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L. MORENO & A. D'ANTONY.

APPARATUS FOR BURNING GAS.

APPLICATION FILED FEB. 27, 1905.

2 SHEETS—SHEET 1.

Fig. 1.

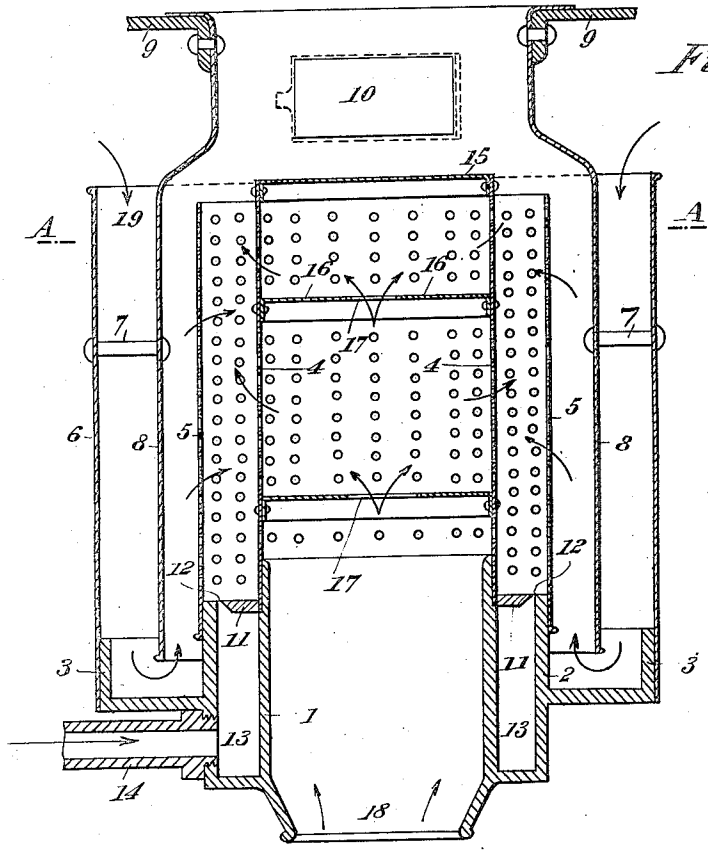
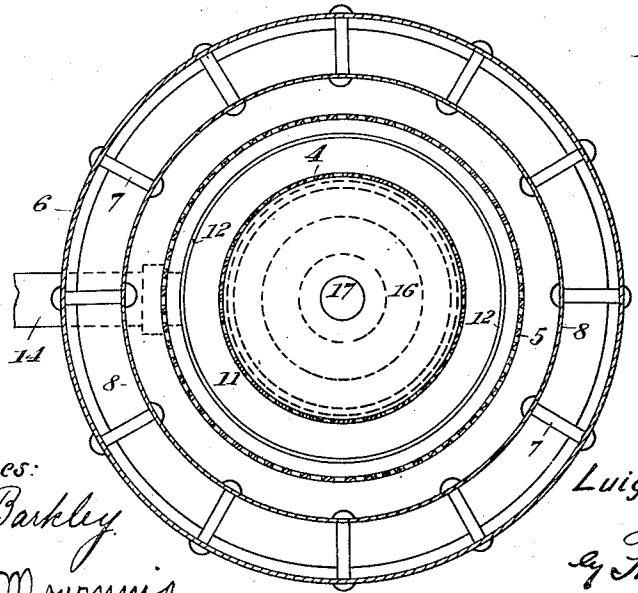


