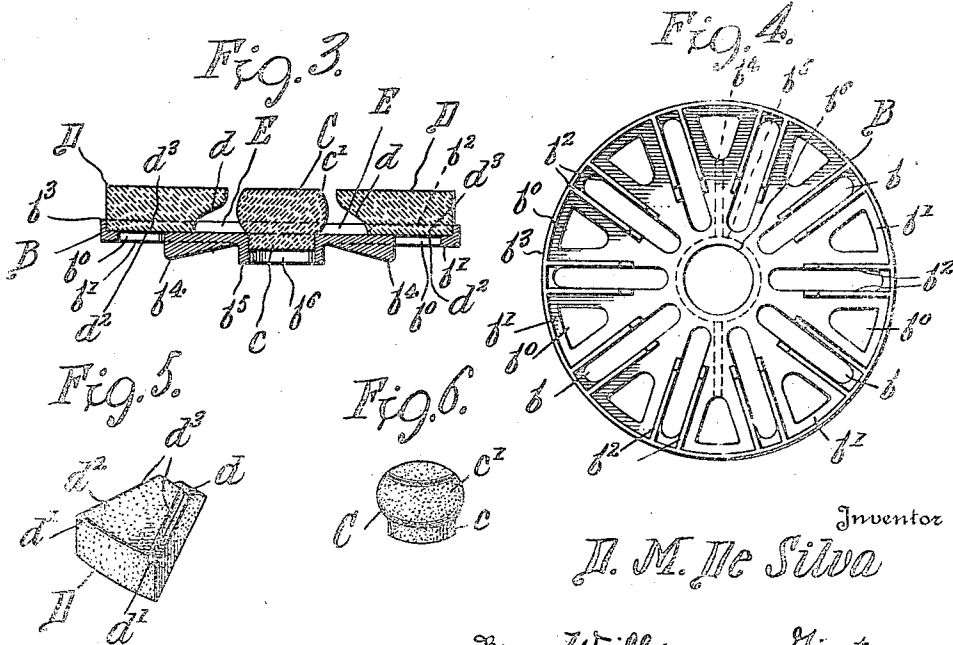
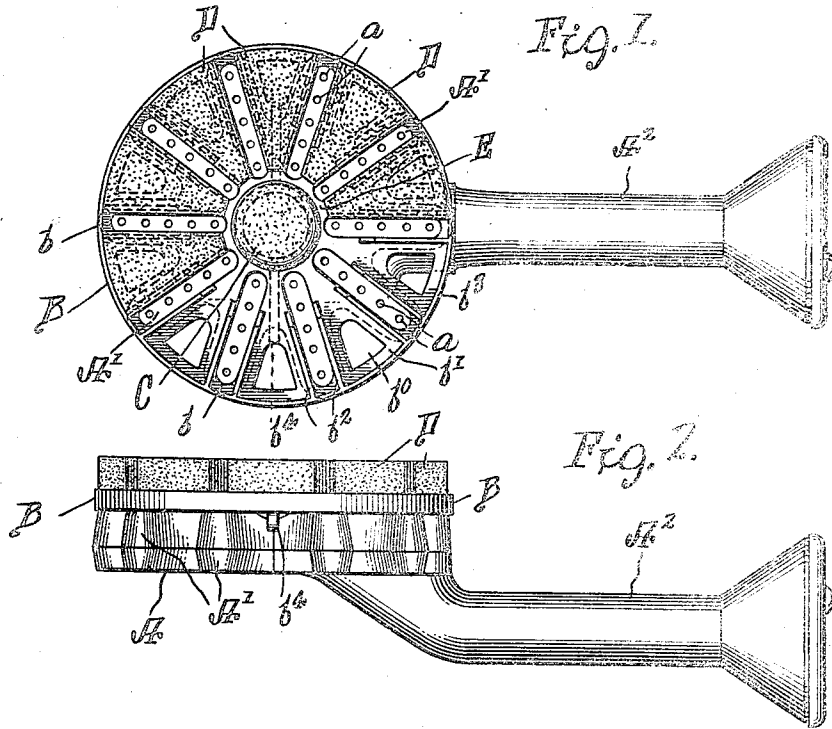


D. M. DE SILVA.
 BURNER FOR GASEOUS FUEL.
 APPLICATION FILED NOV. 24, 1920.

1,379,538.

