No. 635,051. Patented Oct. 17, 1899.

P. MEEHAN & R. GRAY.

VALVE.

(Application filed Aug. 12, 1898.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1

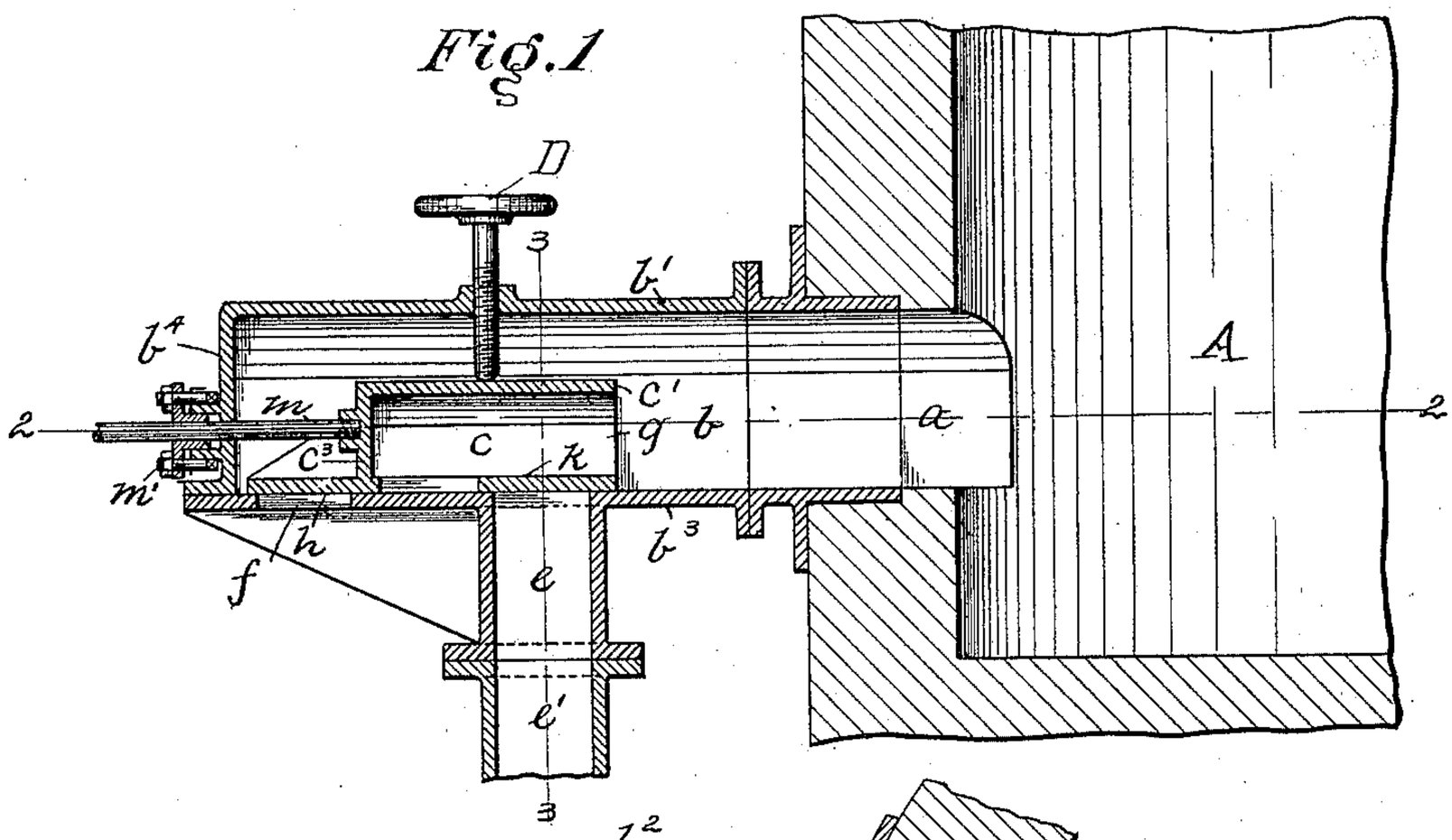


Fig. 2

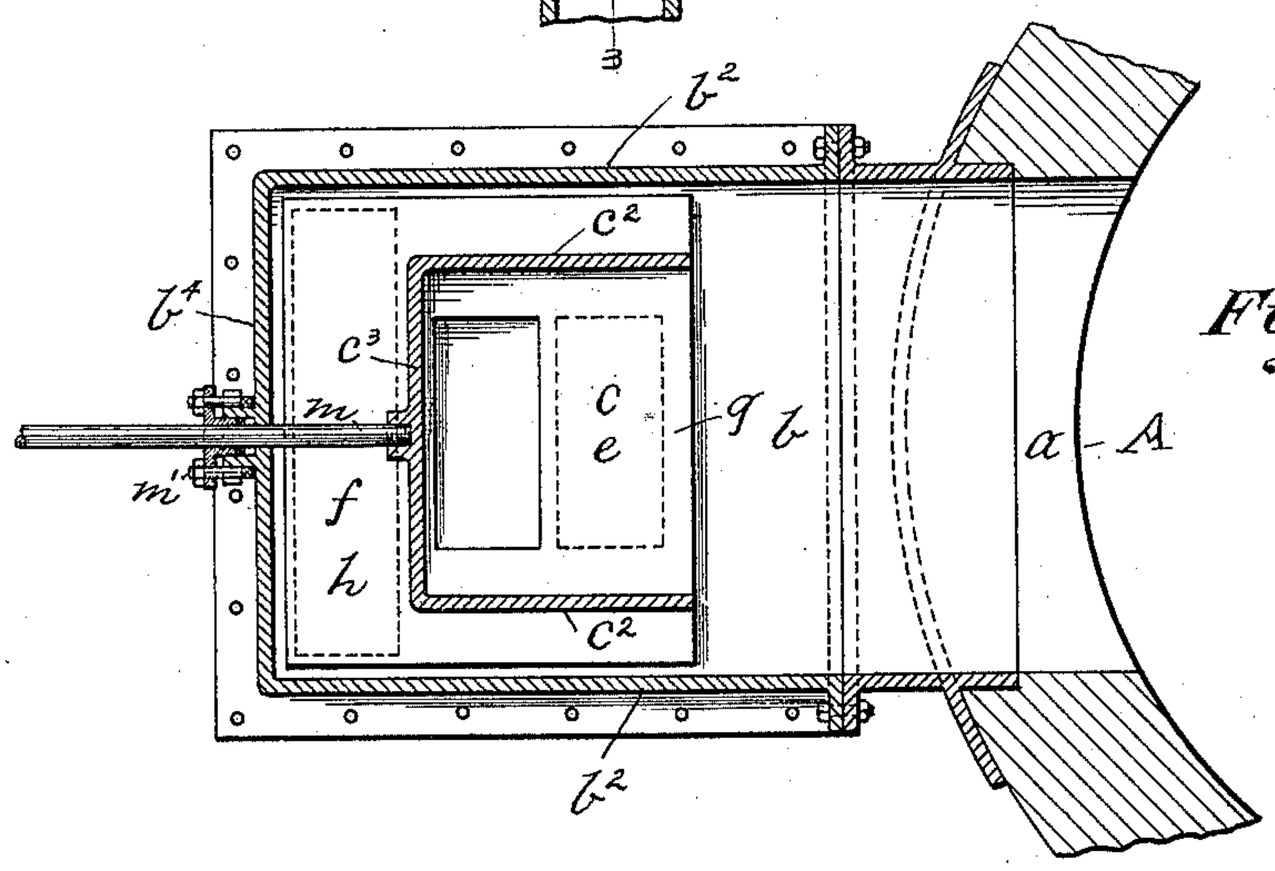
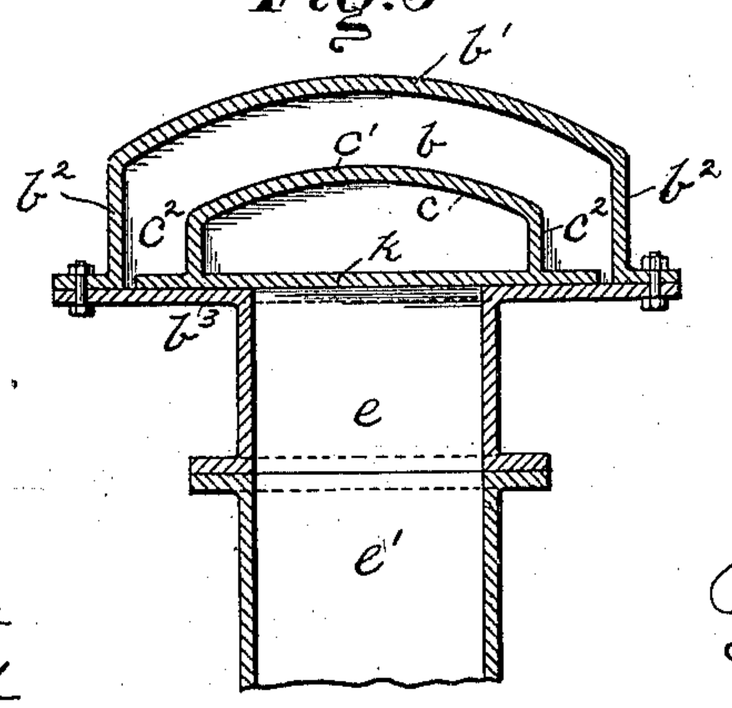


