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GAS-BURNER JET ASSEMBLIES

Filed Oct. 3, 1966

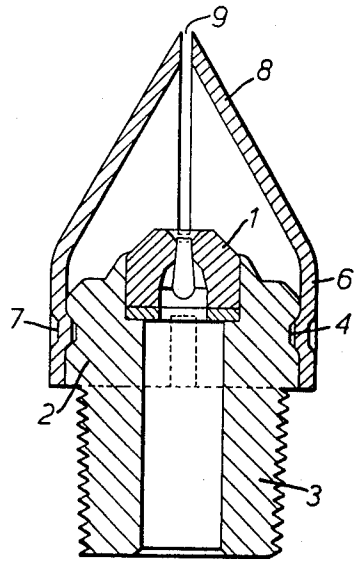

FIG. 1.

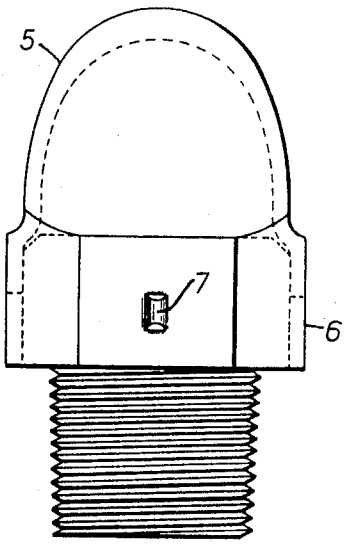

FIG. 3.

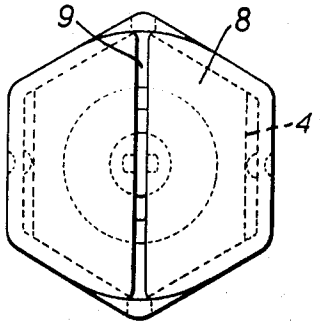

FIG. 2.

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GAS-BURNER JET ASSEMBLIES

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U.S. Cl. 239—594 3 Claims

ABSTRACT OF THE DISCLOSURE

A small, compact gas-burner jet assembly of the same physical dimensions as a post-aerated coal gas jet, and which produces a flat, fan-shaped flame. The assembly can be used with manufactured gases, which are essentially fast burning and natural gas, which is slow burning. When the assembly is used with slow burning gases, the flame extends only partially over a slot formed in the burner head and air is entrained through the exposed portions of the slot.

The present invention relates to a small compact gas-burner jet assembly for use with natural and manufactured gases.

Natural gas has been discovered in large quantities in Europe and is being increasingly used in place of conventional fuel gases made from coal. In some countries where natural gas is not yet available, new gas making processes are being used to produce gases of the same heating value as natural gas, in anticipation that supplies of the latter will become available. There is a need for gas jets and burners for both new appliances and for the conversion of existing ones. In order to reduce the cost of converting appliances, it is necessary that any new jet be capable of burning both the new manufactured gases, which are essentially fast burning, and natural gas, which is slow burning.

Many existing appliances use the well known post-aerated coal gas jet which is unsuitable for use with natural gas and the new manufactured gases, and there is a particular requirement for a jet of similar physical dimensions and flame characteristics.

The present invention facilitates the construction of a small, compact gas-burner jet assembly of the same physical dimensions as a post-aerated coal gas jet, and which produces a flat, fan-shaped flame.

According to the present invention a gas-burner assembly comprises in combination a gas-burner head of hollow shell-like construction having a skirt portion, and a gas injector surrounded by said skirt portion said injector producing a divergent laminar gas stream and said head being formed with two inwardly sloping upwardly extending walls of arcuate section, the edges of said walls defining a slot which lies in a plane containing the longitudinal axis of the burner, said slot extending downwardly at least to the plane which is perpendicular to said gas stream and in the same level as said injector, said gas stream impinging on said sloping walls and being guided substantially uniformly towards said slot when the said plane containing said slot lies at right angles to said gas stream.