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

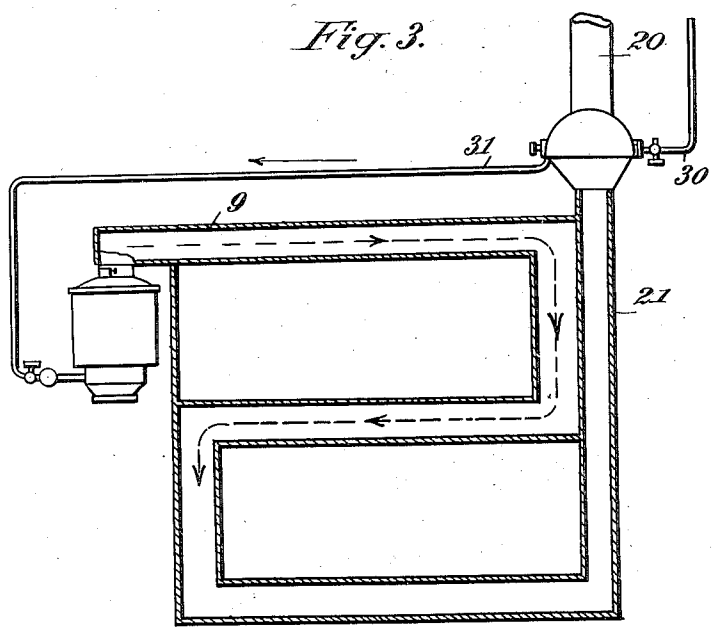


Fig. 5

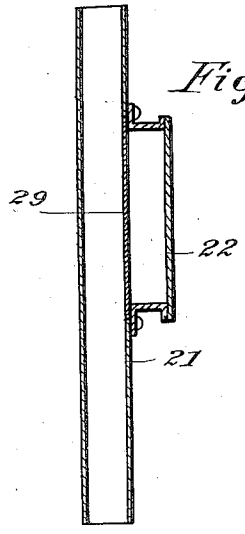
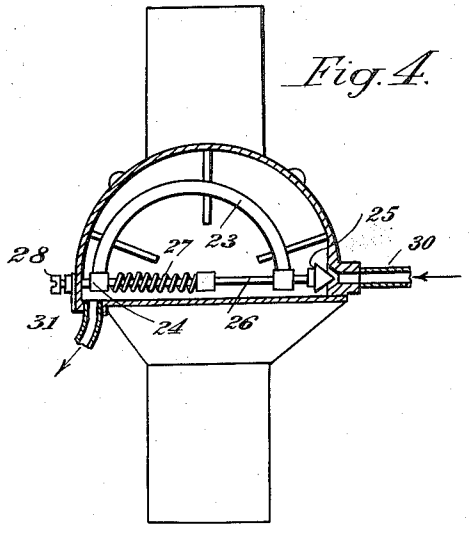


Fig. 4.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR BURNING GAS.

No. 812,513. Specification of Letters Patent. Patented Feb. 13, 1906.

Application filed February 27, 1905. Serial No. 247,636.

To all whom it may concern.

Be it known that we, LUIGI MORENO and AMEDEO D'ANTONY, subjects of the King of Italy, and residents of Turin, Italy, have invented certain new and useful Improvements in Apparatus for Burning Gas, of which the following is a specification.

The present invention relates to apparatus for burning gas.

It is well known that every combustion operated with the aid of atmospheric air as combustive medium the combustion is more or less hindered by the presence of nitrogen.

To remedy this drawback, the present invention consists in operating first the dissociation of the air into its principal components (oxygen and nitrogen) and then the separation of these two gases by chemical affinity. In fact, as the oxygen obtained by the dissociation has a very great affinity for the combutible gas will take alone an active part in the combustion, which in this manner will take place more rapidly and more thoroughly. In practice the dissociation of the combustion-air is effected by means of metallic and finely-perforated walls heated from the one side by the heat furnished by the combustion of the gas, while the other side of these walls comes in contact with the combustive air which is dissociated by the contact with the incandescent wall, and its oxygen passing through the perforations of the wall combines with the combustible gas and determinates the combustion of the latter.

In order to carry out the process hereinbefore described, we make use of a special burner or apparatus, one form of which has been represented, by way of example, in the annexed drawings, in which—

Figure 1 is a vertical section of the burner in a plane passing through the axis thereof; Fig. 2, a section through A A, Fig. 1. Fig. 3 is an elevation of the complete apparatus, the device for utilizing the heat of the burned gases being shown in section. Fig. 4 shows the interior of a thermostatic apparatus for regulating the admission of combustible gas to the burner, and Fig. 5 is a vertical section of the casing of the regulator.

The burner comprises a base formed by a central cylindrical part 1, open at its ends, and two concentric cylindrical rings or galleries 2 3, cast integral with the cylindrical part 1 in the manner shown in Fig. 1. On the parts 1 and 2 are fixed cylinders 4 and 5, which are made of wire-gauze or thin perforated metal. A third cylinder 6, without holes and concentric to the two first-mentioned cylinders, is joined to the part 3 of the base, and between 6 and 5 a fourth and non-perforated cylinder 8 is fixed by means of stay-bolts 7. The upper end of the cylinder 8 is joined to a pipe or conduit 9, forming a passage for the products of combustion. An ignition-opening is formed in the upper part of the cylinder and fitted with a door 10.

Near the upper end of the cylinder 1 an outer annular plate 11 is fixed in such a manner that an annular opening is left between the plate and the upper part of the gallery or cylinder 2. Thus a chamber 13 is formed. The combustible gas, which can escape through the annular opening 12, enters the chamber 13 through a pipe 14.

The cylinder 4 is closed at the top by a plate 15 and at certain points of its height is furnished with annular baffle-plates 16, in the center of each of which is an opening 17.