Fig. 3



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Grace E. Raymond

Inventors
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By Kay & Sutton

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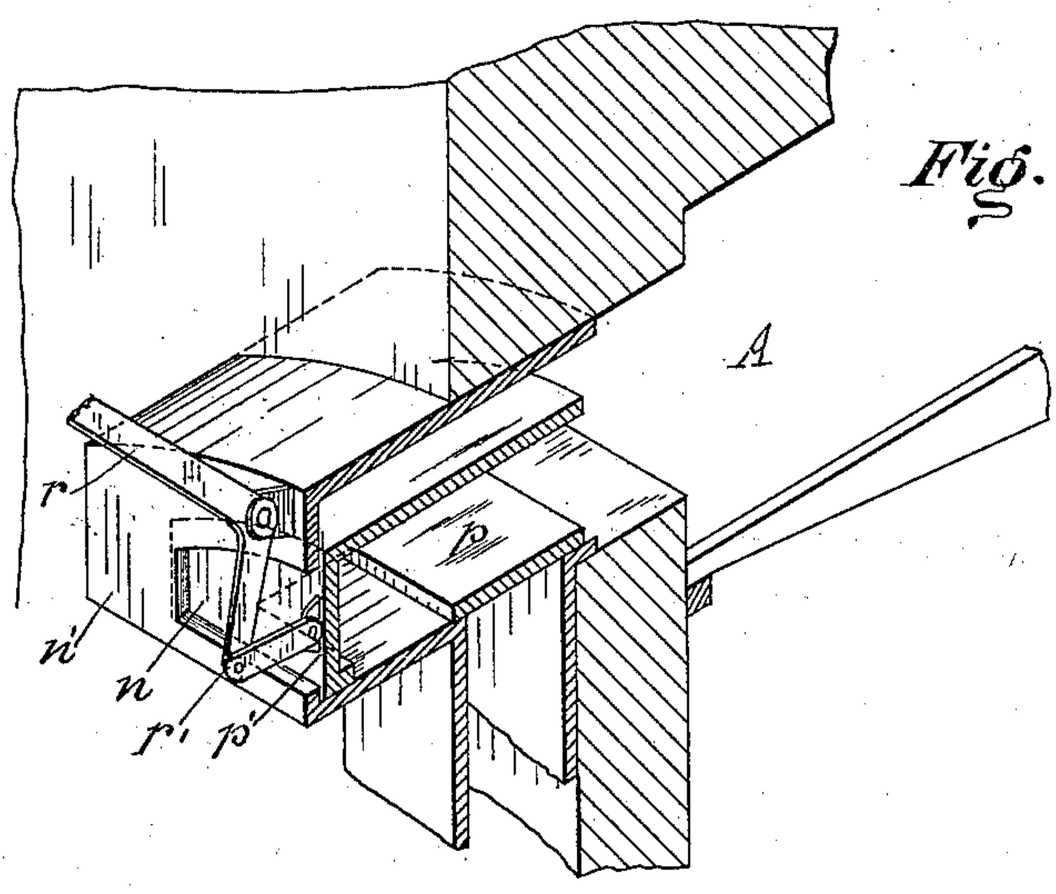

