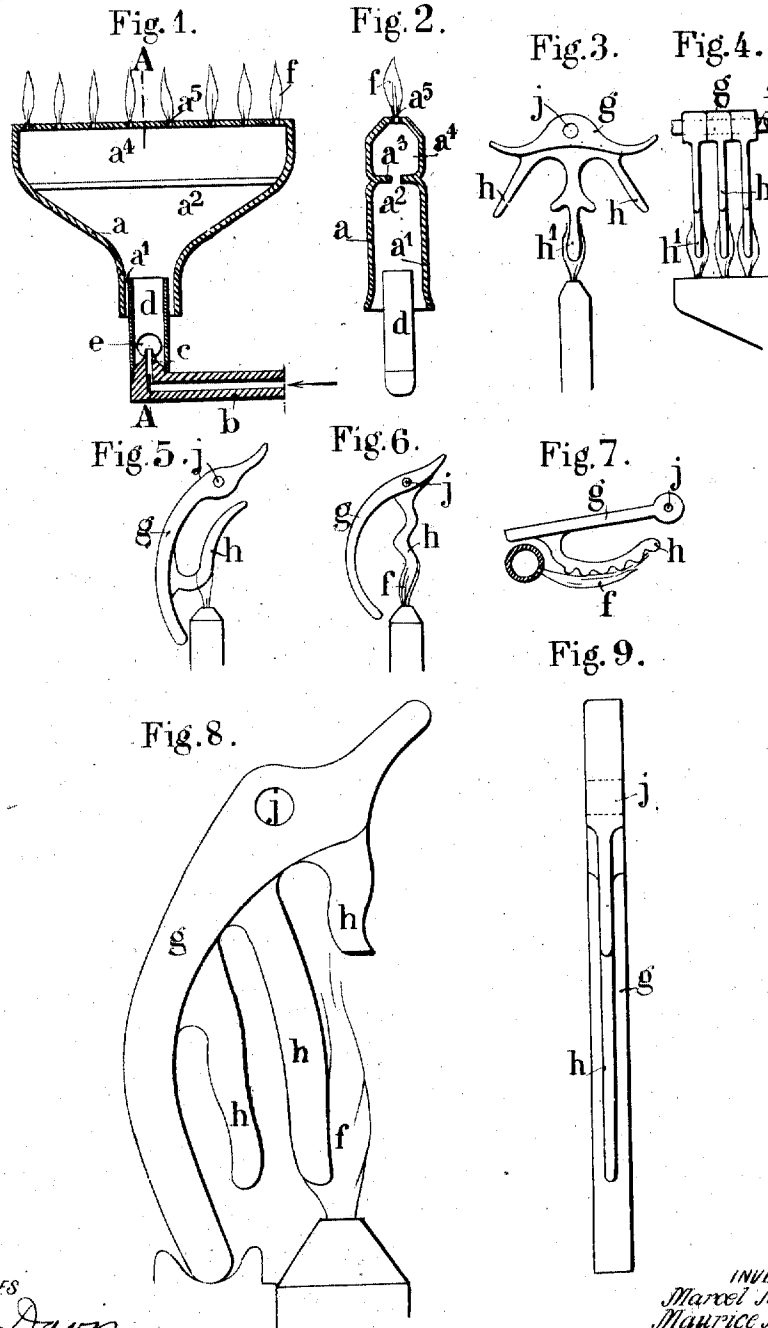


M. & M. M. MÉRAN.
HEATING APPARATUS.
APPLICATION FILED OCT. 15, 1909.

994,599.

Patented June 6, 1911.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 10.

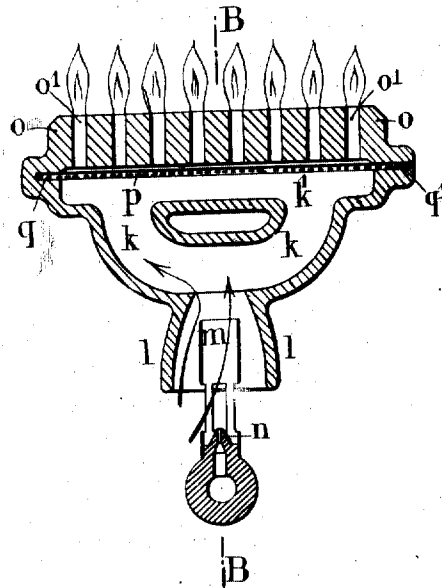
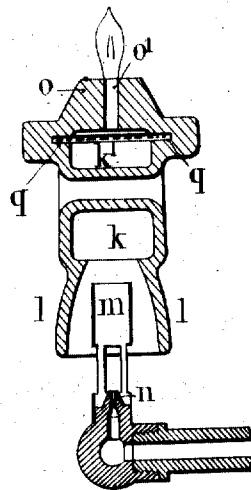


Fig. 11.



