

No. 705,581.

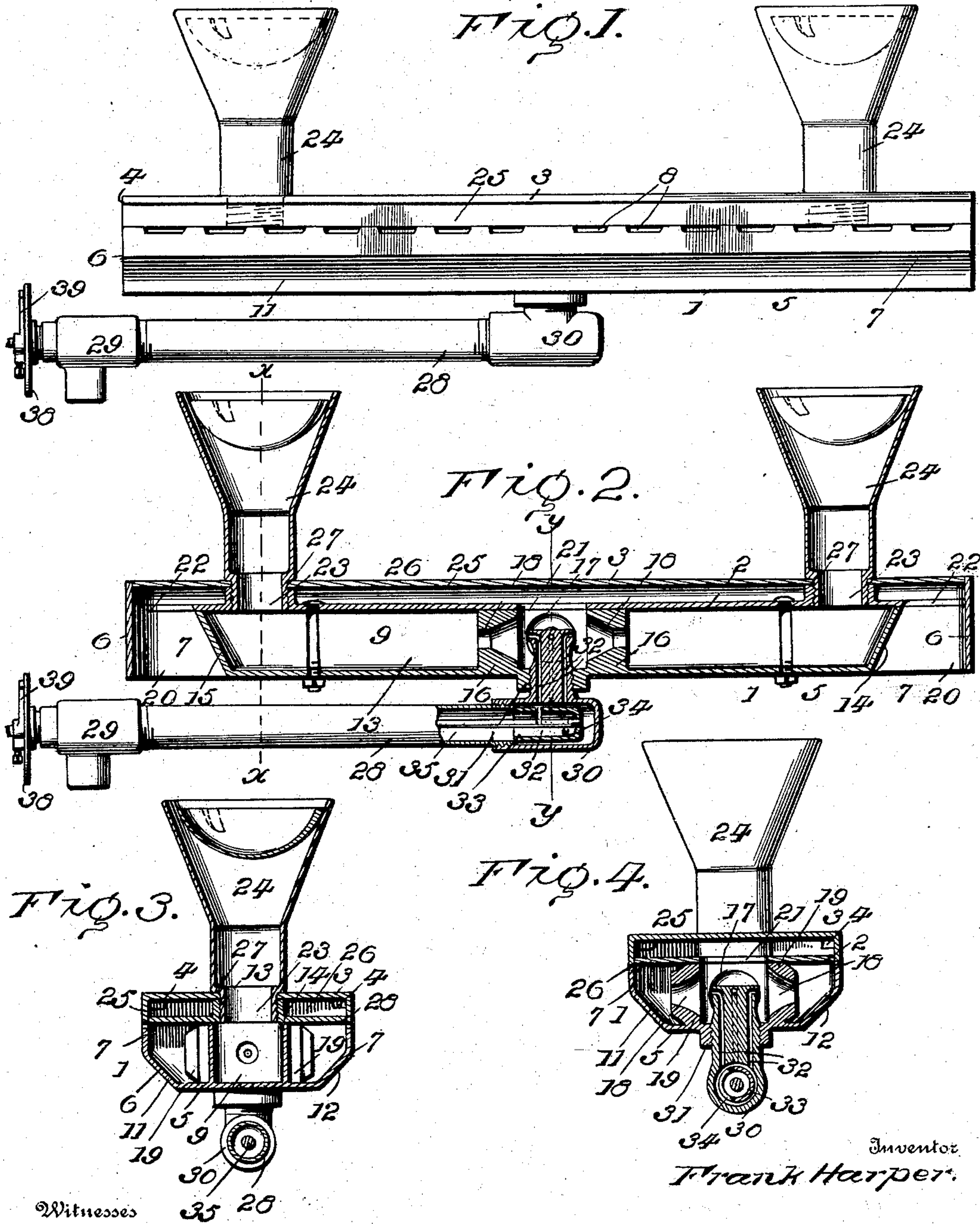
Patented July 29, 1902.

F. HARPER.
GAS BURNER.

(Application filed July 18, 1901.)