Patented May 24, 1921.



Inventor
 D. M. De Silva
 By Wilkinson & Gustaf
 Attorneys.

UNITED STATES PATENT OFFICE.

DWIGHT MORRIS DE SILVA, OF WASHINGTON, DISTRICT OF COLUMBIA.

BURNER FOR GASEOUS FUEL.

1,379,538.

Specification of Letters Patent.

Patented May 24, 1921.

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To all whom it may concern:

Be it known that I, DWIGHT MORRIS DE SILVA, citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Burners for Gaseous Fuel; 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.

My present invention relates to improvements in burners for use with gaseous fuel, and it is intended to provide with a gas burner of the ordinary well known star type a superposed spider provided with a series of segments of porous, fire resistant material, such as pumice stone; the segments being so arranged that there will be a series of combustion chambers between the same, so that when the gases are ignited and the segments become highly heated a catalytic effect on the hydrocarbon gases is produced, causing these gases to form a new combination with the oxygen of the primary air supply, and thus forming a product which is distinguished by the color of its flame and the absence of an excess of unsatisfied carbon or lamp black.

The action of the burner differs from that of the ordinary Bunsen burner where no catalysis is present, as will be hereinafter more fully described.

My invention will be more fully understood after reference to the accompanying drawings, in which like parts indicate similar reference symbols throughout the several views, and in which:—

Figure 1 is a plan view of the complete burner, some of the segments of refractory material being removed to show more clearly the parts below.

Fig. 2 is a side elevation of the complete burner.

Fig. 3 shows an axial section through the removable spider bearing the segments of refractory material.

Fig. 4 is a plan view of the removable spider with the refractory segments detached.

Fig. 5 is a perspective view showing one of the refractory segments detached and in the inverted position; and

Fig. 6 is a detail showing the central refractory segment.

A represents a burner of the ordinary construction having the usual radial arms A', provided with a plurality of perforations, *a*, see Figs. 1 and 2. This burner is provided with a suitable supply pipe A² to which gas and air are fed in the usual way.

I can lay no claim to any special arrangement of the burner *per se*, as such burners are well known in the art, and my invention relates more especially to the detachable spider bearing the segments of porous, fire resistant material which will now be described.

B represents a metal spider provided with a series of radial slots *b* which register with the arms A' of the star burner shown in Fig. 1. Between these radial slots the spider B is provided with a series of sector-shaped arms *b'* having retaining ribs *b*² at each side; the whole spider being surrounded by a circular rib *b*³. These sector-shaped arms *b'* are preferably provided with perforations *b*⁰ so as to expose the bottom of the superposed segments, as will be herein-after described.

The spider B is also provided with one or more radial ribs *b*⁴ adapted to fit in between the adjacent arms A' of the radial burner and to hold the spider in the proper position so that the perforations *a* of the burner may register with the slots *b* of the spider.

The spider is also provided with a downwardly projecting annular flange *b*⁵, adapted to project into the hollow center of the star burner. While I have shown a star burner with ten radially perforated arms, the number of arms may be increased or decreased at will, provided, of course, a superposed spider is used having a similar number of arms symmetrically arranged to register with the burner beneath.

Mounted over the central opening *b*⁶ in the spider is the central segment C made of porous, fire resistant material, such as pumice stone, which segment has a cylindrical stem *c* projecting down into the opening *b*⁶ in the spider, and an annular periphery convex in cross section as shown at *c'* in Figs. 3 and 6.

Mounted over the arms *b'* of the spider

are the sector-shaped blocks D of porous, fire resistant material, such as pumice stone, the inner edges of these sector shaped blocks being preferably curved, as at d' , to provide a combustion space E, as shown most clearly in Fig. 3. These blocks D may be provided with channels d'' at either side of the base d^2 so that the space d^3 of said base may fit snugly between the adjacent ribs b^2 of the spider B. These blocks D may be caused to fit snugly in place, or they may be cemented, or held in place in any other convenient way.