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HEATING APPARATUS.

994,599.

Specification of Letters Patent. Patented June 6, 1911.

Application filed October 15, 1909. Serial No. 522,741.

To all whom it may concern:

Be it known that we, MARCEL MÉRAN and MAURICE MARC MÉRAN, of 155 Rue du Faubourg Poissonnière, in the city of Paris, Republic of France, have invented Improvements in Heating Apparatus, of which the following is a full, clear, and exact description.

In gas apparatus for heating by radiation it has been sought to obtain—

1. An air and gas mixer providing, before combustion, a mixture as perfect and as intimate as possible, the quantities being supposed suitable, so as to obtain a flame furnishing the maximum heat. Moreover, this mixer is required to be of such construction that the heat produced can be increased or reduced by a simple variation of the gas burner.

2. Utilization of the hottest part of this flame in order to raise to the highest possible temperature, a refractory body which will subsequently radiate its heat, and that without detriment to the combustion of the gas.

3. A refractory body of such shape that it can undergo sudden expansion without cracking or splitting.

The present invention is hereinafter described with reference to the accompanying drawing, in which:

Figure 1 shows, in vertical section, an air and gas mixing apparatus comprised in the present improved heating apparatus. Fig. 2 shows a transverse section taken on the line A—A, Fig. 1. Fig. 3 is a side view of a refractory element or body comprised in this apparatus. Fig. 4 is a front view of a number of refractory elements or bodies. Figs. 5, 6 and 7 are side views of three modified forms of refractory bodies. Fig. 8 shows, inside view, another modified form of refractory body. Fig. 9 is a front view of the refractory body shown in Fig. 8. Fig. 10 shows in vertical section a modified form of burner. Fig. 11 is a cross section of the same burner, the section being made on line B—B, Fig. 10.

The heating apparatus which is the subject of the present application comprises a mixer *a* formed of a piece of pottery metal, or other material having the shape shown

in Figs. 1 and 2. This mixer comprises a burner of the ordinary Bunsen type having a jet orifice *c* opening into a cylindrical tube *d*, which has an air admission opening *e* formed therein. This opening is adjustable by means of a shutter in order to regulate the air which is admitted to mix with the gas supplied through the jet orifice. The gas from the Bunsen tube thus constituted, and which is already mixed with air, flows into the mixer, the shape of which is indicated in the drawing. Between the Bunsen tube and the tube forming the base of the mixer, an annular space *a'* is left free through which an additional quantity of air passes in order to become mixed with the mixture previously made. The gas thus mixed distributes itself in the chamber *a''*, flows in a flattened or sheet-like stream through a slot *a'''* and then spreads itself throughout the length of the burner in the chamber *a''* from whence it passes out through nozzles *a''''* to burn in the free air. The size of the air apertures being suitably adjusted, the flames *f* coming out of these nozzles will be of the same length and the same intensity. These flames will burn without noise and their intensity can be diminished simply by diminishing the gas supplied to the jet orifice, without the constitution of the flames being modified and without affecting the admission of air. It should also be remarked that, by reason of its vertical direction, however feeble may be the flow of the gas at the exit from the jet orifice, by simple difference of density it will quite naturally burn at the nozzles.

If a piece or element having the shape illustrated in Fig. 3, that is to say a piece formed of any refractory material and comprising a head *g* and three branches *h* as thin as possible, is suspended just above one of the flames of the burner, the hot gases of the flame will ascend around the middle branch making it red-hot along its whole length. This will be easily effected by regulating the flame in such a manner that the part thereof which has the highest temperature strikes against the middle branch of the refractory element. The piece or element is supported on a rod *i* passing through the hole *j* and is provided on its sides with

similar pieces which are all in contact with one another by the thick parts or heads *g*. The branches *h* *h'* are thinner than the heads and are separate one from the other so that, in order to escape, the hot gases will be compelled to pass between the branches *h'* giving up their heat to the latter. By thus placing a series of pieces or elements arranged side by side, above the nozzles of the burner, as shown in Fig. 4, a radiator is formed which will give a maximum efficiency since all the branches of the pieces or elements, being arranged in the best position possible with respect to the flames, coming from the mixer, will be raised to the highest temperature possible, and nothing opposes radiation therefrom. The branches *h* are provided only in order to utilize the excess of heat contained in the products of combustion. It will be seen moreover that the elements being thin, it is not possible for them to crack or split as a result of sudden expansion due to rapid changes of temperature.