Fig. 4

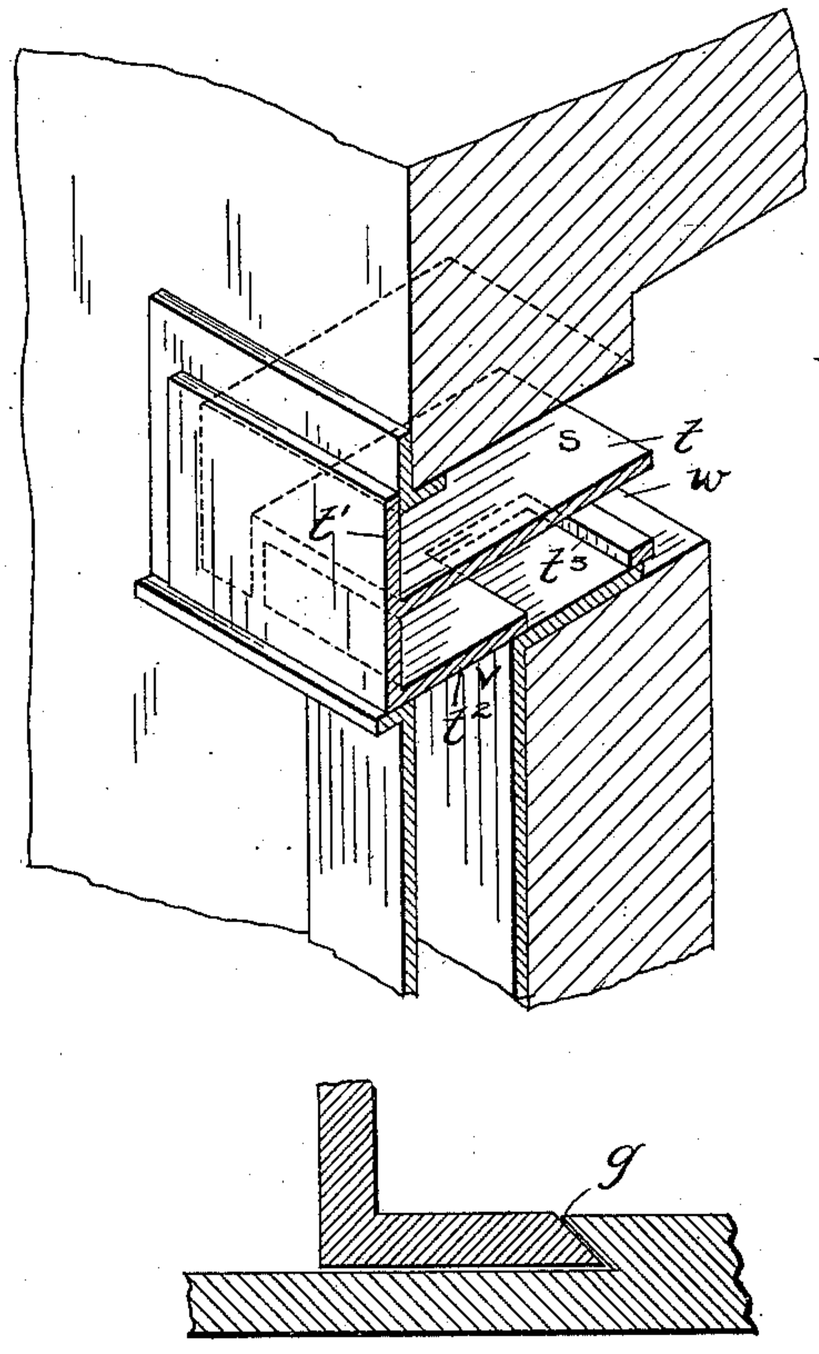

Fig. 5

Fig. 6

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UNITED STATES PATENT OFFICE.

PATRICK MEEHAN AND ROBERT GRAY, OF LOWELLVILLE, OHIO, ASSIGNORS TO THE MEEHAN BOILER AND CONSTRUCTION COMPANY, OF SAME PLACE.

VALVE.

SPECIFICATION forming part of Letters Patent No. 635,051, dated October 17, 1899.

Application filed August 12, 1898. Serial No. 688,452. (No model.)

To all whom it may concern:

Be it known that we, PATRICK MEEHAN and ROBERT GRAY, residents of Lowellville, in the county of Mahoning and State of Ohio, have invented a new and useful Improvement in Valves; and we do hereby declare the following to be a full, clear, and exact description thereof.

Our invention relates to gas and air valves for feeding both gas and air to furnaces—such as boiler-furnaces, hot-blast stoves, or like structures—its object being to provide a simple and efficient valve which will provide for the feeding of both gas and air in proper proportions to support combustion by a single movement of the lever, so that it can be controlled by any workman.

It consists, generally stated, in a combined gas and air valve having a horizontal chamber provided with an air-port and a gas-supply pipe opening by a port into this chamber, the length of the air-port being in proportion to the gas-port, according to the proportion of air and gas to be admitted, and a slide-valve inclosed within the chamber and sliding over the gas-port and adapted in its movement to control—that is, to open and close—both the gas and the air ports simultaneously, so that in the movement of the valve as soon as any gas is admitted to the furnace a proper proportion of air to support the combustion will also be admitted thereto, and as the valve-openings are increased or diminished the proper size of port for feeding the proper proportions of air and gas will be maintained.

