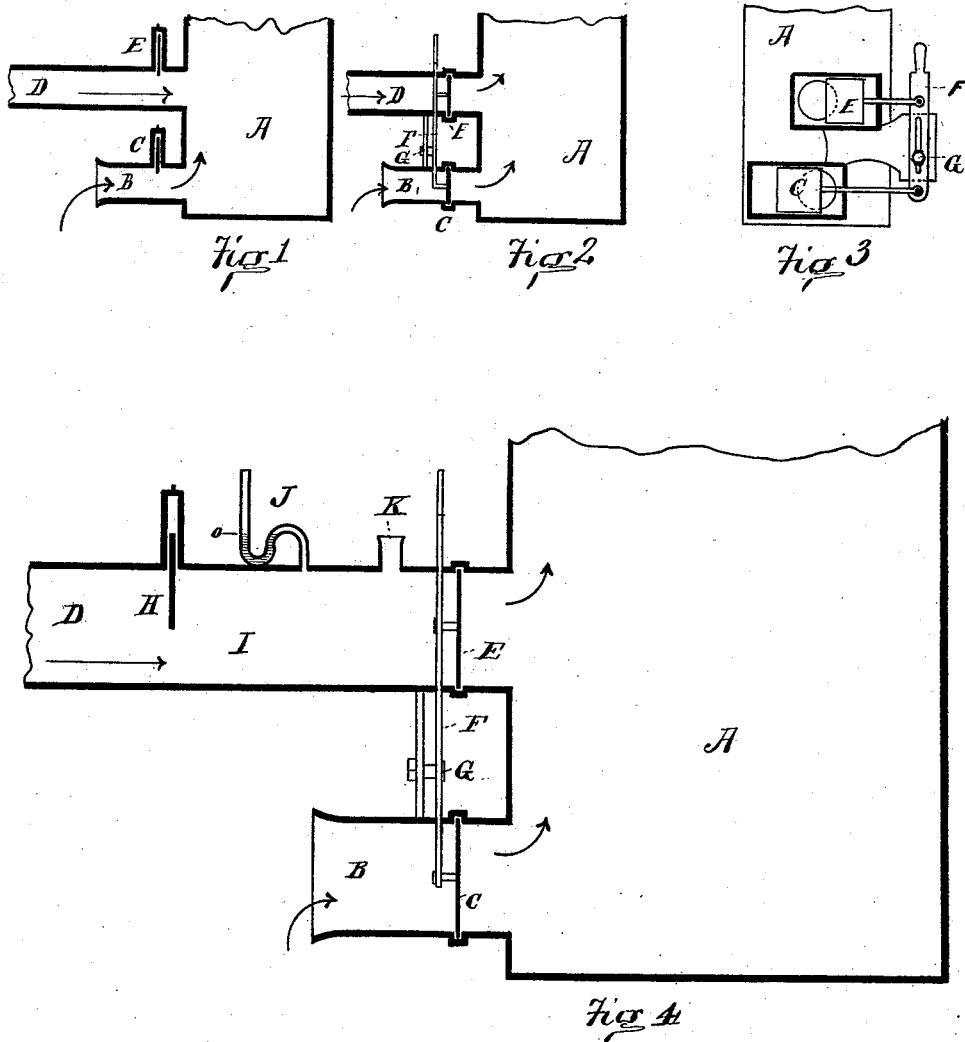


(No Model.)

F. W. GORDON.  
GAS BURNING DEVICE.

No. 264,453.

Patented Sept. 19, 1882.



WITNESSES:  
John Loring  
G. P. Jangman

Fred W. Gordon INVENTOR  
by  
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# UNITED STATES PATENT OFFICE.

FREDRICK W. GORDON, OF PITTSBURG, PA., ASSIGNOR, BY MESNE ASSIGNMENTS, TO HIMSELF AND JAMES P. WITHEROW, OF SAME PLACE.

## GAS-BURNING DEVICE.

SPECIFICATION forming part of Letters Patent No. 264,453, dated September 19, 1882.

Application filed March 31, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, FRED. W. GORDON, of Pittsburg, Allegheny county, Pennsylvania, have invented certain new and useful Improvements in Gas-Burning Devices, of which the following is a specification.

This invention relates to means for securing a proper proportion between the quantities of air and gas admitted into the combustion-chamber of a furnace arranged to use gas as fuel; and it consists of a gas-burner valve and an air-valve arranged with proper proportionate areas, and connected to be operated simultaneously, combined with a gas-valve for regulating the pressure of gas which will reach the aforesaid gas-valve, and an indicator placed between these two gas-valves, substantially as hereinafter set forth and claimed, whereby the gas-pressure may be maintained at its point of passage of the first-mentioned gas-valve at a pressure equal to the air-pressure, so as to secure, through the gas-burner valve and the air-valve, a flow of fluids due the areas of the openings of said valves.