(No Model.)

2 Sheets—Sheet 1.



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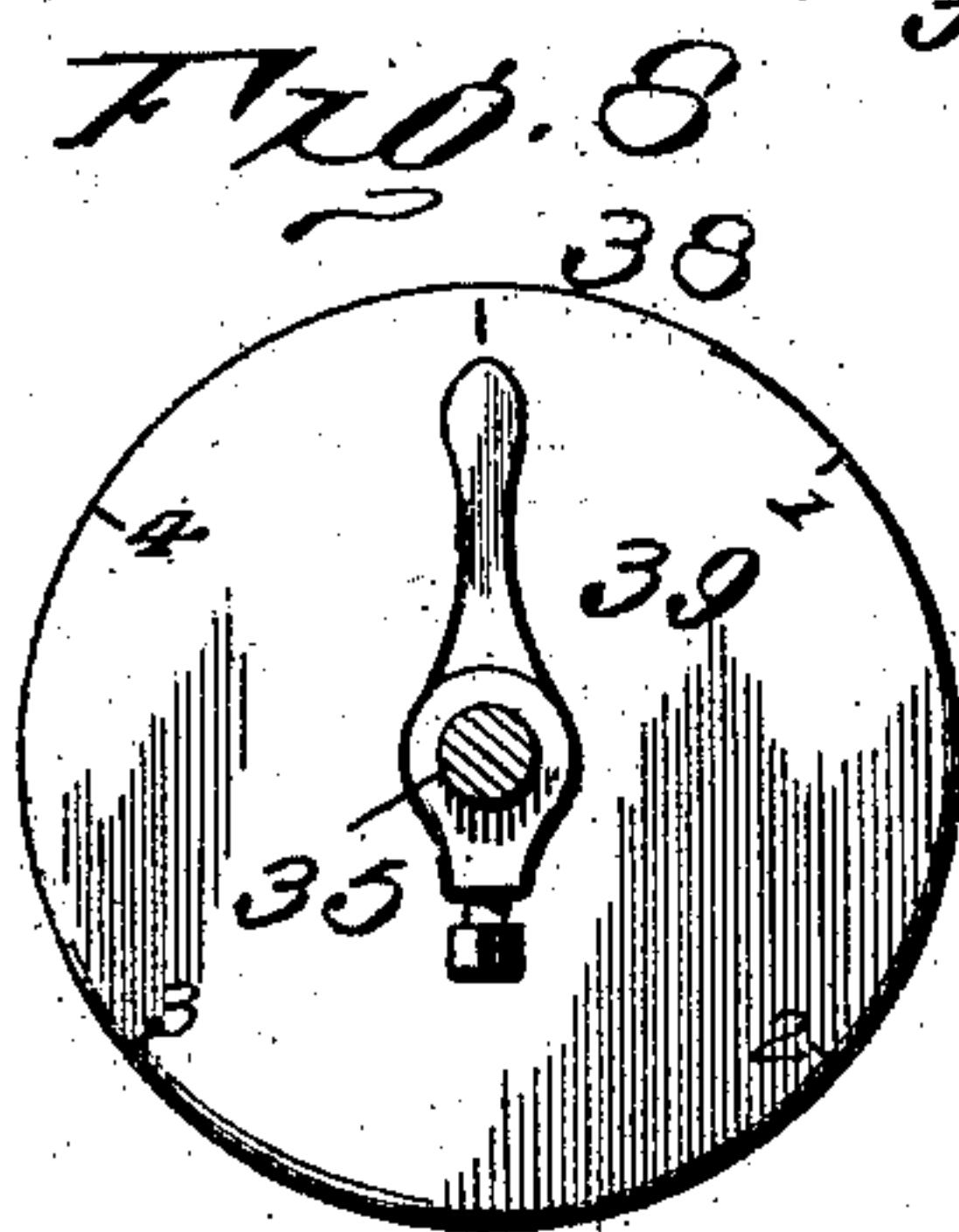