Further, to form a gas-burner jet assembly for use with natural and manufactured gas a burner head according to the invention may be mounted on a gas injector which produces a divergent laminar gas stream and is orientated such that the slot lies in a plane perpendicular or parallel to the plane of the gas stream according to the flame shape required.

The invention will now be described in greater detail

by way of example, with reference to the accompanying drawing of which:

FIGURE 1 is a sectional elevation of the gas-burner jet assembly, taken in a plane perpendicular to the plane of the slot,

FIGURE 2 is a plan view of the gas-burner jet assembly shown in FIGURE 1, and

FIGURE 3 is an elevation of the gas-burner jet assembly shown in FIGURE 1 taken in a plane parallel to the plane of the slot.

With reference to FIGURES 1–3 the gas-burner jet assembly consists of an injector proper **1** mounted in a metal holder **2** which is provided with a means of attachment to a gas pipe **3**. The injector proper is of the type which produces a fan-shaped or laminar stream of gas and is arranged so that the major axis of the laminar gas stream is at right angles to two parallel grooves **4** formed in the metal holder **2**.

The injector is surmounted by a gas-burner head **5** which has a straight walled, hexagonal skirt portion **6** in which are formed two indentations **7** which locate in the grooves **4**, thus allowing the head to be clipped onto and secured to the injector as described in copending British application No. 42,608/65.

Above the skirt portion **6**, the gas-burner head consists of two inwardly sloping upwardly extending walls **8** of arcuate section which are formed, as is the head as a whole, by a metal drawing operation. The edges of the walls **8** define a substantially semicircular slot **9** which extends partly into the skirt portion. When this slot is at right angles to the laminar gas stream issuing from the injector, a flame having a width equal to its height is formed. The jet may equally be made with the slot in the same plane as the laminar injection stream, in which case the height of the flame is greater than its width.

The laminar gas stream from the injector strikes the inside of the sloping walls of the head and then spreads out laterally, being guided by the curvature of the walls, towards the slot where it burns after mixing with the surrounding air.

When used with a fast burning gas, the flame base is siutated on the head and extends over substantially the full length of the slot. The flame may then be considered as essentially post-aerated since there is no mixing of the gas and air prior to the point of combustion.

When used with slower burning natural gas, the flame base does not cover the whole of the slot. The two lower edges of the flame are situated slightly above the base of the slot, and air is entrained into the head through the exposed areas of the slot. A certain premixing of gas and air prior to combustion then occurs. This is accompanied by a slight lifting of the base of the flame at the apex of the head immediately above the injector and additional aeration occurs at this point.

The degree of aeration may be varied by varying either the width of the slot, the distance between the apex of the slot and the injector, or the length of the major axis of the laminar gas stream issuing from the injector.

A similar result can be achieved by using any form of injector which has a divergent gas stream, that is one which impinges upon the walls of the head before issuing from the slot. This impingement has the effect of distributing the gas over substantially the whole length of the slot and of destroying some of the momentum of the gas stream, thus avoiding lifted flames which would normally result from the use of a nondivergent injector in such a short mixing tube.

I claim:

1. A gas-burner assembly comprising in combination a gas-burner head of hollow shell-like construction having a skirt portion, and a gas injector surrounded by said skirt portion, said injector producing a divergent laminar

gas stream and said head being formed with two inwardly sloping upwardly extending walls of arcuate section, the edges of said walls defining a slot which lies in a plane containing the longitudinal axis of the burner, said slot extending downwardly at least to the plane which is perpendicular to said gas stream and in the same level as said injector, said gas stream impinging on said sloping walls and being guided substantially uniformly towards said slot when the said plane containing said slot lies at right angles to said gas stream.

2. A gas burner as claimed in claim 1 in which said injector provides a fan-shaped laminar flame.

3. A gas burner as claimed in claim 2 in which said skirt portion is in snap-fitting engagement with said injector and is rotatable relative thereto.

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