The refractory pieces or elements can be of various shapes and are supported side by side, the contacting thicker parts forming a base or cover, and the thinner parts being separated, surrounded by the flames of the burners, and intended to be raised to a high temperature to radiate their heat. Thus, for example, a piece or element may be arranged as shown in Fig. 5, the part *h* of which is raised to the maximum temperature, this part being surrounded by the flame while the thicker part *g* forms a base and, throughout its length, is in contact with an adjacent piece. In the case of a cooking or roasting stove, the best flame which comes from the burners impinges throughout its length against the thin parts of the branches *h* in order to raise them to the maximum temperature, the thick parts of which are in contact forming a roof or cover. In the two examples last mentioned it will be observed that, whatever may be the expansion, as in the previous example, these pieces or elements are not liable to become cracked.

It is important that the nozzle of the burners should be placed, in general, along a line slightly in front of the thin branches to be heated, the result of this arrangement being that these branches are raised to a high temperature in the direction in which it is desired to radiate the heat. The other branches are provided only for the purpose of utilizing the residue of the heat from the flame.

Fig. 8 shows an element placed above the burner. It will be seen from this figure that the branches are arranged in such a manner that the nozzles of the burner are slightly in front of the middle branch, in such a manner that this branch will become red-hot on all its sides and throughout its

length. The gas which is still very hot, will also raise the other two adjacent branches to incandescence.

Only burners having a single row of apertures have been spoken of. It should however be noted that as many rows as is convenient may be provided. Likewise branches attached by their upper parts to the thick part forming the head or base are alone referred to, but these branches can commence at any point and can be led in any direction.

In the modified form of burner shown in Figs. 10 and 11, the distribution of the gas is made in a perfectly regular manner. This result is obtained by dividing the base of the apparatus into two pipes *k*, forming a fork, and terminated by a sleeve *l* forming a bell. In this bell opens the cylindrical tube *m* surmounting the jet orifice *n* of the Bunsen burner. The two pipes *k*, forming a 'fork', are connected in a long chamber *k'* closed at its upper part by a thick plate *o*, provided with holes *o'* so as to constitute a kind of pipe or conduit on which the gas burns. Between the plate *o* and the burner, a wire gauze *p* is arranged in the following manner: The body of the burner being made entirely of refractory clay and in one piece, an opening *q* *q'* is provided in the interior of the same, so that the strip of wire gauze *p* may be introduced as a drawer in the opening *q* *q'*, as shown in the drawings. The very small orifice *q'* which serves to introduce the wire gauze, can be very easily closed by any heat resisting cement, and the burner, insulated in one piece and baked will present the maximum of strength. Moreover, the wire gauze *p* being arranged on the base of the combustion holes *o'* which are formed in a thick plate of refractory clay, is protected from a too high temperature, which insures its preservation indefinitely. Besides, it is to be noted that the wire gauze may be easily replaced or cleaned, by simply removing the material closing the introduction orifice *q'*.

We claim:

1. The combination with a burner having a plurality of nozzles, of a plurality of heat radiating members formed of refractory material, and each having an apertured head and branches depending from the head and thinner than the same, and a rod above the burner, and upon which the members are mounted in contact with each other, one above each nozzle of the burner.

2. The combination with a burner having a plurality of nozzles, of a plurality of heat radiating members formed of refractory material and each having a head and branches depending from the head and thinner than the same, said members being arranged side by side and in contact with each other, one above each nozzle of the burner.

3. The combination with a burner having
a plurality of nozzles, of a plurality of heat
radiating members formed of refractory ma-
terial and each having a branch projecting
5 from the body thereof and thinner than the
said body, the members being arranged side
by side and in contact with each other, one
above each nozzle of the burner.

The foregoing specification of our im-
provements in heating apparatus, signed by 10
us this 2nd day of October, 1909.

MARCEL MÉRAN.

MAURICE MARC MÉRAN.

Witnesses:

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R. EMBROT.