The action of the burner is as follows: When gas is admitted to the burner and ignition is effected through the door 10, the flame produced occupies the whole annular space between the cylinders 4 and 5, which in a few seconds become incandescent. In consequence of the suctional effect produced by a chimney of any kind—such, for example, as the chimney 20, Fig. 3—the air is drawn through the openings 18 and 19 and comes into contact with the incandescent sides of the cylinders 4 and 5. This air is separated into oxygen and nitrogen by the action of the heat radiated by the sides. The oxygen passes through the small openings in the cylinders 4 and 5 and mixes by affinity with the carbids of the gas and causes the gas to be quickly and completely consumed, while the nitrogen escapes freely through the openings in the upper part of the cylinders 4 and 5 without presenting any obstacle to the combustion which takes place in the space between the two cylinders mentioned above. The top 15 of the central vertical cylinder prevents the air from escaping directly through that end of the cylinder. This air is completely utilized in the combustion, and the object of the baffle-plates 16 is to distribute the air uniformly over the whole perforated surface of the central cylinder. These baffle-plates may be replaced by other devices which effect the same result. Fig. 3 represents, by way of example, the manner in which this heat can be utilized. In this ex-

ample the products of combustion pass into pipes 21, of greater or less length, arranged in a manner that is convenient and suitable to the use to which it is desired to put the heat. These gases are then driven out through the chimney 20.

The heating installation may be provided with a thermostatic device for regulating the admission of the gas to the burner. Such a device may, for instance, comprise a box 22, Figs. 4 and 5, in which a pipe 23 is arranged, which is bent in the form of an arc and closed hermetically at each end. One of the ends is fixed at 24 and the other is joined to a valve 25 by means of a rod 26, controlled by a spiral spring 27 and by a pressing-screw 28. The thermostat is placed at any point in the area in which it is desired to produce and maintain a constant temperature. For this purpose, the thermostat being fixed on the pipe 21 for the burned gases, the side 29 of the box 22 is in direct contact with the hot gases coming from the burner, Fig. 5. Before reaching the pipe 14, leading to the burner, the gas enters the regulator-box 22 through a pipe 30 and passes out through another pipe 31, connected with the pipe 14. It is easy to see on examining the drawings that owing to the heat transmitted through the side 29 (directly the temperature of the products of combustion exceeds the temperature desired) the pipe 23, made of materials which are very sensitive to heat, tends to straighten and push the valve toward its seat, causing it to shut off, more or less, the passage for the gas passing through the pipe 30 and limiting the quantity of this gas admitted to the burner to the quantity necessary for maintaining the desired temperature. By operating the screw 28 the sensitiveness of the pipe 23, as well as the resistance of the spring 27, is increased or reduced. The details of arrangement and construction of this regulator may vary with each case in which the regulator is employed.

Having now fully described our said invention, what we claim, and desire to secure by Letters Patent, is—

1. In combination, a body portion open at both ends, galleries formed around the body portion and each other, a cylinder secured at one end to the outer gallery and having its opposite end open to the atmosphere, a second cylinder arranged within the first-named cylinder and supported thereby, one end of said second cylinder extending within and terminating above the bottom of the outer gallery, the opposite end of said second cylinder being in communication with a draft-pipe, a perforated cylinder secured to the inner gallery within the second cylinder, a second perforated cylinder secured at one end to the body portion and arranged within the first perforated cylinder, said second perforated cylinder having its opposite end closed, baffle-plates within the second perforated cylinder, and a supply-pipe communicating with the inner gallery.

2. In combination, a body portion open at both ends, galleries formed around the body portion and each other, a cylinder secured at one end to the outer gallery and having its opposite end open to the atmosphere, a second cylinder arranged within the first-named cylinder, and supported thereby, one end of said second cylinder being in communication with a draft-pipe, a perforated cylinder secured to the inner gallery within the second cylinder, a second perforated cylinder secured at one end to the body portion and arranged within the first perforated cylinder, said second perforated cylinder having its opposite end closed, baffle-plates within the second perforated cylinder, and a plate carried by the body portion extending toward but not contacting with the outer wall of the first gallery and a supply-pipe communicating with the first gallery.

3. In combination, a body portion open at both ends, galleries formed around the body portion and each other, a cylinder secured at one end to the outer gallery and having its opposite end open to the atmosphere, a second cylinder arranged within the first-named cylinder, and supported thereby, one end of said second cylinder being in communication with a draft-pipe, a perforated cylinder secured to the inner gallery within the second cylinder, a second perforated cylinder secured at one end to the body portion and arranged within the first perforated cylinder, said second perforated cylinder having its opposite end closed, perforated baffle-plates within the second perforated cylinder, a plate carried by the body portion extending toward but not contacting with the outer wall of the first gallery, a supply-pipe communicating with the first gallery and means for regulating the flow of fluid through the supply-pipe.

In testimony whereof we have hereunto set our hands in presence of two witnesses.

LUIGI MORENO.
AMEDEO D'ANTONY.

Witnesses:
HUGO PIZZOTTI,
GOTHARD C. PERONI.