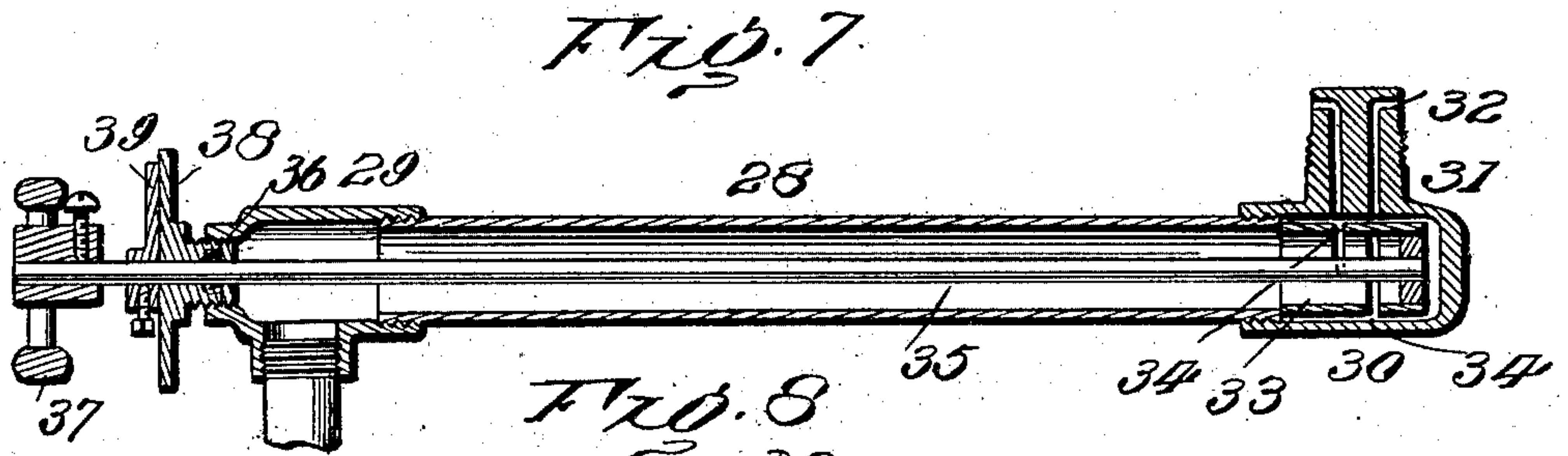
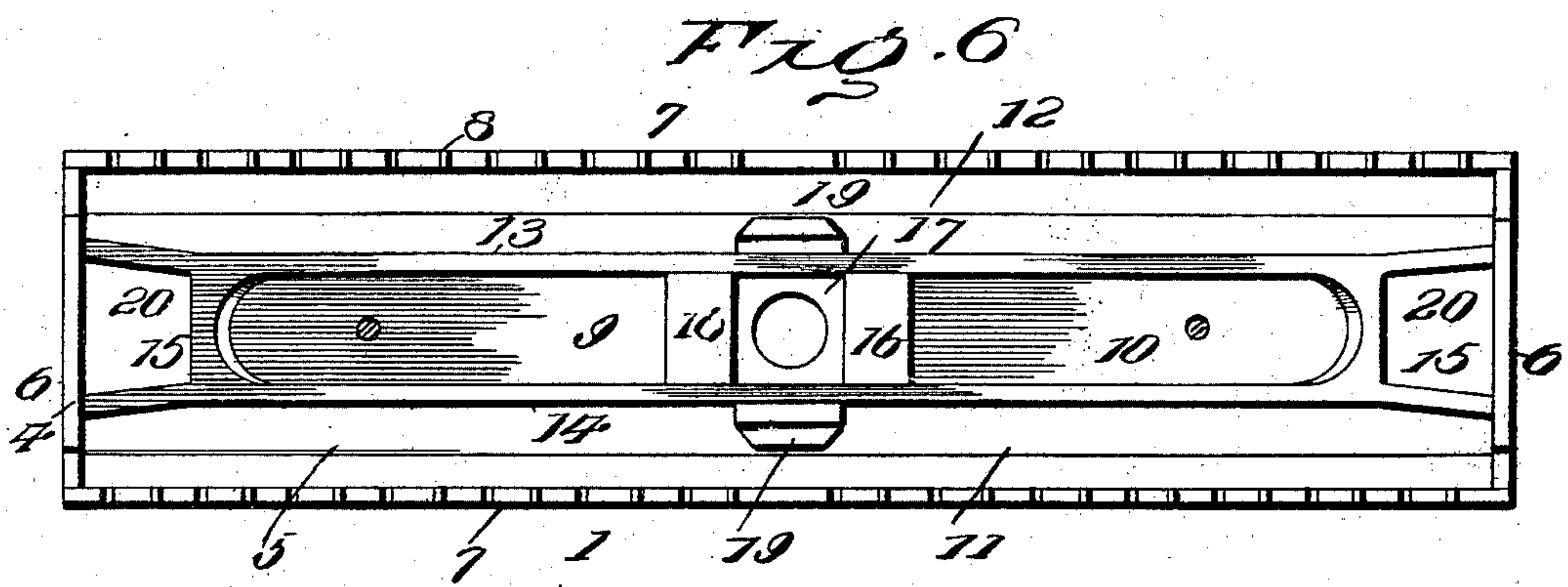
