No. 626,302. Patented June 6, 1899.

P. G. DE SCHODT.

ATMOSPHERIC BURNER.

(Application filed June 16, 1896.)

(No Model.)

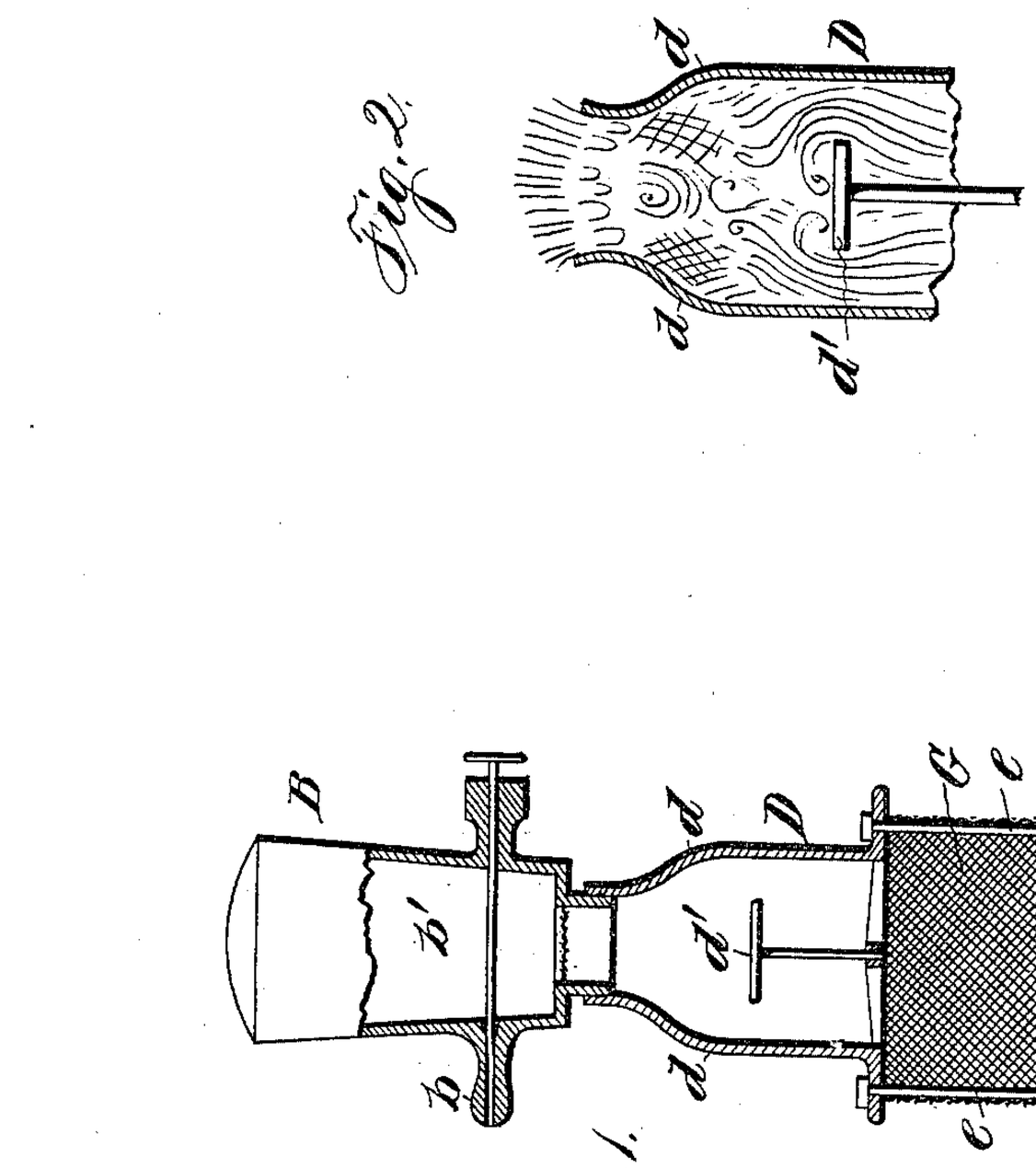

Fig. 1.

Fig. 2.

Witnesses
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PAUL GREYSON DE SCHODT, OF NAMUR, BELGIUM.

ATMOSPHERIC BURNER.

SPECIFICATION forming part of Letters Patent No. 626,302, dated June 6, 1899.

Application filed June 16, 1896. Serial No. 595,780. (No model.)

To all whom it may concern:

Be it known that I, PAUL GREYSON DE SCHODT, a subject of the King of Belgium, residing at Namur, in the Kingdom of Belgium, have invented certain new and useful Improvements in Systems and Means of Illuminating and Heating Applicable to Gas and Mineral Oils; 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, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this application.

My invention has relation to the art of illumination and heating; and it has for its object the provision of means whereby the high temperatures required for illumination and heating by incandescence can be obtained with a minimum volume of gaseous fuel, as ordinary illuminating or other combustible gas.

As is well known, the luminosity of an incandescing body—as, for instance, a refractory oxid—increases much more rapidly than the temperature of the source of heat—*i. e.*, a heating flame—so that in order to obtain the greatest illuminating power from the least possible quantity of fuel it is necessary to develop the greatest possible heat from such fuel, and in order to do this the combustion of the fuel must be substantially perfect. It is also known that the ratio of combustion of a combustible gas relatively to the quantity of gas consumed depends upon the relative proportions and the more or less intimate admixture of the components of such gas.

In the practical carrying out of my invention I prefer to employ an appliance whereby the normal pressure of the gas is increased and to bring the air to be admixed therewith into forcible contact with the gas, so as to effect the admixture mechanically, the result being a more intimate admixture than could otherwise be obtained. I am thus enabled to obtain practically the same results as are obtained with the blowpipe or forced-draft burner and dispense with separate conduits for the air and gas; but that my invention may be fully understood I will describe the same in detail, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical section of a burner embodying my invention, and Fig. 2 is a like fragmentary view of the mixing-chamber of said burner.

