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K. V. SELIVANOV ET AL

3,536,306

MULTIFLAME BURNERS

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3 Sheets-Sheet 2

FIG. 3

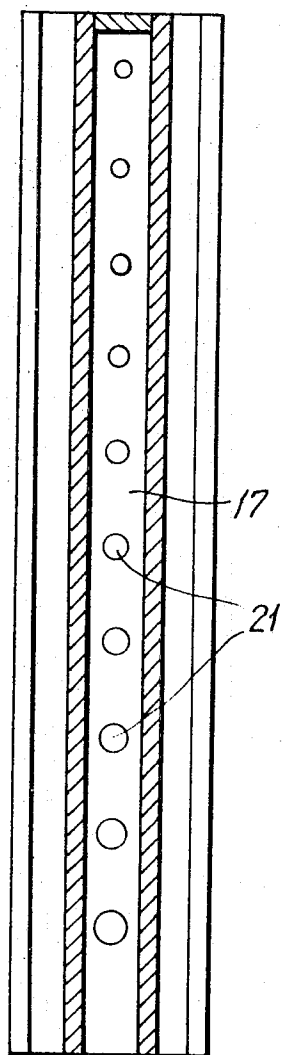
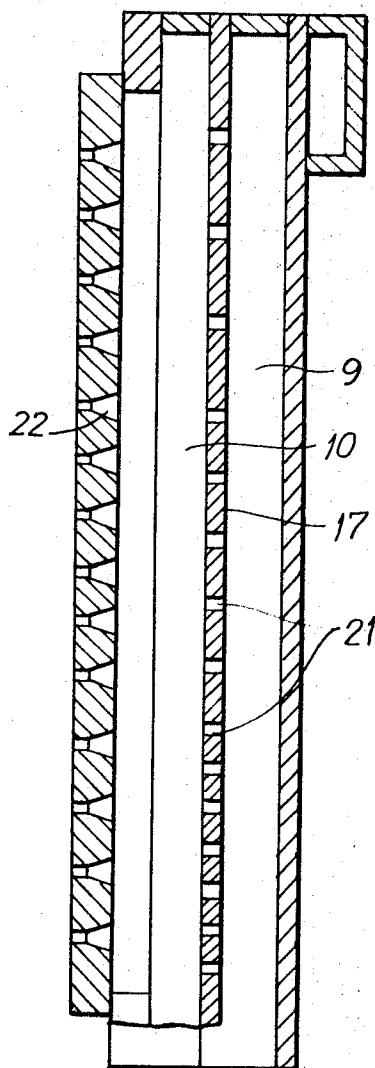
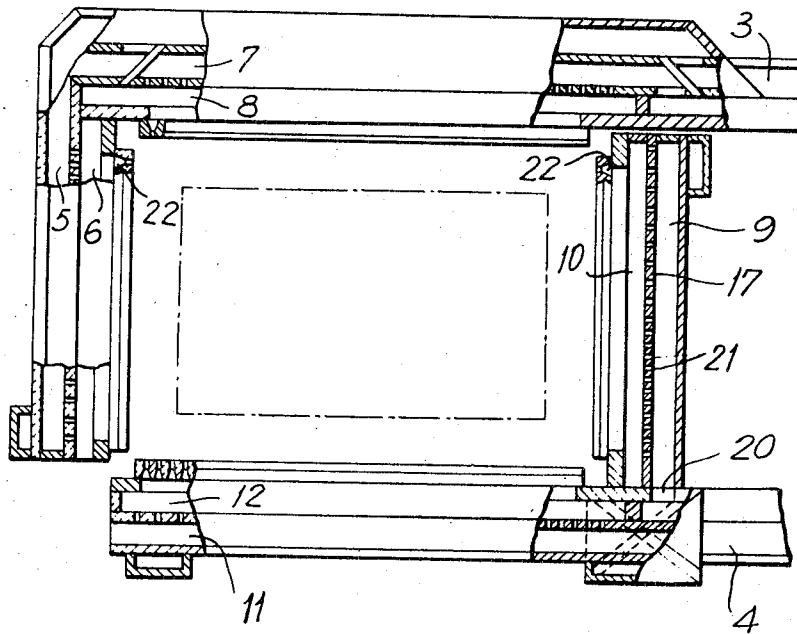