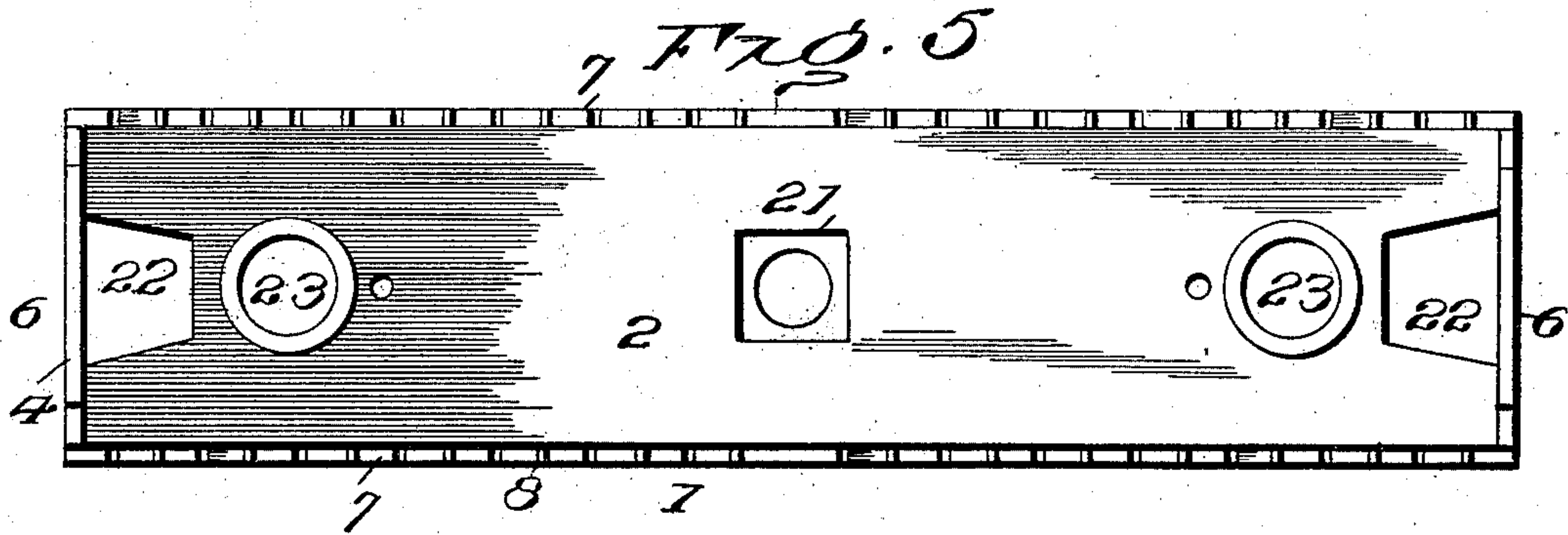
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UNITED STATES PATENT OFFICE.