As hereinbefore stated, I prefer in practice to impart to the gas a greater pressure than its normal pressure, and this may readily be done by connecting the supply-main with a compressor of any well-known construction and by interposing between the compressor and the service or distributing pipes a pressure-regulator, which may likewise be of any well-known construction.

As hereinabove stated, I effect the admixture of the gas and air mechanically or forcibly, because this cannot be done by merely bringing the stream of gas into contact with a stream of air—as, for instance, by causing the air to be drawn along with the stream of gas by its velocity or by the latter and the heat evolved at the burner—as it is well known that two fluids flowing together at different velocities will not readily mix, and if the velocity of one of the fluids is sufficiently great there will, so to speak, be no admixture. In view of this well-known law of fluids and the fact that the velocity of flow of the gas under the action of the compressor would be sufficiently great to prevent an intimate admixture of the required volume of air with the gas, and thus defeat the object aimed at, I provide means whereby such intimate admixture is effected, so as to dispense with air forcing appliances and the special conduits required in the use of such appliances.

The principles of operation upon which the mixing appliances are based are shown in Fig. 2, in which D indicates a mixing tube or chamber whose outlet is contracted, the converging walls *d* having the form of paraboloidal segments, and axially within the tube below said converging walls I arrange a discoidal deflector *d'*. If a gas-injector nozzle or nozzles is or are so arranged relatively to the inlet to the tube D as to inject the gas axially thereinto at the high velocity referred to, currents of air will be induced and flow with the gas into the tube—that is to say, the ambient air will

be entrained by the jet of gas. In this manner a jet of gas enveloped by a body of air is caused to flow into the tube, and unless such flow is baffled or otherwise disturbed there would be but a very slight admixture of air with the gas; but as the jet of gas impinges upon the under side of the deflector *d'* it is deflected laterally, in substantially the form of a more or less concavo-convex sheet, with considerable force toward the tube-walls, thereby intercepting the flow of the envelop of air and mixing therewith. The impact of the gas upon the tube-walls and the axial arrangement of the deflector will also result in a reflux toward the axis of the tube of the mixed fluids, thus producing swirls and eddies from the deflector to the throat or outlet of the tube. As the tendency of the air entrained into the tube by the jet of gas is to hug or flow along the tube-walls, such air as is not intimately mixed with the gas at or about the deflector will flow upward and will then be directed toward the axis of the tube by the paraboloidal walls *d* thereof to the throat or outlet, at which point such air will meet with the out-current of the fluids and will commingle therewith and be absorbed thereby.

Although the velocity of flow of the jet of gas is somewhat increased by the ejector-nozzle beyond the velocity imparted to it by the compressor, yet as it is necessary in effecting the intimate admixture of the fluids to baffle their flow their velocity is somewhat retarded or decreased, and this retardation is increased by the admixture of the more sluggish ambient air with the gas. Hence in order to restore to the mixed fluids the velocity at which they shall issue from the burner I prefer to connect the latter with an expansion-chamber, which, in view of its proximity to the zone of combustion, becomes heated by radiation, thereby expanding the fluids and increasing the pressure thereof correspondingly, as well as preheating such fluids, rendering combustion still more perfect.

In Fig. 1 the injector-nozzle I is screwed to the gas-distributing pipe, and the mixer D is supported at a proper distance above the nozzle by means of rods *e*, secured to the collar *i*, supported by said nozzle. The burner B comprises an expansion-chamber *b'*, preferably of the form of an inverted hollow truncated cone, to which one or more burner-tips *b* are or may be secured, any well-known means being provided in practice for the support of an incandescible mantle or mantles if the burner be used for illuminating purposes. Should the burner be exposed to drafts of air, the space between the injector-nozzle and the mixing-chamber may be inclosed by a foraminous cylinder G.

Inasmuch as the flow of the gas and air to the burner is intercepted and its velocity is thereby reduced, I provide the expansion-chamber *b'*, wherein the intimately-mixed fluids are heated and caused to expand, whereby their normal pressure is restored and the combustion of the gas promoted, as will be readily understood.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. The combination with a burner and a mixing-chamber in communication therewith, and having its walls about the outlet leading to the burner formed of paraboloidal curves converging to said outlet; of an injector arranged relatively to the mixing-chamber to inject gas and induce a flow of air into said chamber, and means substantially such as described whereby the stream of gases flowing axially through the chamber is intercepted, spread and deflected against the chamber-walls and thereby directed to the aforesaid converging surfaces, for the purpose set forth.

2. The combination with a burner, an expansion-chamber in communication therewith, a mixing-chamber having its outlet connected with the expansion-chamber and formed of converging paraboloidal curves, and an injector arranged relatively to the mixing-chamber to inject gas and induce a flow of air thereinto; of means substantially such as described whereby the gas flowing axially into the mixing-chamber is intercepted, spread and deflected laterally against the chamber-walls, and thereby directed to the aforesaid converging surfaces, for the purpose set forth.

3. A burner comprising a mixing-chamber having its walls about the outlet in communication with the burner-tip formed of paraboloidal curves converging to said outlet, a gas-injector located some distance from the inlet to the mixing-chamber, whereby air is entrained thereinto by the velocity of the jet, a deflector *d'* within the mixing-chamber in the path of the jet of fluids, and a guard for guarding the jet against deflection by external air-currents, for the purpose set forth.

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

PAUL GREYSON DE SCHODT.

Witnesses:
HENRI RACLOTE,
EDOUARD LOBANY.