

(No Model.)

J. G. BEALE.
GAS BURNER.

No. 286,170.

Patented Oct. 9, 1883.

Fig. 1.

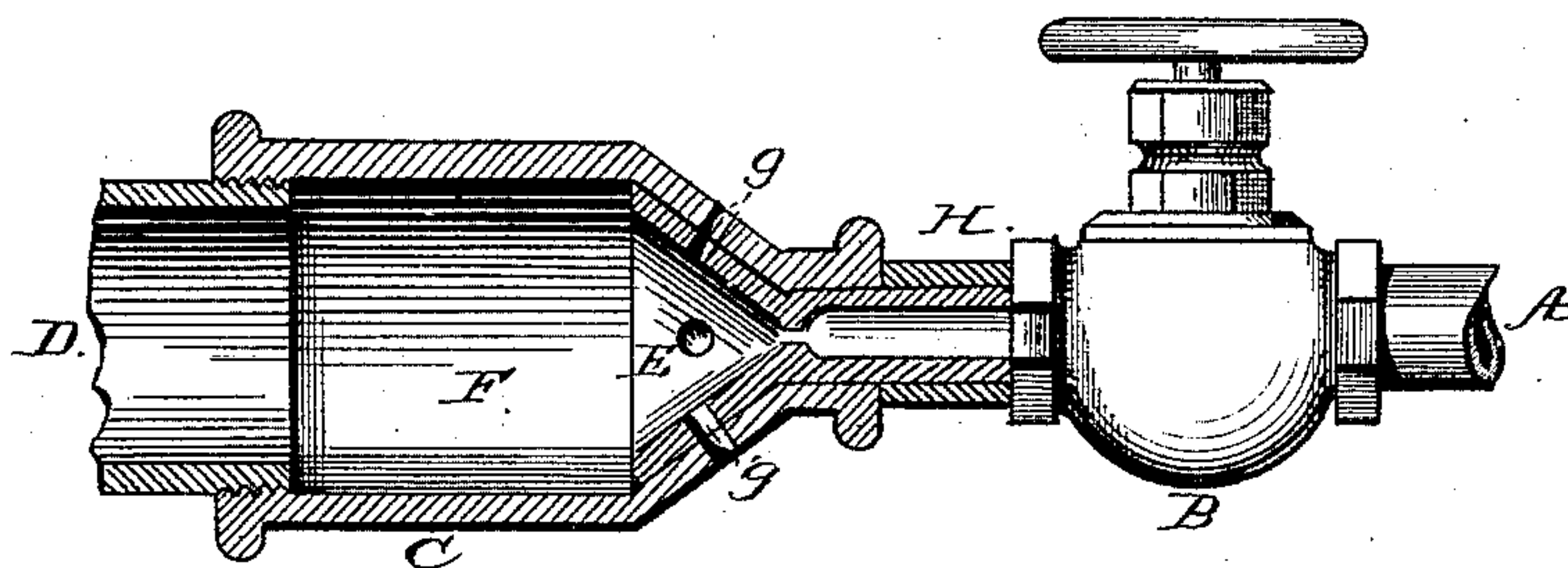


Fig. 2.