FRANK HARPER, OF BEVERLY, OHIO.

GAS-BURNER.

SPECIFICATION forming part of Letters Patent No. 705,581, dated July 29, 1902.

Application filed July 18, 1901. Serial No. 68,833. (No model.)

To all whom it may concern:

Be it known that I, FRANK HARPER, a citizen of the United States, residing at Beverly, in the county of Washington and State of Ohio, have invented certain new and useful Improvements in Gas-Burners; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to burners for consuming gas and used extensively in stoves, the purpose being simplicity of construction, reduction in the number of parts, economy in the consumption of gas for a given number of units of heat, and to increase the efficiency and enhance the value of burners of this type.

The improvement consists of a burner having a series of compartments, a mixing-chamber in communication with each of the compartments, and having an air-space in communication with the mixing-chamber and with the open air and disposed to convey the air for mixing with the gas through the burner, whereby it is heated prior to its admission into the mixing-chamber.

The improvement also consists of novel means for regulating the flow of gas to any one or all of the compartments, said regulating means having an indicator cooperating therewith, whereby it may be ascertained which compartment or compartments are in communication with the gas-supply.

For a full description of the invention and the merits thereof and also to acquire a knowledge of the details of construction of the means for effecting the result reference is to be had to the following description and drawings hereto attached.

While the essential and characteristic features of the invention are susceptible of modification, still the preferred embodiment of the invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a burner embodying the invention. Fig. 2 is a central longitudinal section thereof. Fig. 3 is a transverse section about on the line X X of Fig. 2. Fig. 4 is a cross-section on the line Y Y of Fig. 2. Fig. 5 is a top plan view of the burner, the cap-plate and tips being re-

moved. Fig. 6 is a view similar to Fig. 5 with the tips, cap-plate, and diaphragm omitted. Fig. 7 is a central longitudinal section of the valved portion of the feed or supply pipe. Fig. 8 is an end view thereof, showing more particularly the indicating mechanism, the hand-wheel at the outer end of the valve-stem being omitted.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

The burner comprises, essentially, three parts—a base or body portion 1, a diaphragm 2, and a cap 3, surmounted by tips 4.

The base or body 1 is hollow and comprises a bottom 5, ends 6, and sides 7, the ends projecting above the sides, so as to close the ends of the cap 3 and interlock therewith to prevent lateral and longitudinal displacement thereof. The upper edges of the sides 7 are notched, as shown at 8, to provide openings for the escape of gas to be consumed when the burner is in operation. The lower portion of the sides 7 slopes upwardly to direct the gas to the openings and prevent its lodgment in the angular spaces formed between the sides and bottom, which would result if the sides 7 were not inclined, as indicated. The burner is long and narrow and is subdivided into compartments 9, 10, 11, and 12 by longitudinal partitions 13 and 14 and transverse partitions 15 and 16, the transverse partitions 15 being near the outer ends of the partitions 13 and 14 and the transverse partitions 16 connecting the said partitions 13 and 14 a short distance upon each side of a central point. The compartments 9 and 10 are in longitudinal alinement, whereas the compartments 11 and 12 are at the sides of the burner. The space between the partitions 16 constitutes the mixing-chamber 17, and this mixing-chamber is in communication with each of the compartments 9, 10, 11, and 12 by means of openings 18, formed in the walls of the mixing-chamber, said openings being large at their inner ends and small at their outer ends or outwardly converged. The transverse partitions 16, forming opposite walls of the mixing-chamber, are thickened, so as to give an appreciable length to the tapering openings 18, and in order that

the openings in the opposite walls may be of like length blocks 19 are secured to the partitions 13 and 14 at a point opposite the mixing-chamber. Obviously instead of attaching blocks 19 the partitions 13 and 14 may be thickened in order that the walls of the mixing-chamber may be of uniform thickness.

