENER

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GAS PRESSURE LOADED REGULATOR

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Inventor
Ernest Edward Tavenor
By
Pemie, Edmund & Morton Barrows & Taylor
Attorneys

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GAS PRESSURE LOADED REGULATOR

Ernest Edward Tavener, Tottenham, London, England,
assignor to Keith Blackman Limited, London, England,
a company of Great Britain

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1 Claim. (Cl. 137—505.18)

In recent years there has been a tendency to lengthen ovens, e.g., baking ovens, and it is customary for the control valves for the fuel to be disposed at intervals along the length of the oven so as to provide zonal control. It will be understood that, when an oven is of great length, say upwards of two hundred feet, a considerable distance must be travelled by the operator who regulates the valves, especially when the goods to be baked or heated are very sensitive to heat, thus calling for frequent change of heat input.

In order to overcome difficulties heretofore experienced, the present invention provides a gas burner installation incorporating pressure-loaded governors, the loading of which can be varied manually by operation of small valves spaced at some distance from the governors. Where the fuel is compressed gas, the pressure of such gas can be used for loading, so that no additional source of pressure supply is necessary, but it is to be understood that an additional source will be used if circumstances render it preferable.

A gas burner installation according to the invention includes a plurality of burners arranged in groups each fed with medium through a pressure-loaded governor, and means located at a common control point for permitting regulation of the loading of the individual governors.

There may be combined with each governor an automatic shut-off valve which is preferably, but not essentially, a part of the system.

In the accompanying drawings, Fig. 1 is a diagrammatic illustration of one possible arrangement, and Fig. 2 shows an application to an oven, according to the invention.

Referring to Fig. 1, A denotes a pressure-loaded governor having a main diaphragm V and a compensating diaphragm or a gland, at B. Below the diaphragm B is an automatic diaphragm-controlled shut-off valve C.

As all burner cocks on the outlet side are shut, to reopen the shut-off valve C after closure, pressure is admitted to the outlet side through a "weep" valve manually opened but preferably "spring-closed." In what follows this "spring-closed weep" valve is referred to as the pushbutton and is shown at D. An alternative or additional pushbutton is shown at D'.

Where compressed gas is to be fed to the burners, the gas entering the intake pipe at E passes along the pipe F to the inlet of the pressure-loaded governor, and also to a pipe G in which are provided restrictions H and J beyond which is a manual control valve K. Branching from the pipe G is a pipe W terminating in the compartment R on the upper side of the main diaphragm V. Where thermostatic control is to be resorted to, this may be located at L beyond the position occupied by the manual control valve or at any point appropriate for location of the manual control valve, which latter may be retained for use if, and when, necessary.

The pipe G may conveniently discharge into the low pressure gas main, but if the waste of gas and possible

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danger should be of no consequence, then it may discharge into the atmosphere. Discharge into the atmosphere is practicable if compressed air from an additional source should be used to furnish the loading pressure.

From the pipe F a connection M leads via the pushbutton D to the burner supply pipe N. A pressure gauge X may conveniently be fitted in the connection M. The alternative or additional pushbutton D' may be placed in a by-pass branch O or may constitute a component of the governor. The burners are shown at P.

The mode of operation is as follows:

It is assumed that compressed gas is available and that all burner cocks are shut. The pushbutton D or D' is opened to permit gas under pressure to pass from the pipe F direct to the burner supply pipe N, thus building up pressure in the latter. When the pressure reaches a certain amount, as indicated by the pressure gauge X, corresponding to the setting of the shut-off valve C, this valve opens as the result of pressure on its diaphragm.

The pressure in the burner supply pipe N is then controlled by the governor A, the position of the main valve head Q being determined by the pressure to which the governor is loaded in the compartment R above the diaphragm. The compartment S below the diaphragm V is in communication with the burner supply pipe N by way of a port T, or an external pipe such as U, which may be connected at any convenient point along the burner supply pipe N. As the diaphragm V is subjected on one side to the pressure prevailing in the burner supply pipe N, and on the other side to controlled pressure, any difference in the pressures will result in movement of the diaphragm V, and consequently of the valve head Q, until equalization of pressures is realized.

The variable loading is brought about by manipulation of the control valve K. When the said valve is closed, the full pressure in the intake pipe F is transmitted to the compartment R above the diaphragm V, there being no drop in pressure owing to the restriction H as there is no flow of gas and only pressure is being transmitted. When the manual control valve K is open, there will be a reduction of pressure in the branch W from the pipe G owing to a drop in pressure resulting from the gas flowing through the restriction, this drop being variable in accordance with the extent of opening of the manual control valve K.

The restriction J is not essential, but is introduced in order to set a low limit to the minimum pressure communicated through the pipe W to the compartment R. It will be seen that if it were possible to lower the pressure below the point at which the burners would keep alight properly, some would go out, and the escaping unburnt gas could be a source of danger. It will also be seen that this minimum pressure will normally be just above the setting of the shut-off valve C. Should the minimum pressure be still further lowered from any cause, e.g., shortage of gas, or stoppage of the compressor through electricity failure, then the shut-off valve C will close immediately and before this valve can be reopened all outlets must be closed as previously described.

In the application of the system to an oven as illustrated in Fig. 2, the oven is to be regarded as partitioned into zones, all controls being brought to one panel Y where they are grouped. Thus, the only occasion when an operator needs to travel along the length of the oven is when he is to light the burners. For this purpose and when a shut-off valve C is used the additional pushbutton D' near to the burners to be lighted may be found advantageous. After lighting the burners, the governors of each group can be adjusted to the required heat output from the respective control point Z, which may be placed at a point convenient for the operator to view the goods issuing from the oven, from which he judges the amount

of heat required in different zones. A gauge gives a visual indication of the heat input into each zone.

Should electric ignition for the burners be used, then provision may be made to promote safety; e.g., a magnetic valve may be inserted in the intake pipe F and so connected electrically that it is shut unless the ignition is "on."

What is claimed is:

In a gas burner installation including a pressure-loaded governor having gas inlet and outlet ports and a pressure-loading chamber and being adapted to maintain a constant gas outlet pressure for any particular pressure loading, and a gas supply pipe connected into the inlet port of the governor for supplying gas under pressure, the improvement comprising means for providing a loading pressure for the governor including a branch gas discharge pipe connected into and leading from the gas supply pipe, a pressure control pipe one end of which is connected into the branch gas discharge pipe while its other end is connected into the pressure-loading chamber of the governor, a gas flow-restricting orifice in the branch gas discharge pipe between the gas supply pipe and the pressure control pipe, a control valve intercalated

in the branch gas discharge pipe on the side of the pressure control pipe opposite that of the gas flow-restricting orifice, said gas flow-restricting orifice causing a reduction in pressure in the pressure control pipe and pressure loading chamber of the governor when the control valve is open to discharge gas, and a second gas flow-restricting orifice in the branch gas discharge pipe between the pressure control pipe and the control valve for setting a low limit to the pressure in the pressure loading chamber of the governor.

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