It also consists in other improvements—such, for example, as the employment of a valve of smaller size than the interior of the chamber and having an outlet-opening at the end toward the furnace, so that the air can pass over the top and sides of the valve and mingle with the gas escaping at such outlet, so as to cause the proper mingling of the air and gas as they enter the furnace-chamber.

It also consists in means for locking or holding down such valve as against back pressure within the chamber, which is found in some cases necessary, especially in hot-blast stoves.

To enable others skilled in the art to make and use our invention, we will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a vertical section of the invention as applied to a furnace for hot-blast stoves. Fig. 2 is a horizontal section on the line 2 2, Fig. 1, indicating the construction of the parts and showing the preferred size of air and gas inlets. Fig. 3 is a vertical cross-section on the line 3 3, Fig. 1. Fig. 4 is a vertical section showing another form of the valve applied to a boiler-furnace. Fig. 5 is a like view showing still another form of valve embodying the invention. Fig. 6 is a detail of a modified valve-seat.

Like letters of reference indicate like parts in each figure.

While the invention is illustrated in different forms, the general principle is the same in all—namely, the employment of a chamber having both air and gas ports, the air-port being proportioned to the gas-port in accordance with the desired proportions of air and gas to be fed to the fire-chamber, the valve sliding within this chamber over the gas-port and in its movement covering or uncovering both air and gas ports.