The several parts comprising the base or body of the burner, including the various partitions, may be integrally formed, this being preferable, although not essential to the essence of the invention. Openings 20 are provided at the ends of the burner and extend to the bottom 5, and these openings are bounded by the ends 6, partitions 15, and terminal portions of the partitions 13 and 14, said end portions being outwardly flared. These openings 20 admit air to the burner for mixing with the gas prior to consumption thereof.

The diaphragm 2 rests upon the partitions 13, 14, 15, and 16 and comes inside of the ends 6 and sides 7 and closes the compartments 9, 10, 11, and 12. This diaphragm is secured to the base or body 1, preferably by being bolted to the bottom 5, and has an opening 21 in register with the mixing-chamber 17 and has notches or openings 22 in its ends to register with the openings 20. Other openings 23 are provided in the diaphragm near its ends and are in communication with the outer ends of the compartments 9 and 10, and these openings 23 are reinforced by annular bosses, which are internally threaded to receive the burner-tips 24.

The cap 3 closes the base or body and has pendent longitudinal flanges 25, which rest upon the upper notched edges of the sides 7 and close the notch 8, so as to form the escape-openings for the gas. An air-space 26 is formed between the cap 3 and diaphragm 2 and is in communication at its ends with the openings 20 and midway of its ends with the mixing-chamber 17. This cap is held to the base or body 1 in any selected way, and, as shown, the tips 24 subserve this purpose, the cap having openings 27 in line with the openings 23 of the diaphragm to admit of the reduced threaded ends of the tips 24 passing therethrough, the shoulders at the base of the reduced threaded ends overlapping the cap-plate and holding it in place. When the parts of the burner are assembled, the openings 20 for the admission of air are closed by the cap-plate, and the air entering there-through finds its way into the mixing-chamber 17 by way of the air-space 26 and, commingling with the gas in the chamber 17, passes through the latter into the respective compartments through the openings 18.

The supply or feed pipe 28 for conveying gas to the burner from a suitable source has a portion valved and provided with fittings 29 and 30, the fitting 30 constituting the valve-casing and the fitting 29 the packing for the valve-stem. Each of the fittings is approxi-

mately of T form. The fitting 30 has its side or vertical extension 31 formed with a plurality of passages 32, which open through the sides of the extensions near its upper end and which passages communicate with the interior of the fitting, so as to be controlled by the rotary valve 33. This valve 33 is hollow and is formed in its sides with openings 34 to register with the passages 32 to establish communication between the said passages and the feed or supply pipe. There will be a passage 32 for each compartment, and the discharge ends of the respective passages come opposite a central point of the respective openings 18, whereby a jet of gas passing through any one or more of the openings 18 will create a suction and draw air into the said opening from the air-space 26, the tapering form of the openings 18 furthering this purpose and facilitating a commingling of the air and gas on their way to the point of consumption. The valve 33 is secured to the inner end of a valve-stem 35, so as to rotate therewith, and the outer end of the valve-stem passes through a stuffing-box 36 at the outer end of the fitting 29 and is provided with an operating-wheel 37. A disk 38 is secured to the fitting 29, preferably by means of a threaded boss, which constitutes a part of the stuffing-box, and is graduated upon its outer face for coöperation with a pointer 39, secured to the valve-stem 35, to indicate the position of the valve with reference to the passages 32. The neutral point is indicated by "0" and when the pointer 39 is opposite the said neutral point gas is shut off from every part of the burner, and upon rotating the valve-stem to the right until the pointer comes opposite the numeral "1" of the disk communication is established between one of the compartments, as 9, and the gas-supply, and a continued rotation of the valve-stem to the right until the pointer comes opposite the numeral "2" establishes communication between another compartment, as 10, and the supply gas. By continuing to rotate the valve to the right each of the compartments is successively brought into communication with the supply-pipe and are successively cut off from the supply of gas by turning the valve-stem to the left. When the pointer is at "0," the gas is cut off from every portion of the burner, and upon rotating the valve to the left the compartments are successively brought into communication with the feed-pipe and cut off in rotation. When the pointer is turned to the left until it reaches the last of the series of numerals, which in the present instance is "4," the last compartment, or 12, is supplied with gas, and by continuing to rotate the valve to the left the compartment 12 is cut off and the compartment 11 receives a supply of gas. A further rotation of the valve to the left cuts off the supply from the compartment 11 and establishes communication between the compartment 10 and the supply. It will thus be seen that by a proper

manipulation of the valve any one of the compartments or all of them may be used, as required.