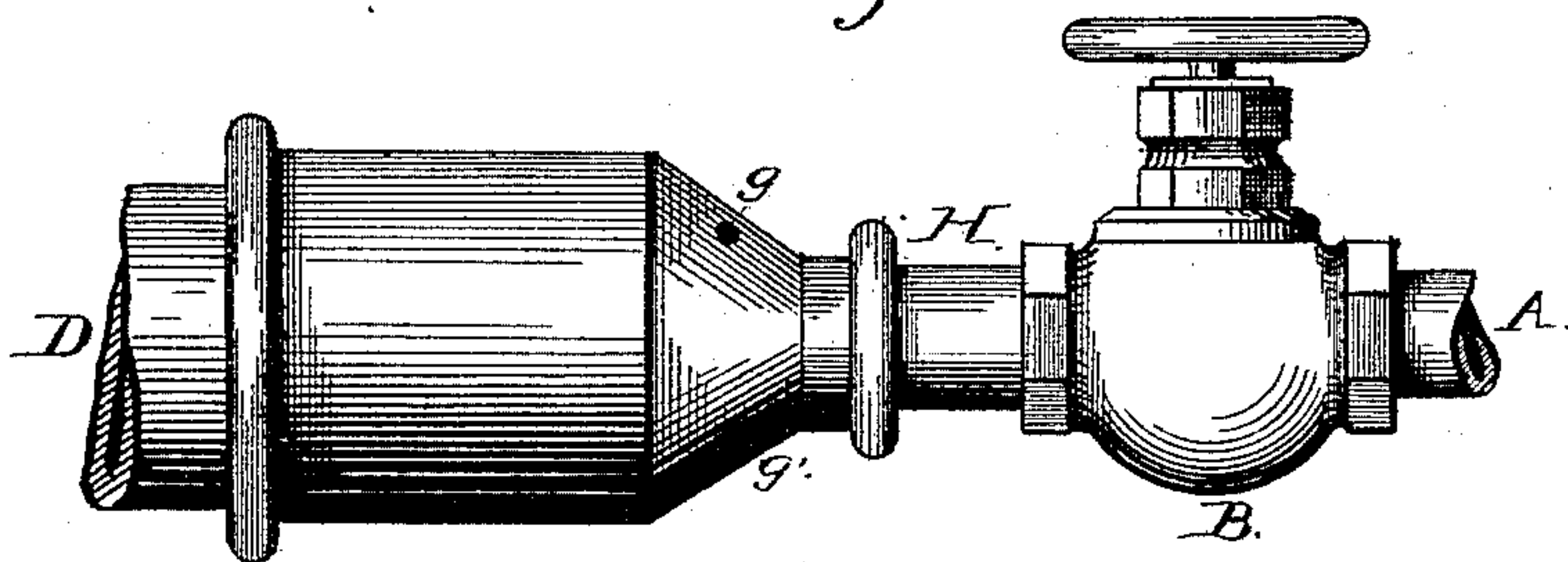
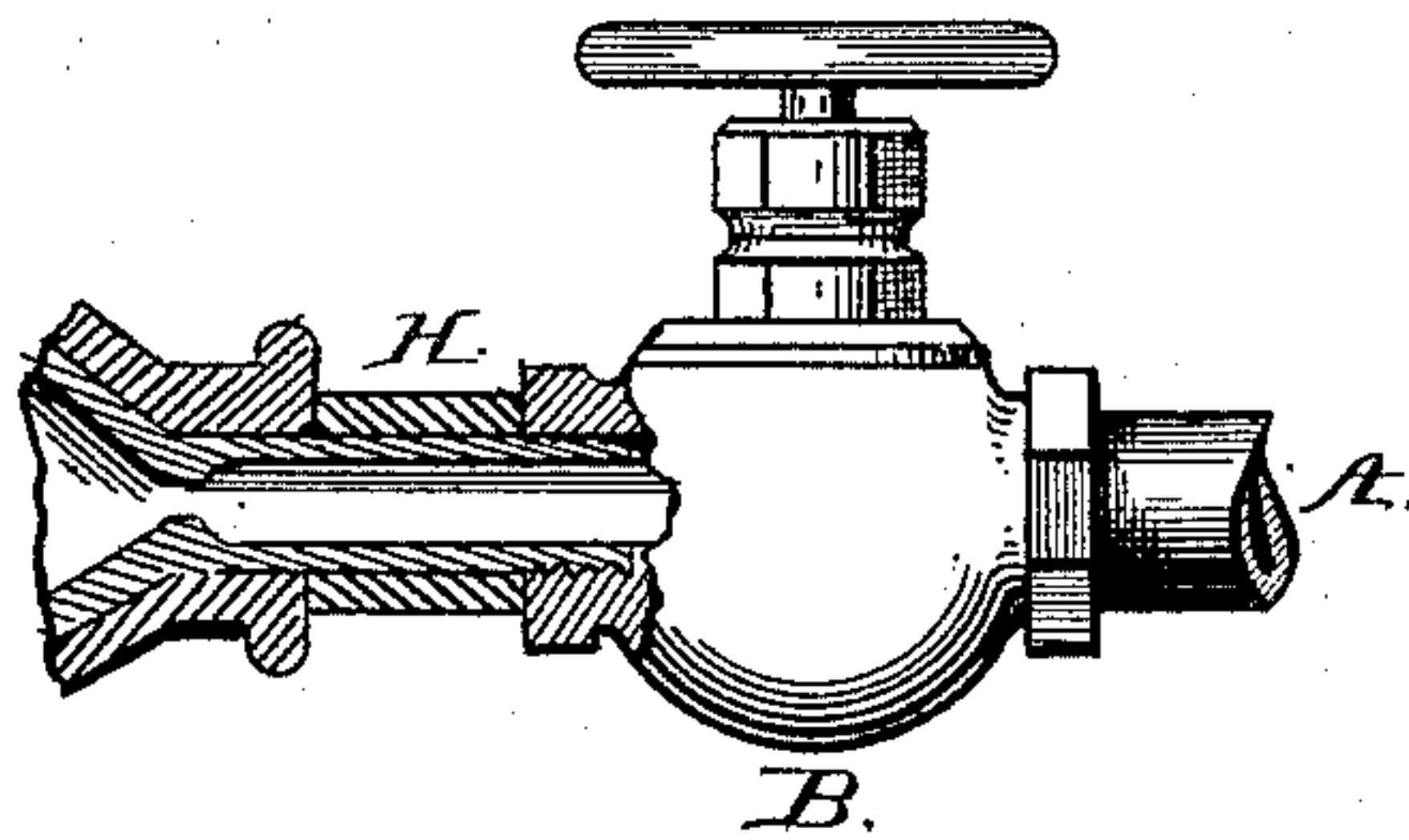


Fig. 3.



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GAS-BURNER.

SPECIFICATION forming part of Letters Patent No. 286,170, dated October 9, 1883.