In the preferred construction shown in Figs. 1, 2, and 3 the burner is attached to the furnace A, which can be of any construction, either that which is shown, which is the base of a hot-blast stove, or a boiler-furnace, as illustrated in Fig. 4, or other furnace to which the same is applicable. The furnace-chamber has the entrance-port a, in line with which is the valve-chamber b, which is preferably formed, as shown, in a horizontal position. This chamber is usually formed of a casting corresponding in width to the port a or adapted, as shown in Fig. 4, to fit said port neatly, and the casting having the top wall b', side walls b^2, bottom wall b^3, and end wall b^4. The bottom wall b^3 is generally formed with a flat upper surface, upon which the valve c rests and over which it travels when in use, though, as shown in Fig. 6, a dovetailed connection q may be formed between the valve-chamber casting and the valve to hold it down to place. For general purposes, however,

the weight of the valve is sufficient for this purpose, and it need only be held down when it is desired to absolutely lock the valve—such, for example, as in hot-blast stoves, where the blast is being passed through the furnace—in which case the valve may be locked down by means of the hand-bolt D pressing on the top wall of the valve and binding it down upon the gas-port, or the valve may be put in a vertical position when necessary. In the bottom of the valve-chamber are the gas-port *e* and the air-port *f*, the gas-port *e* leading up from the gas-pipe *e'*, carrying the gas from any desired source, either from the blast-furnace or from natural or artificial gas-supply pipes. The air-port *f* opens directly to the atmosphere. As seen in Fig. 2, both gas and air ports are rectangular in shape. These may be varied to suit circumstances, the air-port being in proportion to the length of the gas-port, and the length of these ports can be varied according to the desired supply of air to support combustion of the gas admitted, which of course varies according to the gas used, but is always of greater volume than the gas. The ports are preferably made of about the same width, and therefore as they are uncovered by the movement of the valve they maintain practically the same proportional size of air-inlet and gas-inlet, no matter in what position the valve is placed. The shape of the gas-valve is made clear in the different drawings, the valve having the top wall *c'*, side walls c^2, and the end wall c^3. The entrance-port *i* is formed at the rear end of the valve-body close to the back wall c^3, the valve having the bottom wall *k*, which travels over the port *e* and closes the same, which wall *k* extends out to the mouth *g* of the valve. In order to control the air-port *f*, the valve has the tailpiece *h*, of sufficient width to cover the air-port, which extends over said port and acts to open or close the same as the valve is moved. It will be noticed that between the top wall *b'* of the valve-chamber and the top wall *c'* of the valve and between the side walls of the chamber and the valve that full space is provided for the flow of the air entering from the air-port *f* over the top of the valve-body and that there is no opportunity for the mixing of the gas and air until they pass the front end of the valve, where the gas escaping through the mouth *g* can mingle with the air passing over the valve, when the gas, being lighter than the air, will mingle therewith, and the mingled gas and air will pass into the furnace-chamber A. For the purpose of moving the valve any suitable device may be employed. For example, where the valve is employed with a hot-blast stove and the parts are subjected to pressure the valve-rod *m* may extend out through a stuffing-box *m'* in the rear wall b^4 of the valve-chamber, at which point it can connect onto any suitable lever, screw, or like device for moving the valve.