Particular attention is called to the fact that the air in its passage to the mixing-chamber is compelled to travel a portion of the length of the burner, hence is heated in transit and warms the gas, with which it readily mixes, and as a result a more intense flame and heat is obtained.

Having thus described the invention, what is claimed as new is—

1. A burner having a plurality of compartments, each having a gas-outlet, a supply-pipe, fittings in the length of the supply-pipe, one of the fittings constituting a valve-casing and having an extension formed with a series of passages, one for each compartment of the burner, a valve in said fitting for establishing communication between the said passages and pipe, the valve-stem passing through the other fitting and provided with operating means, a graduated disk, and a pointer secured to the valve-stem and cooperating with the graduations of the said disk to indicate the position of the valve, substantially as set forth.

2. A burner having a mixing-chamber and a plurality of compartments grouped about the mixing-chamber and in communication therewith, air-inlets at opposite ends of the burner and in communication with the mixing-chamber, and means for admitting gas into the mixing-chamber in jets for any one or all of the aforesaid compartments, substantially as described.

3. A burner having compartments, a mixing-chamber in communication with each of the compartments, means for supplying air to the mixing-chamber, a pipe for supplying gas and having a portion extending into the mixing-chamber and provided with outlets directly opposite openings between the mixing-chamber and the said compartments of the burner, and a valve for controlling the said outlets to admit gas to any one or all of them, substantially as set forth.

4. A burner having compartments, a mixing-chamber, and having tapering openings establishing communication between the mixing-chamber and compartments, means for supplying air to the mixing-chamber, a feed-pipe having a portion entering the mixing-chamber and provided with outlets terminating opposite the openings between the mixing-chamber and compartments, and a valve for controlling the said outlets to admit gas to any one or all of them, substantially as set forth.

5. A burner comprising a centrally-disposed mixing-chamber and compartments at the ends and sides of and in communication with the said mixing-chamber, and independent means for supplying air and gas to the mixing-chamber, the gas-supplying means having a portion formed with outlets opposite the openings between the mixing-chamber and the respective compartments and including a valve for admitting gas to any one or all of the said outlets, substantially as set forth.

6. A burner subdivided by longitudinal and transverse partitions into a mixing-chamber and compartments, each of the latter having an outlet for the gas and a valve having a portion extended into the mixing-chamber and provided with an outlet for each compartment, the valve controlling the supply of gas to any one or all of the said compartments, substantially as set forth.

7. A burner subdivided by longitudinal and inner and outer transverse partitions into a mixing-chamber and compartments, the latter having an outlet for the gas, the inner transverse partitions being thickened and the middle portion of the longitudinal partitions being correspondingly thickened, the last-mentioned parts forming walls of the mixing-chamber and the said walls having outwardly-tapering openings, substantially as set forth.

8. In a burner, a base or body portion subdivided into compartments, a diaphragm closing said compartments and securely fastened to the base or body, a cap arranged over the diaphragm and spaced therefrom, and tips secured to the diaphragm and having portions to overlap and engage with the cap and hold it in place, substantially as set forth.

9. In a burner, a base or body having a mixing-chamber and compartments in communication therewith and having end air-inlets, a diaphragm closing the top side of the said compartments and cut away opposite the mixing-chamber and air-inlets, and a cap arranged over the diaphragm and spaced therefrom, said space establishing communication between the mixing-chamber and air-inlets, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

FRANK HARPER. [L. S.]

Witnesses:

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