The operation of the device is as follows:

The parts being in the assembled position shown in Figs. 1 and 2, the mixed air and gas being turned on through the base of the burner in the usual way, and being ignited at the top of the burner; the burning mixture impinges on the bottoms and sides and inner edges of the segments D, and also on the annular surface c' of the disk C. The gaseous products pass through the radial slots b of the burner, and also into the annular combustion chamber E, while ignited; the result being that the porous, fire resistant material is quickly heated to a high temperature, and catalytic action results which causes the hydrocarbon gases to form a new combination with the oxygen of the primary air supply, and complete combustion ensues.

I have found from experience that pumice stone is an especially suitable material from which to form the fire resistant segments, as this proves very durable in withstanding the sudden and great changes of temperature incident to the normal use of apparatus of the character described. Moreover it has special qualities which seem to render it highly efficient in the relation stated. It can be very readily and cheaply secured, being a volcanic product very commonly found in nature.

Due to the general arrangement hereinbefore described, an intimate mixture of the air and gas is secured, with resultant economy in operation, and the catalytic action and the complete combustion hereinbefore described is more effectually accomplished.

While I have described one embodiment of the invention, it will be obvious that various modifications might be made in the construction, combination and arrangement of parts which could be used without departing from the spirit of my invention; and I do not mean to limit the invention to such details, except as particularly pointed out in the claims.

Having thus described my invention what I claim and desire to secure by Letters Patent of the United States is:

1. Apparatus of the character described,

comprising in combination a gas burner provided with a series of radial perforated arms, and means for supplying a mixture of air and gas to said burner, and a spider mounted above said burner and provided with an annular socket in its center, and a series of radial slots registering with the perforated arms of the burner, said slots separating the said spider into a series of sector-shaped segments, with blocks of porous, heat resistant material mounted above said annular socket and above said sector-shaped segments, with air passages between said blocks, substantially as described.

2. Apparatus of the character described, comprising in combination a gas burner provided with a series of radial perforated arms, and means for supplying a mixture of air and gas to said burner, and a spider mounted above said burner and provided with an annular socket in its center, and a series of radial slots registering with the perforated arms of the burner, said slots separating the said spider into a series of sector-shaped segments, with blocks of solid pumice stone mounted above said annular socket and above said sector-shaped segments, with air passages between said blocks, substantially as described.

3. Apparatus of the character described, comprising in combination a gas burner provided with a series of radial perforated arms and means for supplying a mixture of air and gas to said burner, and a spider mounted above said burner and provided with an annular socket in its center, and a series of radial slots registering with the perforated arms of the burner, said slots separating the said spider into a series of sector-shaped segments, with blocks of porous, heat resistant material mounted above said annular socket and above said sector-shaped segments, the said blocks being spaced apart to provide air passages between them, and the bottom faces of said blocks being arched to form a substantially annular combustion chamber connecting with said air passages, substantially as described.

4. Apparatus of the character described, comprising in combination a gas burner provided with a series of radial perforated arms, and means for supplying a mixture of air and gas to said burner, and a spider mounted above said burner and provided with an annular socket in its center, and a series of radial slots registering with the perforated arms of the burner, said slots separating the said spider into a series of sector-shaped segments, with blocks of solid pumice stone mounted above said annular socket and above said sector-shaped segments, the said blocks being spaced apart to provide air passages between them, and the bottom faces of said blocks being arched to form a substantially annular combustion

chamber connecting with said air passages, substantially as described.

5. Apparatus of the character described, comprising in combination a gas burner provided with a series of radial perforated arms, and means for supplying a mixture of air and gas to said burner, and a spider mounted above said burner and provided with an annular socket in its center, and a series of radial slots registering with the perforated arms of the burner, said slots separating the said spider into a series of sector-shaped segments, with blocks of porous, heat resistant material mounted above said sector-shaped segments, said blocks being of sector-shape with radially disposed substantially parallel sides, the sides of said blocks being spaced apart to provide air passages between them, and the inner ends of said blocks being curved upward from the bottom to provide a substantially annular combustion chamber connecting with said air passages, and a central block also of material similar to that of the sector-shaped blocks made circular in cross section and mounted in said central socket, substantially as described.