FIG. 4





1

2

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MULTIFLAME BURNERS

Konstantin Vasilievich Selivanov, Tikhom Alexeevich Vladimirsky, Leonid Andreevich Kolesnikov, and Oleg Efimovich Melnikov, Moscow, U.S.S.R., assignors to Vsesojuzny Nauchno-Issledovatel'sky Institut Zheleznodorozhnogo Transporta, Moscow, U.S.S.R.
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10 Claims 10

ABSTRACT OF THE DISCLOSURE

A multiflame burner for burning a combustible gas mixture comprising a mixing chamber connected to a burner head, said burner head having the shape and size of the article to be heated therein. The burner head has gas chambers divided by a partition having gas feed holes. Uniform flame intensity is provided in the burner by arranging the gas feed holes in the partition in a manner such that the hole area per unit length of the partition decreases with an increase in the distance between the holes and the inlet through which the combustible gas mixture enters the gas chamber.

This is a continuation of application. Ser. No. 429,422 filed Feb. 1, 1965, now abandoned.

This invention relates to multiflame burners intended to burn mixtures of combustible gases and oxygen for local heating in gas-pressure welding, heat treatment of metals and other applications, such as bending.

It is known to use multiflame burners consisting mainly of a body with a chamber for mixing combustible gas and oxygen, and a burner head which comprises gas chambers and water cooling chambers and is arranged so as to suit the shape and size of the article being heated.

The burners known hitherto have their gas chambers divided by means of partitions having equally spaced gas holes of the same area, the chambers being provided with orifices for the discharge and burning of the mixture of combustible gas and oxygen.

Such burners fail to ensure uniform flame distribution, particularly in the case of slowly burning gas mixtures (for example, the mixture of natural gas and oxygen or the mixture of industrial propane and oxygen).

Nonuniform flame distribution results in uneven heating of the article being treated, with consequent failure to ensure adequate quality of welding or heat treatment.

It is known to obtain uniform local heating of the article by the use of oxyacetylene multiflame burners.

Since acetylene is costly and short in supply, its use as a combustible gas is disadvantageous. Apart from this, the use of acetylene calls for provision of gas plants staffed with specially trained personnel.

This invention has for an object the elimination of the aforesaid disadvantages.

A particular object of this invention is to devise such a multiflame burner for local heating of articles in gas-pressure welding, heat treatment and other operations, such as bending, that will burn cheap combustible gases (natural gas, industrial propane, etc.) and ensure uniform heating, the application of said burners improving the quality of the above-mentioned operations and enabling the gas supply units to be simplified and their operational cost to be reduced.

According to the present invention, a multiflame burner for local heating of articles in gas-pressure welding, heat treatment and other operations, e.g., bending, comprises a mixing chamber connected with a head arranged so as to suit the shape and size of the article being heated and

has a cooling chamber and gas chambers divided by a partition having gas holes, in which burner uniform flame intensity throughout the head, in burning, say, natural combustible gases, is obtained by arranging the gas holes in the partition so that the hole area per unit length of the partition decreases with the increase in the distance between the holes and the inlet wherethrough the combustible mixture enters the gas chamber.

The gas holes in the partition may be made equal in area and arranged lengthwise of the partition so that the spaces between them increase with the increase in the distance between the holes and the inlet wherethrough the combustible mixture enters the gas chamber. Alternatively, the gas holes in the partition may be spaced equally and have their respective areas decreasing with the increase in the distance between the holes and inlet wherethrough the combustible mixture enters the gas chamber.