In the use of our invention as embodied in the construction shown in Figs. 1 and 3 and when used with a hot-blast stove when the furnace is to be lighted the valve is moved forward by its rod *m*, permitting the entrance of gas and air through the ports *e* and *f* in the desired proportion, and the gas is ignited and burns within the furnace-chamber A, and the heat in said chamber is regulated by the slide-valve, as desired. The gas and air mingle at the mouth of the valve, as above described, and burn in said chamber, being under full control of the workmen by the simple sliding of the single valve. As the valve is slipped forward it opens or uncovers both air and gas ports, and on account of the difference in size of the two ports proper portions of gas and air are fed to the chamber. When it is desired to carry air through the hot-blast stove, the gas and air supply are cut off by the drawing of the valve back, so as to close the ports *e* and *f*, and in order to prevent the escape of air from the hot-blast by the entrance of gas, if its pressure should be higher than that of the air, we prefer to screw down the hand-screw D, forcing the valve into close contact with the bottom of the valve-chamber and so positively closing the valve-ports. The valve can be quickly opened by the running up of the screw D and the movement of the valve in its chamber, as above described.

The construction shown in Fig. 4 of the drawings is practically the same as that above described, except that the air-port *n* is made in the rear wall *n'*, and this port is closed by the rear wall *p'* of the sliding valve *p*, and the lever *r* is connected directly to a strap *r'*, which is connected to the valve-body through said port *n*, and the valve can therefore be easily moved without the necessity of the employment of a stuffing-box. The construction shown in Fig. 5 is also the same as those above described, except that the valve is opened by a backward movement instead of a forward movement, and so doing forms an air-port at the end of the valve-chamber. For example, the valve-chamber *s* is open at the rear end and the valve *t* has projecting upwardly from it the plate or extension *t'*, which closes the space above the valve-body, fitting against the open end of the valve-chamber *s*. The valve has also the bottom wall t^2, covering the gas-port *v*, and the port t^3, which by the backward movement of the valve-body is drawn over the gas-port *v* and so admits gas to the valve, the valve-body having also the mouth *w*, at which point the air entering at the open end of the valve-chamber mingles with the gas entering from the gas-port *v* into the valve. This valve can be operated in the same way as the other valves by a simple lever or like connection, and it gives the same control both of gas and air ports, differing only in the direction in which it is moved.

In either form of the valve employed a very simple valve is provided and one which on

account of its simplicity is not liable to injury by the heat of the furnace, while by a simple movement of the single valve in either direction the control of both gas and air in proper proportions for combustion is provided.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. A combined air and gas valve having a valve-chamber provided with air and gas ports, and a slide-valve inclosed within the valve-chamber and opening toward the furnace-chamber, whereby there is space at top and sides of said valve for the passage of air, said valve sliding over the gas-port and adapted in its movement to control the air-port, substantially as set forth.

2. A combined air and gas valve having a valve-chamber provided with gas and air ports, the air-port being proportioned to the length of the gas-port, and a slide-valve within said chamber having a body of smaller size than the chamber, said valve sliding over the gas-port and controlling both gas and air ports in its movement, substantially as set forth.

3. A combined gas and air valve having a valve-chamber provided with an air-port, and with a gas-port opening through the base thereof, and having a slide-valve of smaller size than the chamber, and inclosed within and contacting with the base thereof, said valve having closed top, side and end walls and a mouth opening toward the furnace-chamber, and having a port controlling the gas-entrance, substantially as set forth.

4. A combined gas and air valve having a valve-chamber provided with gas and air ports in the base thereof, the air-port being proportioned to the gas-port, and a slide-valve inclosed within and sliding over the base of the chamber, said valve having a solid top, side and rear walls, a port in its base for the entrance of gas, and an open mouth at its forward end, and having a tailpiece extending over the air-port, substantially as set forth.

5. A combined air and gas valve having a valve-chamber provided with gas and air ports and a slide-valve inclosed therein, and contacting with the base thereof and sliding over the gas-port and controlling the air-port, said valve having solid top, side and end walls, and an open mouth toward the furnace, and a hand-screw passing through the top of the valve-chamber and contacting with the valve-body, substantially as set forth.

In testimony whereof we, the said PATRICK MEEHAN and ROBERT GRAY, have hereunto set our hands.

PATRICK MEEHAN.
ROBERT GRAY.

Witnesses:
FRANK L. OSCH,
S. ROSENFELD.