Application filed March 29, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH G. BEALE, a citizen of the United States, residing at Leechburg, in the county of Armstrong and State of Pennsylvania, have invented a new and useful Improvement in the Method and Machinery for Burning Gas; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming a part thereof.

This invention consists in an improved apparatus by means of which gases may be admixed with an equivalent amount of air previous to the combustion of the gas.

Figure 1 in drawings is a sectional view of my air and gas mixing apparatus with air-valve. Fig. 2 is a side view of same. Fig. 3 is a detail view, showing the manner of attaching the valve B to the stem of valve E.

In the drawings, A is the gas-supply pipe. B is the valve for regulating the flow of gas. C is air-mixing apparatus. D is the discharge-pipe. E is a conical valve for regulating the proper proportion of air into the mixing-chamber. F is the mixing-chamber. *g g g g* are openings for the passage of air into the mixing-chamber F. H is a sleeve placed on the hollow stem of the conical valve E, so as to hold the valve down against the bottom of the mixing-chamber F.

In the construction of this apparatus, the mixing apparatus C and the conical valve may be cast of brass or of other metal. The base of the mixing-chamber is bored out and the valve E turned up to fit it. The sleeve H is then put on, and the gas-valve B is screwed on sufficiently loose, so as to allow the mixing-chamber to move around the valve E. The holes *g g g g* are then bored through the mixing-chamber and the conical valve. When this is done, the apparatus is ready for use.

In the practice of this method and apparatus for burning natural gas, the mixing apparatus having been connected to the supply-pipe, and near to the furnace, fire-place, or burner, and the discharge-pipe communicating with the furnace, fire-place, or burner, the valve B is opened so as to allow the desired amount of gas to pass into the mixing-chamber F. The conical valve E is then adjusted so as to allow a full and free passage of air

through *g g g g*. The pressure of the gas passing into the mixing-chamber will cause a suction of the air through *g g g g*, and the air and gas thus intimately admixed will be forced forward through the discharge-pipe D, and from thence into the combustion-chamber. When the air and gas appears at the point designed for combustion, it is ignited. The conical valve is then turned around so as to nearly close the air-inlets *g g g g*, when a smoke-flame will appear. The valve should then be gradually opened until the smoke disappears entirely, and a white flame is caused at the point of combustion. The volume of the flame and quantity of heat evolved may be regulated by the amount of gas let through valve B.

The natural gas is composed of a number of hydrocarbon compounds with an average composition of eighty-seven per cent. of carbon and thirteen per cent. of hydrogen, which will require two hundred and thirty-two pounds of oxygen to convert the eighty-seven pounds of carbon to carbonic acid, and one hundred and four pounds of oxygen to convert the thirteen pounds of hydrogen to steam, (HO,) and to get this three hundred and thirty-six pounds of oxygen will require thirteen hundred and forty-four pounds of air to consume one hundred pounds of such gas. It will thus be seen that nearly thirteen and a half pounds of air is required to produce a perfect combustion of one pound of natural gas, and where the gas is used in large volumes it is impossible to thoroughly admix sufficient air at the point of combustion to secure a perfect combustion; but by my method of admixing the air and gas thoroughly previous to its exit at the point of combustion an instantaneous and thorough combustion ensues. The gas and air may also be admixed by means of a siphon or injector or other apparatus; but in practice I find most excellent results by the use of apparatus shown in the drawings.

My invention may be applied to burning natural gas, gasoline, or gas made from coal for light to very great advantage, as by the previous admixture of an equivalent of air with the gas, the gas and air is thoroughly commingled, and when they emerge from the burner a perfect combustion takes place and smoke is absolutely prevented. For this purpose I

attach the burner directly to a mixing-chamber, such as shown in Figs. 1 and 2.

This invention is intended to be applied more particularly to natural gas, which ordinarily escapes at a pressure of from ten to two hundred pounds per square inch. Such gas, when burned in the ordinary manner, rushes forth with such force as to escape many feet from the mouth of the burner before any combustion can take place; but by means of my device a sufficient quantity of air may be admitted with said gas to render combustion independent of the air about the end of the burner. Furthermore, when gas under great pressure is burned in the ordinary manner immense volumes of smoke are produced, showing that the gas is only partially consumed, whereas with my apparatus a clear, steady, hot flame may be produced.

I am aware that an apparatus for commingling air and gas previous to the combustion of the latter is not broadly new. I am furthermore aware that in such apparatus it is

not new to combine with the shell of a mixing-chamber provided with orifices a sleeve having similar orifices adapted to register therewith, and thus form a valve for the admission of air. Such construction I do not therefore claim; but

What I do claim is—

In an apparatus for mixing air and gas previous to combustion, the combination, with the induction-pipe A and eduction-pipe D, of the mixing-chamber shell C, having conical end provided with orifices, the conical valve E, having a hollow stem screw-threaded at its outer end, and provided with orifices registering with those in shell C, the sleeve H, and the valve B, screwed to the outer end of the valve-stem, all arranged and operated in the manner and for the purposes described.

JOSEPH G. BEALE.

Witnesses:

JAMES H. PORTE,
WALTER REESE.