6. Apparatus of the character described, comprising in combination a gas burner provided with a series of radial perforated arms, and means for supplying a mixture of air and gas to said burner, and a spider mounted above said burner and provided with an annular socket in its center, and a series of radial slots registering with the perforated arms of the burner, said slots separating the said spider into a series of sector-shaped segments, with blocks of solid pumice stone mounted above said sector-shaped segments, said blocks being of sector shape with radially disposed substantially parallel sides, the sides of said blocks being spaced apart to provide air passages between them, and the inner ends of said blocks being curved upward from the bottom to provide a substantially annular combustion chamber connecting with said air passages, and a central block also of material similar to that of the sector-shaped blocks made circular in cross section and mounted in said central socket, substantially as described.

7. Apparatus of the character described, comprising in combination a gas burner provided with a series of radial perforated arms, and means for supplying a mixture of air and gas to said burner, and a spider mounted above said burner and provided with an annular socket in its center, and a series of radial slots registering with the perforated arms of the burner, said slots separating the said spider into a series of sector-shaped segments, the said spider being provided with a downwardly projecting lug engaging between adjacent perforated arms of the burner and holding said spider on said

burner with its slots registering with the perforated arms of said burner, with blocks of porous, heat resistant material mounted above said annular socket and above said sector-shaped segments, with air passages between said blocks, substantially as described.

8. Apparatus of the character described, comprising in combination a gas burner provided with a series of radial perforated arms, and means for supplying a mixture of air and gas to said burner, and a spider mounted above said burner and provided with an annular socket in its center, and a series of radial slots registering with the perforated arms of the burner, said slots separating the said spider into a series of sector-shaped segments, the said spider being provided with a downwardly projecting lug engaging between adjacent perforated arms of the burner and holding said spider on said burner with its slots registering with the perforated arms of said burner, with blocks of solid pumice stone mounted above said annular socket and above said sector-shaped segments, with air passages between said blocks, substantially as described.

9. A spider for use with gas burners of the radial arm or so-called "star" type, comprising a perforated metal disk provided with an annular socket in its center, and a series of radial slots registering with the perforated arms of the burner, said slots separating the said disk into a series of sector-shaped segments, with blocks of porous, heat resistant material mounted above said sector-shaped segments, said blocks being of sector shape with radially disposed substantially parallel sides, the sides of said blocks being spaced apart to provide air passages between them, and the inner ends of said blocks being curved upward from the bottom to provide a substantially annular combustion chamber connecting with said air passages, and a central block also of material similar to that of the sector-shaped blocks made circular in cross section and mounted in said central socket, substantially as described.

10. A spider for use with gas burners of the radial arm or so-called "star" type, comprising a perforated metal disk provided with an annular socket in its center, and a series of radial slots registering with the perforated arms of the burner, said slots separating the said disk into a series of sector-shaped segments, with blocks of solid pumice stone mounted above said sector-shaped segments, said blocks being of sector shape with radially disposed substantially parallel sides, the sides of said blocks being spaced apart to provide air passages between them, and the inner ends of said blocks being curved upward from the bottom to provide a substantially annular combustion

chamber connecting with said air passages, and a central block also of material similar to that of the sector-shaped blocks made circular in cross section and mounted in said central socket, substantially as described.

11. A spider for use with gas burners of the radial arm or so-called "star" type, comprising a perforated metal disk provided with an annular socket in its center, and a series of radial slots registering with the perforated arms of the burner, said slots separating the said disk into a series of sector-shaped segments, with blocks of porous, heat resistant material mounted above said annular socket and above said sector-shaped segments, the said blocks being spaced apart to provide air passages between them, and the bottom faces of said blocks being arched to form a substantially annular

combustion chamber connecting with said air passages, substantially as described.

12. A spider for use with gas burners of the radial arm or so-called "star" type, comprising a perforated metal disk provided with an annular socket in its center, and a series of radial slots registering with the perforated arms of the burner, said slots separating the said disk into a series of sector-shaped segments, with blocks of solid pumice stone mounted above said annular socket and above said sector-shaped segments, the said blocks being spaced apart to provide air passages between them, and the bottom faces of said blocks being arched to form a substantially annular combustion chamber connecting with said air passages, substantially as described.

DWIGHT MORRIS DE SILVA.