For a further understanding of the present invention a description thereof is given hereinbelow with reference to the accompanying drawings, wherein:

FIG. 1 shows a multiflame burner with the head arranged to suit the shape and size of a H-section article (side view);

FIG. 2 shows a multiflame burner with the head arranged to suit the shape and size of a rectangular-section article;

FIG. 3 shows the partition with equally spaced gas holes of varying diameter;

FIG. 4 shows a partition with gas holes equal in area and spaced from each other at distances increasing with the increase in the distances between said holes and the inlet wherethrough the combustible mixture enters the gas chamber;

FIG. 5 shows the head of a multiflame burner for rectangular-section articles.

The multiflame burner for H-section articles comprises mixing chamber 1 intended for mixing the combustible gas and the oxygen and connected with the burner head through distribution chamber 2.

The burner head is arranged to suit the shape and size of the article being heated. One head may be used for heating articles of various sizes, for example, to weld round-section articles of the size from 60 x 100 to 90 x 150 mm.

The burner head consists of upper part 3 and lower part 4. The upper and lower parts of the burner head are each fitted with two outer and two inner gas chambers arranged in pairs; 5 and 6, 7 and 8, 9 and 10, 11 and 12. The gas supply is directed to the gas chambers in burner head upper part 3 via gas ducts 13 and 14, and to the gas chambers in burner head lower part 4 via gas ducts 15 and 16.

Each pair of gas chambers is divided by a partition same as chambers 9 and 10 are divided by partition 17.

The mixing chamber is made up of pipes 18 and 19 wherein a coolant, such as water, circulates.

The gas mixture passes through inlet 20 into outer gas chamber 9 and thence through gas holes 21 in partition 17 into inner chamber 10, wherefrom it discharges through orifices 22 into the atmosphere to burn.

The area of the gas holes 21 per unit length of partition 17 decreases with the increase in the distance between said holes and inlet 20 wherethrough the combustible mixture enters gas chamber 9, whereby provision is made for equality in lengths of flames produced from all orifices 22.

According to FIG. 4 this is accomplished in that the gas holes are made equal in area and spaced at distances increasing with the increase in the distance between the holes and inlet 20 through which the combustible mixture passes into the gas chamber.

An alternative to this method as shown in FIG. 3 is to space the gas holes equally, with the hole areas decreasing with the increase in the distance between the holes and the inlet through which the combustible mixture enters the gas chamber.

The above-described arrangements insure uniform flames from orifices 22 throughout the burner head, whereby provision is made for uniform heating of the article.

This description of the present invention is given in connection with the preferable embodiment thereof and it is to be understood that changes and modifications may be made without departure from the scope and spirit of this invention, as those skilled in the art will easily understand.

What is claimed is:

1. A multiflame burner adapted for burning a gas mixture and comprising: a mixing chamber adapted for mixing a combustible gas and oxygen; a burner head connected to said mixing chamber and of a shape to accommodate an article to be heated; cooling chambers mounted on said burner head; said burner head including gas chambers; a partition dividing each of said gas chambers into an outer gas chamber having an inlet and an inner gas chamber having an outlet, said inner gas chamber having said outlet constituted by orifices adapted to discharge the gas mixture into the atmosphere to burn; said burner head including ducts coupled to said mixing chamber to deliver said gas mixture into said outer gas chamber, said partitions being provided with gas holes extending in alignment from said inlet completely across said partition and arranged throughout said alignment so that their areas per unit length of the partition decreases throughout the length of the partition proportionally to an increase in distance between said holes and the inlet wherethrough the gas mixture enters the inner gas chamber to provide for uniform flame intensity throughout the burner head.

2. A multiflame burner as claimed in claim 1, wherein said gas holes are equal in area and are spaced along the partition at distances increasing with an increase in distance between said holes and the inlet.

3. A multiflame burner as claimed in claim 1, wherein said gas holes are equally spaced in said partition and decrease in area with an increase in the distance between said holes and the inlet.