The invention further consists of a peculiar form of indicator to be placed between the two gas-valves, whereby an excessive pressure will be indicated by odor and a deficient pressure by visible combustion at the indicator, as hereinafter set forth.

In the accompanying drawings, Figure 1 illustrates an ordinary arrangement of combustion-chamber with gas and air inlets; Figs. 2 and 3, the same with the gas and air valves connected, and Fig. 4 my improved device.

In Fig. 1, let A represent a combustion-chamber, to be connected with chimney, as usual; D, the gas-pipe; E, the gas-burner valve; B, the air-pipe, and C the air-valve. In operation, the valves C and E are so adjusted that the proportion of air and gas admitted to the chamber A is proper. In case increased combustion is required, each valve must be readjusted separately with skillful care. All this is as usual.

In Figs. 2 and 3 the valves C and E are united by the lever F, so that when more gas is admitted the air admission is coincidently regulated in the proper proportion, this proportion being adjustable by alteration in the

fulcrum-point G of the lever to suit different qualities of gas. This is also as usual.

The atmospheric pressure at B is practically constant, and the force of the draft acting to draw the air in is practically constant. The gas-pressure is subject to variations at all times. The flow of fluid through an opening is dependent on area and pressure. If we adjust the connected valves C and E of Figs. 3 and 4 so as to present proper relative areas of opening when the gas is at a certain pressure, and then the gas pressure is increased, the proportions will no longer be correct. The object of connecting the air and gas valve is to permit the heat of the furnace to be raised or lowered by a simple motion requiring no skill, the scientific regulation of the proportion of openings having been previously effected—one for all.

It will be seen that if the gas-pressure at the valve E is subject to much variation the air and gas valve will require a scientific adjustment at each change.

I seek to secure at the valve E a constant gas-pressure, and one equal to the air-pressure at C, whereby the flow of fluids may at all times be dependent on the areas of the valves.

In Fig. 4 the general arrangement is the same as in Figs. 2 and 3; but I add the valve H in the gas-pipe, so that the pressure reaching valve E may be under control, and I apply the indicator J to the chamber I between the valves. The zero-mark of a pressure-indicator is generally fixed at atmospheric pressure.

The attendant is instructed to regulate his fire by the lever F, and to keep the indicator J at zero by means of the valve H in an obvious manner. If the valve H should be entirely or too much closed, the draft would of course produce a negative pressure in the chamber I, and an undue proportion of air would enter at C.

As gas-pressures are at all times delicate and gas-furnace labor generally unintelligent, I arrange a novel form of indicator at the chamber I. This indicator is a simple opening, K. The valves H, E, and C being opened, the gas and air flow to combustion-chamber and become consumed. If valve H is opened too widely, more gas enters chamber I than can

pass the valve E. Therefore a portion escapes at opening K. The excessive pressure in the chamber I is thus indicated by the gage J or by the odor of gas escaping at K. The valve  
5 H should then be partially closed. On the other hand, if the valve H be too much closed, less gas reaches the chamber I than the valve E will pass at the solicitation of the draft, and  
10 a partial vacuum is created in said chamber, which induces an inward flow of air at opening K. Air and gas thus mingle in the chamber I, which, by its proximity to the combustion-chamber, is hot and ignites the mingled fluids, and flame is seen through the opening K,  
15 though normally all combustion and all mingling of fluids should be deferred till the combustion-chamber A is reached.

In practice the valve H is to be so adjusted that a slight outflow of gas occurs at K, thus  
20 indicating that the pressure in the chamber I is not below that of the atmosphere, and at the same time not much above it.

I claim as my invention—

1. The combination, substantially as specified, of a combustion-chamber, a gas-inlet  
25 thereat, an air-inlet thereto, valves at each of these inlets connected to be adjusted simultaneously, a valve in the gas-pipe for regulating the flow of the gas to said gas-inlet valve, and a  
30 pressure-indicator at the gas-pipe between the two gas-valves, all arranged to be operated substantially as set forth.

2. The combination, substantially as set forth, of the combustion-chamber, the connected air and gas inlet valves, the second gas-  
35 valve, and the opening in the gas-pipe between the two gas-valves, all arranged to be operated substantially as set forth.

FRED. W. GORDON.

Witnesses:

J. M. ROURKE,

J. P. WITHERONE.