4. A burner as claimed in claim 1, wherein said chambers are relatively flat elongated chambers of relatively uniform height on opposite sides of said partition, said partition being of relatively uniform thickness at least along said alignment.

5. A burner as claimed in claim 4, wherein all of said orifices are uniformly spaced in said inner chamber, said orifices and gas holes being in parallel rectilinear alignment.

6. A burner as claimed in claim 5, wherein said gas holes are of uniform axial extent which is relatively short with respect to the height of the inner chamber.

7. A burner as claimed in claim 6, wherein the first said gas chambers collectively encompass and define a work zone having the shape of a piece to be heated, said inner chambers all facing inwardly into said zone.

8. A multiflame burner adapted for local heating in gas-pressure welding, heat-treatment of metals and other operations involving the burning of combustible gas mixtures and preferably mixtures of natural combustible gas with oxygen or of technical propane with oxygen, said burner comprising: a mixing chamber; a burner head connected with said mixing chamber and conformed to the shape and size of the article to be heated; cooling chambers in said burner head; gas chambers in said burner head; partitions of uniform thickness lengthwise, subdividing each said gas chamber into an outer gas chamber and inner gas chamber, each said inner gas cham-

ber having orifices which form the working profile of the burner head and discharge the combustible mixture into surrounding atmosphere to burn; ducts to deliver the combustible mixture into said outer gas chambers, said ducts being connected with said outer gas chambers and said mixing chamber; each said partition being provided with gas holes such that their areas per unit length of the partition decrease throughout the associated partition's length with an increase in the distance between said holes and the associated duct, wherethrough the combustible mixture enters the associated outer gas chamber, whereby provision is made for a uniform flame intensity throughout the burner head.

9. A multiflame burner adapted for local heating in gas-pressure welding, heat-treatment of metals and other operations involving the burning of combustible gas mixtures and preferably mixtures of natural combustible gas with oxygen or of technical propane with oxygen, said burner comprising: a mixing chamber; a burner head connected with said mixing chamber and conformed to the shape and size of an article to be heated; cooling chambers in said burner head; gas chambers in said burner head; partitions of uniform thickness lengthwise, subdividing each said gas chamber into an outer gas chamber and an inner gas chamber, said inner gas chamber having orifices that form the working profile of the burner head and discharge the combustible mixture into the surrounding atmosphere to burn; ducts to deliver the combustible mixture into said outer gas chambers, said ducts being connected with said outer gas chambers and said mixing chamber; each said partition being provided with gas holes equal in area and spaced lengthwise of the associated partition at distances increasing with an increase in distance between said holes and the associated duct, wherethrough the combustible mixture enters the associated outer gas chamber, whereby provision is made for a uniform flame intensity throughout the burner head.

10. A multiflame burner adapted for local heating in gas-pressure welding, heat-treatment of metals and other operations involving the burning of combustible gas mixtures and preferably mixtures of natural gas with oxygen or of technical propane with oxygen, said burner comprising: a mixing chamber; a burner head connected to said mixing chamber and of a shape to accommodate an article to be heated; cooling chambers in said burner head; gas chambers in said burner head; partitions of uniform thickness lengthwise, subdividing each said gas chamber into an outer gas chamber and an inner gas chamber, each said inner gas chamber having orifices that form the working profile of the burner head and discharge the combustible mixture into the surrounding atmosphere to burn; ducts to deliver the mixture of combustible gas and oxygen into said gas chamber, said ducts being connected to said outer gas chambers and said mixing chamber; each said partition being provided with gas holes equally spaced in the associated partition throughout its length and decreasing in area with an increase in the distance between said holes and the associated duct, wherethrough the combustible mixture enters the gas chamber, whereby provision is made for a uniform flame intensity throughout the burner head.

References Cited

UNITED STATES PATENTS

1,751,960	3/1930	Veenstra	239—561
2,719,581	10/1955	Greathead	239—132.3
3,331,293	7/1967	Mullaney	263—2

JOHN J. CAMBY, Primary Examiner

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